GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING

(AUTONOMOUS)

MADHURAWADA , VISAKHAPATNAM-530048

AFFILIATED TO JNTU-KAKINADA

COLLEGE OF ENGINEERING
(AUTONOMOUS)

REGULATIONS OF B.TECH. PROGRAMME

(UNDER AUTONOMOUS STATUS)

FOR 2013-2014 ADMITTED BATCH

ALL BRANCHES ARE ACCREDITED BY **NBA** OF AICTE

ACCREDITED BY **NAAC** WITH **'A'** GRADE WITH A **CGPA** OF **3.47**/4.00

Vision

To evolve into and sustain as a Centre of Excellence in Technological Education and Research with a holistic approach.

Mission

To produce high quality engineering graduates with the requisite theoretical and practical knowledge and social awareness to be able to contribute effectively to the progress of the society through their chosen field of endeavour.

To undertake Research & Development, and extension activities in the fields of Science and Engineering in areas of relevance for immediate application as well as for strengthening or establishing fundamental knowledge.

FOREWORD

The successful completion of the first batch of B.Tech. programme under autonomous status gave us a lot of satisfaction and encouragement. The smooth transition into the autonomous system from JNTU-K regulations has been possible with the great support from the University authorities, ever encouraging parents and disciplined students from time to time.

In the light of changing scenario of accreditation process globally, to upkeep the quality of education further, a major revision in the curriculum has been taken up with an objective to provide outcome based education.

We execute these changes through our dedicated faculty, commendable academicians from institutions of repute, enthusiastic representatives from Industry, affiliating University JNTU-K and UGC present in the Boards of Studies, Academic Council and Governing Body.

It is hoped that the new regulations and curriculum will enhance the all-round ability of students so that they can technically compete at global level with native ethical standards.

Principal

B.TECH. ACADEMIC REGULATIONS
(Effective from academic year 2013-‘14)

R 1.0 Qualification for Admission and duration:

R1.1 The selection for category A and B seats shall be as per Govt. of Andhra Pradesh rules.

R1.2 The duration of the programme for the Degree of Bachelor of Technology will be four academic years, with two semesters in each year. However if a student cannot complete within 4 years, he can do so by taking more time but not more than 8 years.

R1.3 The duration of each semester will normally be 20 weeks with 5 days a week. A working day shall have 7 periods each of 50 minutes.

R 2.0 Structure of the Programme:

Semester	No. of Courses per semester Theory + Lab	Credits
I	5 + 4 / 5 + 3 + Professional ethics	45
II	5+3+Professional ethics / 5 + 4	
III	6 + 2	44
IV	6 + 2	
V	6 + 2 / 6 + 2 + IPR	46
VI	4 + 2* + 2 + IPR / 4 + 2* + 2	
VII	Industry oriented Mini Project $ 5 + 1* + 2	45
VIII	1 + 1*+ 1#+ Seminar +Comprehensive viva + Project	
	Total:	**180 credits**

*Core Electives, # Open Elective, $ Summer Programme to be carried out after VI semester and assessed in VII semester

i. The curriculum in the first and second semesters shall be common for all the B.Tech. programmes except for department specific courses.

ii. Each course is normally assigned a certain number of credits as follows:

· 3 credits for 4 lecture periods per week and no credits for tutorials.

· 2 credits for 3 laboratory periods per week.

· 2 credits for Industry oriented Mini Project.

· 2 credits for Seminar with 3 periods per week.

· 2 credits for comprehensive viva-voce.

· 8 credits for project work.

iii. Participation in Social Service for a minimum of 32 hours is compulsory.

Participation in extra/co-curricular activities like Sports, Cultural and Literary activities for a minimum of 32 hours is also compulsory.

The activities are monitored and grades are awarded as given below:

EXCELLENT

GOOD

SATISFACTORY

A student shall obtain a minimum of satisfactory grade in both social service and extra / co-curricular activities during the course of study to be eligible for the award of the degree.

R 3.0 Method of Evaluation:

The performance of a student in each semester shall be evaluated subject-wise with a maximum of 100 marks each for theory and practical/drawing subjects. In addition, Industry oriented mini-project, Seminar, Comprehensive viva-voce and Project work shall be evaluated for 50, 50,100 and 200 marks, respectively.

R 3.1 Theory:

For all lecture based theory courses, the assessment shall be for 30 marks through internal evaluation and 70 marks through external end-semester examination of three hours duration.

R 3.1 a. Internal evaluation:

The 30 internal marks are awarded as follows

Two tests	20 marks
Four assessments by atleast any two of the following methods	10 marks

Assignment/ Quiz/Term paper/ Tutorial /Surprise test/Open book test/ Seminar/ Case study/Lab activity/projects etc. as notified by the teacher at the beginning of the semester and distributed evenly over the entire semester.

The internal marks for tests (20 marks) shall be computed as, the weighted average of the two tests at 2:1 with the higher score carrying a weightage of 2.

The remaining 10 internal marks shall be computed as the average of marks obtained in the four assessments.

R 3.1 b. External evaluation:

The question paper shall be set externally and valued both internally and externally. A chief examiner appointed for each subject shall monitor the valuation process.

If the difference between the first and second valuations is less than or equal to 10 marks, the better of the two valuations shall be awarded.

If the difference between the first and second valuation is more than 10 marks, the chief examiner shall value the script. The marks given by the chief examiner shall be final for award.

R 3.2 Practical / Drawing:

Practical / drawing shall be evaluated for 100 marks, out of which 50 marks are for external examination and 50 marks are for internal evaluation.

The 50 internal marks are distributed as 25 marks for day-to-day work in two cycles and 25 marks for internal examination. The internal examination shall be conducted by the teacher concerned and another faculty member of the same department once for each cycle of instruction period and average of the two shall be considered for award of marks. A minimum of 50% of maximum marks shall be obtained to earn the corresponding credits.

10 out of 12 to 16 experiments/exercises recommended are to be completed in a semester.

R 3.3 Industry Oriented Mini Project:

The industry oriented mini project shall be carried out during the summer break for a minimum of 4 weeks after the VI Semester and completed before the start of the VII semester. A report has to be submitted at the beginning of the VII semester for assessment by an internal evaluation committee comprising Head of the Department and two faculty of the department including the project Supervisor for 50 marks. A minimum of 50% of maximum marks shall be obtained to earn the corresponding credits.

R 3.4 Seminar:

The seminar shall have two components, one chosen by the student from the course-work without repetition, from the topics taught / studied, and approved by the faculty advisor. The other component is suggested by the advisor and can be a reproduction of the concept in any standard research paper or an extension of concept from earlier course work. A hard copy of the information on seminar topic in the form of a report is to be submitted for evaluation along with presentation. The presentation of the seminar topics shall be made before a committee comprising the Head, seminar advisor and a senior faculty of the department. The two components of the seminar are distributed between two halves of the semester and are evaluated for 50 marks each. The average of the two components shall be taken as the final score. A minimum of 50% of maximum marks shall be obtained to earn the corresponding credits.

R.3.5 Comprehensive viva-voce:

The comprehensive viva-voce will be conducted by a committee comprising Head of the Department, Senior faculty members of the respective department. This is aimed at assessing the student's understanding of various subjects studied during the entire programme of four years. The Comprehensive viva-voce shall be evaluated for 100 marks during VIII semester. A minimum of 50% of maximum marks shall be obtained to earn the corresponding credits.

R 4.0 Project:

The project work shall be spread over the entire VIII semester and of somewhat innovative in nature, with research / industry orientation. A project batch shall comprise of not more than four students. A mid-term evaluation is conducted on the progress by Head of the Department and the supervisor for 40 marks. On completion of the project, a second evaluation is conducted before the report is submitted for another 40 marks. The final evaluation shall be based on the report submitted and a viva-voce examination for 120 marks by an external examiner.

R 5.0 Attendance Requirements:

It is desirable for a candidate to put up 100% attendance in the class in all the subjects. However, a candidate shall be permitted to appear for the end semester examination provided he records a minimum of 75% attendance for each subject in any semester. However, condonation for shortage of attendance may be given on Medical grounds, if a certificate to the extent is submitted to the HOD when the candidate first returns to the classes. Certificates submitted afterwards shall not be entertained on any count. A condonation fee as fixed by the college for those who put in attendance between 65 and 74 per cent shall be charged before the student is permitted to the end examination.

Attendance may also be condoned as per the State Government rules for those who participate in prestigious sports, co- and extra-curricular activities provided their attendance is in the minimum prescribed limits for the purpose and recommended by the concerned authority.

Attendance will be indicated in the marks memo by a letter code as follows:

Grading of Attendance:

90% and above	A	(Very Good)
75% to 89%	B	(Good)
65% to 74%	C	(Satisfactory)
Below 65%	D	(Detained)

A student who gets less than 65% (D Grade) attendance in a maximum of two credit courses in any semester shall not be permitted to take the end semester examination in which he/she falls short.

A student who gets less than 65% (D Grade) attendance in non-credit mandatory courses shall not be permitted to take the end semester examination in which he/she falls short.

His/her registration for those subjects will be treated as cancelled. The student should re-register and repeat those subjects as and when offered next.

R 5.1:

i. A student shall acquire at least C grade in attendance to be eligible to appear for the end-semester examination in the concerned subject.

ii. If a student gets D grade in more than two credit courses in any semester he/she shall be detained and has to repeat the entire semester.

R 6.0 Minimum Academic Requirements:

The following academic requirements shall be met along with the attendance requirements mentioned above to be eligible for the award of the B.Tech. degree.

i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, if he/she secures not less than 25 marks in external end examination, and a minimum of 40 marks on the aggregate of internal evaluation and external examination taken together.

ii. In case of practical / drawing / project, a student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each of them if the student secures a minimum of 50% in the end examination and not less than 50% marks on the aggregate in the internal evaluation and external end examination taken together.

iii. For the non-credit mandatory courses viz., Professional Ethics, Environmental studies and Intellectual Property Rights and Patents, a student shall satisfy minimum attendance requirements on par with the other theory courses and secure a pass in the end semester examinations for which the evaluation shall be totally internal.

iv. A student shall be promoted from IV to V semester, if he / she acquires a minimum of 62 out of 89 credits (70%) up to the end of IV Semester (from I, II, III semesters regular and supplementary examinations & IV semester regular examinations).

v. A student shall be promoted from VI to VII semester, only if he / she fulfills the academic requirements of acquiring a minimum of 94 credits out of 135 credits (70%) up to the end of VI semester (from I to V semesters regular and supplementary examinations & VI semester regular examinations).

vi. Student shall register, put up minimum attendance in all courses including non-credit mandatory courses.

vii. A student shall earn all the 180 credits and secure a pass in non-credit mandatory courses to be eligible for the award of the degree.

viii. Marks obtained only from the credit courses shall be considered for the award of Percentage / Class / Division.

ix. A student who fails to earn 180 credits or secure a pass in non-credit mandatory courses within 8 academic years from the year of his / her admission shall forfeit his / her seat and his / her admission stands cancelled.

R 7.0 Make-up program for defaulters:

A make-up programme in subsequent semesters will be offered outside the regular time table for the students who got detained due to shortage of attendance in not more than two credit courses and one non-credit mandatory course, if any. However, this facility shall not be extended to those candidates who are detained for want of attendance as per regulations R 5.1.(ii)

i. Make-up programme shall be announced at the beginning of every semester. The announcement of subjects offered for the make-up programme is at the discretion of the Principal. A student shall have to register within the time stipulated in the announcement by paying the prescribed fee.

ii. The number of total contact hours and method of evaluation for any make-up program shall be the same as those for a regular semester.

iii. It is desirable for a candidate to put up 100% attendance in all the subjects registered for the make-up programme. However, 25% concession in attendance may be permitted at the discretion of the principal based on the merits of the individual case under extraneous circumstances with proper evidence. No further condonation of attendance on par with the regular semester shall be permitted.

iv. If a candidate is failed to satisfy the attendance requirement in a course registered during make-up programme, then he has to repeat the course in the subsequent make-up programme when offered next.

v. The method of internal evaluation in the case of make-up programme is same as for the regular B.Tech. programme.

vi. For the courses registered in the make-up programme, the internal marks secured earlier are nullified and internal marks from the latest make-up programme shall be final.

vii. The credits for the courses registered during the make-up programme shall be earned from the end semester examinations following the corresponding regular semester.

viii. A pass in case of non-credit mandatory courses, for the courses registered during the make-up programme shall be secured from the end semester examinations following the corresponding regular semester.

ix. Attendance and completion of courses during the make-up programme shall be suitably reflected in the consolidated marks memo.

No student can register for more than two credit courses and one non-credit mandatory course for a make-up programme.

Withdrawal from a make-up program after registration will no entitle for any refund of fees.

R 8.0 Supplementary examinations:

Supplementary examinations for the odd semester shall be conducted with the regular examinations of even semester and vice versa, for those who appeared and failed in regular examinations.

R 9.0 Class/Division:

70% and above	:	First Class with distinction
60% and above, but less than 70%	:	First Class
50% and above, but less than 60%	:	Second Class.
40% and above, but less than 50%	:	Pass Class
Less than 40%	:	Fail

R 10.0 General:

i. Where the words ‘he’, ‘him’, ‘his’, occur, they imply ‘she’, ‘her’, ‘hers’, also.

ii. The academic regulation should be read as a whole for the purpose of any interpretation.

iii. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman, Academic Council is final.

iv. The college may change or amend the academic regulations or syllabi from time to time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the college.

REGULATIONS FOR B.TECH. (LATERAL ENTRY) STUDENTS ADMITTED INTO III SEMESTER

(UNDER AUTONOMOUS STREAM)

RL 1.0

1.1 The selection and admission process shall be as per Government of Andhra Pradesh rules through ECET.

1.2 A student admitted to B.Tech. through lateral entry scheme joins the College in the III Semester of the respective 8-Semester program. The duration of the programme is 3 years / 6 semesters. However, if a student can not complete within 3 years, he can do so by taking more time but not more than 6 years / 12 semesters.

1.3 Participation in Social Service for a minimum of 24 hours is compulsory.

Participation in extra/co-curricular activities like Sports, Cultural and Literary activities for a minimum of 24 hours is also compulsory.

The activities are monitored and grades are awarded as given below:

EXCELLENT

GOOD

SATISFACTORY

A student shall obtain a minimum of satisfactory grade in both social service and extra / co-curricular activities during the course of study to be eligible for the award of the degree.

RL 2.0 The attendance requirements shall be same as those admitted into four year regular B.Tech. programme,

RL 3.0 Minimum Academic Requirements:

i. For the non-credit mandatory courses, Environmental studies and Intellectual Property Rights and Patents, a student shall satisfy minimum attendance requirements on par with the other theory courses and secure a pass in the end semester examinations for which the evaluation shall be totally internal.

ii. A student shall be promoted from VI to VII semester, only if he / she fulfills the academic requirements of a minimum of 63 credits out of 90 credits (70%), upto the end of VI semester (from III to V semesters regular and supplementary examinations & VI semester regular examinations).

iii. To be eligible for the award of B.Tech. degree, a student shall register and satisfy the attendance requirements for all the courses including non-credit mandatory courses, and shall earn 135 credits, and secure a pass in the non-credit mandatory courses.

iv. A student who fails to earn 135 credits, and secure a pass in non-credit mandatory courses within six academic years from the year of his / her admission shall forfeit his / her seat and his / her admission stands cancelled.

RL 4.0 All other regulations are same as those applicable to the students admitted into B.Tech. I-Semester.

RL 5.0 Subjects are identified as exempted / compulsory / pre-requisites by the respective Chairman, Boards of Studies and recommended for study to make-up for any gaps in the curriculum for further study.

The student has to register for compulsory courses, attend the classes and qualify in examination.

The student has to register for the pre-requisite courses, attend the classes for which the evaluation is totally internal.

Compulsory and pre-requisite courses do not carry any credits.

RL 6.0 Marks obtained from the credit courses shall be considered for the award of class / division.

RL7.0 General:

i. Where the words ‘he’, ‘him’, ‘his’, occur, they imply ‘she’, ‘her’, ‘hers’, also.

ii. The academic regulation should be read as a whole for the purpose of any interpretation.

iii. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman, Academic Council is final.

iv. The college may change or amend the academic regulations or syllabi from time to time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the college.

TRANSITORY REGULATIONS FOR STUDENTS RE-ADMITTED INTO NEW REGULATIONS OF AUTONOMOUS STREAM FROM PREVIOUS REGULATIONS

RT 1.0. Credit equivalences shall be drawn for the students re-admitted into 2013 regulations from the earlier regulations. A Student has to register for the substitute / compulsory / pre-requisite subjects identified by the respective Boards of Studies.

The student has to register for substitute subjects, attend the classes and qualify in examination and earn the credits.

The student has to register for compulsory courses, attend the classes and qualify in examination.

The student has to register for the pre-requisite courses, attend the classes for which the evaluation is totally internal.

Compulsory and pre-requisite courses do not carry any credits.

RT 2.0 Marks obtained from the credit and substitute courses shall be considered for the award of class / division.

RT 3.0 General:

i. Where the words ‘he’, ‘him’, ‘his’, occur, they imply ‘she’, ‘her’, ‘hers’, also.

ii. The academic regulation should be read as a whole for the purpose of any interpretation.

iii. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman, Academic Council is final.

iv. The college may change or amend the academic regulations or syllabi from time to time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the college.

COURSE STRUCTURE

SEMESTER - I

Code	COURSE TITLE	L	T	P	C
13HE1101	English	4	1	0	3
13BM1101	Mathematics-I	4	1	0	3
13BC1101	Chemistry	4	0	0	3
13CH1101	Introduction to Chemical Engineering	4	0	0	3
13BC1102	Physical Chemistry	4	0	0	3
13MT1101	Engineering workshop	*0*	*0*	*3*	*2*
13HE1102	English Language Lab	*0*	*0*	*3*	*2*
13BC1103	Chemistry Lab	*0*	*0*	*3*	*2*
13NM1101	Professional Ethics	*2*	*0*	*0*	*0*
	TOTAL	**22**	**02**	**9**	**21**

SEMESTER - II

Code	COURSE TITLE	L	T	P	C
13BM1102	Mathematics-II	4	0	0	3
13BP1101	Physics	4	1	0	3
13ME1102	Engineering Mechanics	4	1	0	3
13BC1104	Organic Chemistry	4	0	0	3
13CT1102	Computer programming through-C	4	0	0	3
13ME1103	Engineering Drawing	1	0	3	3
13CT1103	Computer programming Lab	0	0	3	2
13BP1102	Physics Lab	0	0	3	2
13BC1105	Physical Chemistry Lab	0	0	3	2
	TOTAL	**21**	**02**	**12**	**24**

SEMESTER - III

Code	COURSE TITLE	L	T	P	C
13BM1105	Probability and Statistics	4	1	0	3
13CH1102	Chemical Engineering Thermodynamics I	4	1	0	3
13CH1103	Momentum Transfer	4	0	0	3
13CH1104	Chemical Process Calculations -I	4	0	0	3
13CH1105	Mechanical Unit Operations	4	0	0	3
13CH1106	Process Instrumentation	4	0	0	3
13BC1106	Organic Chemistry Lab	0	0	3	2
13CH1107	Momentum Transfer Lab	0	0	3	2
	TOTAL	**24**	**2**	**6**	**22**

SEMESTER - IV

Code	COURSE TITLE	L	T	P	C
13HM1102	Management science	4	0	0	3
13CH1108	Heat transfer	4	1	0	3
13CH1109	Chemical Process Calculations-II	4	0	0	3
13CH1110	Chemical Engineering Thermodynamics -II	4	1	0	3
13CH1111	Mass Transfer Operation-I	4	0	0	3
13CH1112	Numerical methods in Chemical Engineering	4	0	0	3
13CH1113	Heat transfer Lab	0	0	3	2
13CH1114	Mechanical Unit Operation Lab	0	0	3	2
13NM1102	Environmental Studies	2	0	0	0
	TOTAL	**26**	**02**	**6**	**22**

SEMESTER - V

Code	COURSE TITLE	L	T	P	C
13CH1115	Material Science for Chemical Engineers	4	0	0	3
13CH1116	Chemical Reaction Engineering-I	4	1	0	3
13CH1117	Mass Transfer Operation-II	4	1	0	3
13CH1118	Industrial Pollution and Control	4	0	0	3
13CH1119	Process Dynamics and Control	4	0	0	3
13CH1120	Chemical Technology	4	0	0	3
13CH1121	Mass Transfer Operations Lab	0	0	3	2
13ES11BC	Basic Computations Lab	0	0	3	2
13HE1103	Technical communication and soft skills lab	0	0	3	2
	TOTAL	**24**	**2**	**9**	**24**

SEMESTER - VI

Code	COURSE TITLE	L	T	P	C
13CH1122	Process Modeling and Simulation	4	1	0	3
13CH1123	Chemical Reaction Engineering-II	4	1	0	3
13CH1124	Chemical Process Equipment Design-I	2	0	3	3
13CH1125	Bio Chemical Engineering	4	0	0	3
	ELECTIVE-I	4	0	0	3
13CH1126	Corrosion Engineering				
13CH1127	Nanotechnology				
13CH1128	Design and Analysis of Experiments				
	ELECTIVE-II	4	0	0	3
13CH1129	Polymer Engineering				
13CH1130	Petroleum Refining and Petrochemicals				
13CH1131	Energy Engineering				
13CH1132	Process Dynamics and Control Lab	0	0	3	2
13CH1133	Chemical Reaction Engineering Lab	0	0	3	2
13NM1103	Intellectual Property rights and Patents	2	0	0	0
	TOTAL	**24**	**2**	**9**	**22**

SEMESTER - VII

Code	COURSE TITLE	L	T	P	C
13CH1134	Chemical Process Equipment Design-II	2	0	3	3
13CH1135	Transport Phenomena	4	1	0	3
13CH1136	Optimization of Chemical Processes	4	1	0	3
13CH1137	Novel Separation Processes	4	0	0	3
13CH1138	Chemical Plant Design and Economics	4	0	0	3
	ELECTIVE-III	4	0	0	3
13CH1139	Waste Water Treatment				
13CH1140	Computational Fluid Dynamics				
13CH1141	Green Chemical Engineering				
13CH1142	Computer Aided Design of Chemical Equipment-Lab	0	0	3	2
13CH1143	Control System Design, Simulation and Optimization lab	0	0	3	2
13CH11MP	Industry oriented Mini Project	0	0	0	2
	TOTAL	**22**	**2**	**9**	**24**

SEMESTER - VIII

Code	COURSE TITLE	L	T	P	C
13CH1144	Chemical Engineering Mathematics	4	0	0	3
	OPEN ELECTIVE	4	0	0	3
	E1LECTIVE-IV	4	0	0	3
13CH1145	Instrumental Methods for Chemical Analysis				
13CH1146	Down Stream Processes in Bio Processing				
13CH1147	Safety and Hazard Analysis				
13CH11SM	SEMINAR	0	0	3	2
13CH11PW	PROJECT WORK	0	0	12	8
13CH11CV	COMPREHENSIVE VIVA	0	0	0	2
	TOTAL	**12**	**0**	**15**	**21**

LIST OF OPEN ELECTIVES

CODE	COURSE TITLE	OFFERING DEPARTMENT
13CH1128	Design and Analysis of Experiments*	Chemical Engineering
13CE1155	Green Buildings and Infrastructure	Civil Engineering
13CE1156	Disaster Management	Civil Engineering
13CS1113	E-Commerce	Computer Science and Engineering
13CT1132	Software Project Management*	Computer Science and Engineering
13EC1140	Bio-Medical Instrumentation	Electronics and Communications Engineering
13EE1138	Electrical Safety Management	Electrical and Electronics Engineering
13EE1139	Reliability Evaluation of Engineering Systems	Electrical and Electronics Engineering
13EE1140	Design Concepts for Engineers	Electrical and Electronics Engineering
13EE1141	Special Electrical Machines for Industrial Applications	Electrical and Electronics Engineering
13IT1113	Neural Networks	InformationTechnology
13IT1114	Biometrics	InformationTechnology
13ME1143	Renewable Sources Of Energy*	Mechanical Engineering
13ME1153	Project Management*	Mechanical Engineering
13BP1103	Nano Technology	Physics
13HM 1104	Entrepreneurship and Small Business Management	Management Studies
13HM 1105	Financial Management	Management Studies
13HM 1106	Indian and International Business Environment	Management Studies

*These courses can be taken by the students of respective departments if they are not offered /opted earlier in the structure.

SYLLABI FOR I SEMESTER

ENGLISH

(Common to all Branches)

Course Code: 13HE1101

L	T	P	C
4	1	0	3

Course Educational Objectives:

Enabling the students to

- ✤ Understand class room lectures in different subjects
- ✤ Read technical and general materials including literary, scientific, political, economic and cultural topics of interest
- ✤. Develop effective written communication in academic, technical and professional contexts
- ✤ Develop creative and critical thinking skills necessary to become employable

Course Outcomes:

The learners will be able to show:

- ✤ Skills in reading including skimming, scanning, intensive and extensive and comprehension
- ✤ Enriched vocabulary and become better communicators
- ✤ Skills of communicating in descriptive, analytical and narrative modes with felicity
- ✤ Creative and critical thinking skills for employability

Course Work:

To achieve the above objectives, instruction will be imparted through relevant ESP materials, articles and editorials from newspapers, technical journals, magazines in classes and laboratory. Students will be given individual and integrated practice in LSRW skills.

Contents:

Reading Comprehension - Reading in various degrees of speed (slow, fast, very fast); reading different kinds of texts for different purposes (for example, for relaxation, for information, for understanding, for discussion at a later stage etc.); reading between the lines, skimming and scanning and so on.

Vocabulary –synonyms, antonyms, prefixes, suffixes, confusables, one-word substitutes, Idioms and phrases

WRITING:

- Grammar: Common errors, articles, prepositions, tenses, concord, phrasal verbs, modal verbs, conditionals, transformation of sentences, punctuation and spelling
- Selecting materials for expository, descriptive, and argumentative pieces summarizing and abstracting
- Paragraph writing with coherence, cohesiveness and clarity,
- Essay writing- variety in sentences and paragraphs, précis writing
- Business letter writing
- Reference skills; use of dictionary, library and internet sources

SYLLABUS

UNIT-I (13 Lectures)

1. Story of Insects (English Today)
2. Bringing up Boys & Girls (Academic Encounters)
3. The Lunatic, the Lover and the Poet (The Siren's Song)
4. Vocabulary Building: Prefixes, Suffixes, One-Word Substitutes etc.

UNIT-II (14 Lectures)

1. Unity of Minds by Dr. A.P.J. Kalam (English Today)
2. On His Blindness (The Siren's Song)
3. Cultural Variation & Change (Academic Encounters)
4. Grammar: Tenses & Concord

UNIT-III **(11 Lectures)**

1. Three Years She Grew in Sun and Shower (The Siren's Song)
2. Advertising in the Media (Academic Encounters)
3. Grammar: Articles & Prepositions
4. Paragraph Writing; Technical Description-Process, Object

UNIT-IV **(12 Lectures)**

1. A Special Kind of Blessing (English Today)
2. Techniques of Solving Crimes (Academic Encounters)
3. La Belle Dame Sans Merci (The Siren's Song)
4. Précis writing &Letter Writing

UNIT-V **(10 Lectures)**

1. I Have A Dream (English Today)
2. Because I Could not Stop for Death (The Siren's Song)
3. Writing: Note Taking & Note Making ,Essay writing
4. Grammar: Simple, Compound & Complex Sentences

TEXTBOOKS:

1. Kristine Brown & Susan Hood, *"Academic Encounters: Life in Society Reading, Study Skills, Writing, London"*, Cambridge University Press/ Foundation Books, 2006.
2. K Durga Bhavani, G. K. Subbarayuydu, C. Vijayasree, D. Prema Kumari & Y. L. Srinivas, *"English Today: A Course in Reading and Writing"*, Foundation Books, 2005.
3. David Murdoch, The Siren's Song, "*An Anthology of British and American Verse"*, Madras, Orient Longman, 1993.

REFERENCS:

1. Alec Fisher, *"Critical Thinking An Introduction"*, New Delhi: CUP, First South Asian Edition, 2011.
2. Bikram K. Das, Kalyani Samantray, Rath Nayak, Susmita Pani & Saveeta Mohanty, "*An Introduction to Professional English and Soft Skills"*, New Delhi, Foundation Books, 2009.

3. *"Regional Institute of English, English for Engineers"*, New Delhi, Foundation Books, 2006.

4. Sharon J.Gerson, Steven M.Gerson, *"Technical Writing"*, New Delhi, Pearson education, 2007.

SUGGESTED READING:

Stories of humour, adventure, mystery and autobiographies of eminent scientists.

MATHEMATICS-I

(Common to all Branches)

Course Code: 13BM1101

L	T	P	C
4	1	0	3

Pre requisites:

- ✤ Basic formulae of differentiation, product rule, and quotient rule.
- ✤ Basic Integration formulae, integration by parts, definite integrals and properties.
- ✤ Basic concept of partial differentiation.

Course Educational Objectives:

- ✤ The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- ✤ The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- ✤ Solve ordinary differential equations of first, second and higher order.
- ✤ Learn the technique of Laplace transform and apply it to solve differential equations.
- ✤ Understand the concept of Double and Triple integrals and their applications to calculation of areas, volumes .
- ✤. Extend the concept of integration to vector functions, understand the significance of the operators, gradient, divergence and curl.
- ✤ Find surface areas and volumes of certain solids using Green, Stokes and Gauss divergence theorems.

UNIT-I (12 Lectures)

ORDINARY DIFFERENTIAL EQUATIONS:

Linear equations of first order, Bernoulli differential equation, Linear differential equations of higher order with constant coefficients, Method of Variation of parameters, Linear differential equations with variable coefficients (Cauchy's homogeneous linear equation, Legendre's linear equation).

APPLICATIONS OF LINEAR DIFFERENTIAL EQUATIONS:

Orthogonal trajectories, Models on R-L-C circuits, Newton's law of cooling.
(11.9, 11.10, 13.1—13.7, 13.8(1), 13.9, 12.3, 12.5, 12.6)

UNIT-II (12 Lectures)

LAPLACE TRANSFORMS:

Laplace transform of elementary functions, properties, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, division by t, evolution of integrals by Laplace transforms.

INVERSE TRANSFORM:

Introduction, Finding inverse transforms by the method of partial fractions, other methods of finding Inverse Transform, Convolution theorem, Unit step function, and Unit impulse function.

APPLICATION OF LAPLACE TRANSFORMS:

Initial and Boundary Value Problems.
(21.1-21.5, 21.7-21.15, 21.17, 21.18

UNIT-III (12 Lectures)

PARTIAL DIFFERENTIATION:

Total derivative, change of variables, Jacobians, Tangent Plane and Normal to the Surface, Taylor's theorem for functions of two variables.

APPLICATIONS OF PARTIAL DIFFERENTIATION:

Maxima and Minima of functions of two variables, Lagrange method of undetermined multipliers.
(5.5 – 5.9, 5.11, 5.12)

UNIT-IV (12 Lectures)

MULTIPLE INTEGRALS:

Introduction to Non-Cartesian Coordinates, Double integrals, Change of order of integration, Double integral in polar co-ordinates, Triple integrals, Change of variables in double integrals, Change of variables in triple integrals. Simple Applications of Multiple Integrals**:** Area enclosed by plane curves, Volumes of solids.
(8.19, 8.21, 7.1, 7.7,)

UNIT-V (12 Lectures)

VECTOR DIFFERENTIATION:

Differentiation of vectors, curves in space, velocity, acceleration, Scalar and Vector point functions. Gradient of a scalar field and directional derivatives- Divergence and curl of a Vector field and it's physical interpretation.

VECTOR INTEGRATION:

Line integral, Circulation, work done, surface and volume integrals.

Vector integral theorems: Green's, Stoke's and Gauss Divergence theorems (without proofs) and related problems.
(8.1- 8.16)

TEXT BOOK:

Dr.B.S.Grewal *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. Kreyszig E, "*Advanced Engineering Mathematics*", 8th Edition, John Wiley, Singapore, 2001.
2. Greenberg M D, "*Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, "*Advanced Engineering Mathematics*", 7th Edition, Cengage Learning, 2011.

CHEMISTRY

(Common to all Branches)

Course Code: 13BC1101

L	T	P	C
4	0	0	3

Course Eductational Objectives:

The course attempts impart a sound knowledge on the principles of chemistry involving different application oriented topics to requied for all engineering branches.

Course Outcomes :

The student should able to apply

- ✤ The principles involved in corrosion and its control
- ✤ Treatment of water for industrial purpose and concepts of energy storage devices.
- ✤ Utillisation of polymer engineering materials towards different applications.

UNIT-I (10 Lectures)

ELECTROCHEMICAL CELLS:

Electrode potential, Nernst equation, EMF of electrochemical cell, Reference electrodes-Standard hydrogen electrode, calomel electrode. Electrochemical series, Concentration cell, Construction of glass electrode, determination of P^H of given solution using glass electrode

Batteries-Primary cell-Dry or Lachanche cell, alkaline battery; secondary cells (storage batteries or accumulators) – Lead-acid Accumulator, Nickel-cadmium battery, Lithium ion battery (LIB) and redox flow battery.

Fuel cells - hydrogen - oxygen fuel cell, phosphoric acid fuel cell, solid oxide fuel cells

UNIT-II (12 Lectures)

CORROSION AND ITS CONTROL:

Introduction - Direct chemical corrosion and electrochemical corrosion and its mechanisms, Types of electrochemical corrosion-Differential aeration corrosion, galvanic corrosion, concentration cell corrosion, corrosion and pitting, stress corrosion, Galvanic series, passivity, factors influencing corrosion.

Corrosion control-proper designing, cathodic protection-sacrificial anodic protection and impressed current cathodic protection, modifying the environment and use of inhibitors.

Protective coatings- Anodic and cathodic coatings, Hot dipping-Galvanizing and Tinning, Metal cladding, Electroplating, Electroless plating, cementation or diffusion coatings.

UNIT-III (10 Lectures)

POLYMER TECHNOLOGY:

Polymerization, classification, degree of polymerization, functionality and tacticity of polymer, Types of polymerization-addition and condensation polymerization, Mechanism of addition polymerization, Condensation polymerization, Preparation, properties and uses of polythene, PVC, Teflon, nylons-6,6, Polyester, Bakelite and Silicones.

Plastics- Thermo plastics and thermosetting plastics, compounding of plastic.

Elastomers-Natural and synthetic rubbers, Manufacture, properties and applications of natural rubber-vulcanization, compounding of rubber, Synthetic rubbers-Preparation, properties and applications of Buna-S and Buna-N.

UNIT-IV (12 Lectures)

WATER TECHNOLOGY:

Introduction-characteristics imparted by impurities, hardness of water – Temporary and permanent hardness- units, Determination of hardness by EDTA method, Disadvantages of hard water, Chemical aspects of scale and sludge formation in boilers, caustic embrittlement,boiler corrosion, priming and foaming, Municipal water treatment-sedimentation, coagulation,

and filtration, Desalination of brackish water, Water softening methods-lime -soda method, zeolite method and ion exchange process.

UNIT-V: **(16 Lectures)**

ENGINEERING MATERIALS:

Fuels- classification, characteristics of fuel, calorific value –determination of calorific value by bomb calorimeter and Junkers gas calorimeter, theoretical calculation of calorific value, Types and Analysis of coal - Proximate and ultimate analysis of coal, Manufacture of coke- Petroleum-classification based on sources of petroleum, Refining of petroleum, Knocking, octane value, cetane value, Cracking -thermal cracking and catalytic cracking-fixed bed & moving bed catalytic cracking, reforming.

Cement: Classification of cement, chemical composition, functions of ingredients in Portland cement, Manufacture of Portland cement- raw materials, setting and hardening of Portland cement.

Refractories- Classification and properties of refractories, Failures of refractory materials.

Lubricants-friction, lubrication, functions of lubricants, mechanism of lubrication-thick film, thin film and extreme pressure lubrication, types of lubricants- solid, semisolid and liquid lubricants and their properties .

TEXT BOOKS:

1. Jain& Jain, *"A text book of Engineering Chemistry"*, 15th Edition, Dhanapat Roy publishing company, 2010.
2. Sasichawla, *"Engineering Chemistry"*, 3rd Edition, Dhanapat Roy publishing company, 2004.

REFERENCES:

1, S.S. Dara, *"A Text book of Engineering Chemistry"*, 11th Edition, S.Chand & Co, 2006.

2. C. Parameswara Murthy, C.V. Agarwal and Andhra Naidu, *"A Text Book of Engineering Chemistry"*, 1st Edition, B.S. Publications, 2006.

INTRODUCTION TO CHEMICAL ENGINEERING
(Qualitative Treatment Only)

Course Code: 13CH1101

L	T	P	C
4	0	0	3

Course Educational objectives:

This course introduces the student the following aspects

- ✤ Unit Operations
- ✤ Materials Energy Balance
- ✤ Fluid Mechanics
- ✤ Heat Transfer
- ✤ Mass Transfer

Course outcomes:

After completion of this course the student would be able to get

- ✤ A better insight exposure to the fundamentals of various chemical engineering courses like Momentum Transfer, Heat Transfer, Mass Transfer etc.
- ✤ This will also help them to familiarize with the typical chemical engineering terminology that they will come across in their future courses.

Definition, Origin and History of Chemical Engineering, Functions of a Chemical Engineer. Professional and general aspects of chemical engineering. Difference between Chemical engineering science and technology.

Origin and development of the Chemical Process Industry. The present day chemical industry, systematic analysis of chemical processes, Representation of a chemical process in terms of flow sheet. Scale of chemical processes.

UNIT-I **(10 Lectures)**

Introduction, units and dimensions, unit processes, unit operations, Basic laws of heat, mass and momentum.

UNIT-II **(10 Lectures)**

Energy, humidity and saturation. Material balance, Energy balance.

UNIT-III **(12 Lectures)**

FLOW OF FLUIDS: Introduction, nature of fluid, viscosity, velocity profile, flow field, types of fluid motion, laminar and turbulent flow, flow of a fluid past a solid surface.

Reciprocating, rotary, and centrifugal pumps.

UNIT-IV **(14 Lectures)**

HEAT TRANSFER: Conduction, convection (omit correlations for calculation of heat transfer coefficients, heat transfer with change in phase) and radiation. Flow arrangement in heat exchangers, variation of fluid temperatures in heat exchangers.

Heat transfer equipment (double pipe & Shell and tube heat exchanger), evaporation, long tube vertical type and forced circulation type evaporators, multiple effect evaporation, methods of feeding.

UNIT-V **(14 Lectures)**

MASS TRANSFER: Diffusion, mass transfer operation, absorption, Vapour-Liquid Equilibrium, Relative Volatility, Distillation with Reflux, Liquid-Liquid Extraction, Distribution Coefficient, Triangular graphs, Selection of Solvent.

Equipment of gas-Liquid Operations, Selection of Equipment for gas-liquid operations.

TEXT BOOK:

Ghosal S. K., Sanyal. S. K. and Dutta. S, "*Introduction to Chemical Engineering*", Tata-McGraw Hill Publications, New Delhi, 1993.

REFERENCE:

McCabe W.L., Smith J.C. and Harriott P., "*Unit Operations in Chemical Engineering*", 7th Edition, McGraw Hill, New York, 2005.

PHYSICAL CHEMISTRY

Course Code: 13BC1102

L	T	P	C
4	0	0	3

Course Educational Objectives:

The course attempts to provide the principles and applications of physical chemistry which are essential for a chemical engineering student.

Course Outcomes:

The student can be able to apply

- ✤ The laws and principles of distribution and thermodynamics
- ✤ The rates and mechanism of a catalytic reactions
- ✤ The principles of phase rule to a heterogeneous system whereever necessary

UNIT-I (8 Lectures)

DISTRIBUTION LAW:

Statement-Nernst Distribution law, Explanation and limitations of law, Modification of Distribution law when association or dissociation of the solute occurs, Determination of Equilibrium constant from Distribution coefficient, Extraction of a solute from solution with an immiscible solvent, Applications of Distribution law, partition chromatography .

UNIT-II (12 Lectures)

CHEMICAL KINETICS:

Basic Terms, Methods of determining order of reaction, Theories of reaction rates- Arrhenius, Collision and Absolute reaction rate theories, Influence of ionic strength on the rates of reaction, Simultaneous reactions-Consecutive reactions, Parallel reactions, Reversible or opposing reactions, Chain reactions- Hydrogen and chlorine & Hydrogen and bromine, Fast reactions-stopped flow and relaxation techniques.

UNIT-III (10 Lectures)

CATALYSIS:

Definition - Types- Homogeneous and heterogeneous catalysis, Characteristics of catalytic reactions, Promoters, Catalytic poisoning, Retardation, Autocatalysis, Activation energy and catalysis, Mechanism of Catalysis , Acid-base catalysis- Protolytic and Prototropic mechanism, Enzyme catalysis-Mechanism of enzyme catalysis-Characteristics of enzyme catalysis.

UNIT-IV (15 Lectures)

THERMODYNAMICS :

Thermodynamic terms and Basic concepts, Thermodynamic processes-Reversible and irreversible process, pressure-volume work, Internal energy, First Law of thermodynamics ,Enthalpy, Molar Heat Capacities, Isothermal and Adiabatic expansion of an ideal gas .

Spontaneous process- Entropy- Second Law of thermodynamics, Carnot Cycle- Derivation of entropy from Carnot cycle – Physical significance of entropy, Free energy, Gibbs Helmholtz Equation,Clausius-Clapeyron Equation, Van't hoffs isotherm and isochore,Third law of thermodynamics.

UNIT-V (15 Lectures)

PHASE RULE AND COLLOIDS:

PHASE RULE

Definition and explanation of terms, Thermodynamic derivation of Phase rule, One component system- Water system and Sulphur system, Two component systems –Eutectic point-Lead-silver system-Applications of phase rule

COLLOIDS:

Definition of colloids, Classification of colloids, Solids in liquids (Sols)-Kinetic, optical and electrical properties, Stability of colloids, Protective action, Hardy-Schultz Law, Gold Number, Liquids in liquids (emulsions)-Types of emulsions, Preparation, Emulsifier, Liquid in Solids (gel), Classification, Preparation and properties- General applications of colloids

TEXT BOOKS:

1. Puri, Sharma and Pathania , *"Physical Chemistry"*, 42nd Edition (2008) Vishal publishing company.
2. Arun Bahl, BS Bahl & Tuli , *"Essentials of Physical Chemistry"*, 16th Edition,S.Chand publications.

REFERENCES:

1. Glasston & Lewis, *"Physical Chemistry"*, 2nd Edition, McMillan publishers, 1973.
2. Guru deep Raj, *"Advanced Physical Chemistry"*, 33rd Edition, Goel Publishing House, 2007.
3. Atkins, *"Physical Chemistry"*, 9th Edition W. H. Freeman Publishers, 2010.

ENGINEERING WORKSHOP

(Common to all Branches)

Course Code :13MT1101	L	T	P	C
	0	0	3	2

Course Educational Objectives:

To provide hands on experience on basic Engineering and IT related skills.

- To train the student in the basics of computer components, maintenance software(s) installation
- To train the students in office tools.
- To give the student exposure to DOS commands and LINUX commands.
- To demonstrate and train the students in basic professional trades.
- To train the students to know about different system tools in personal computer.

Course Outcomes:

At the end of the course the student will be able to

- Identify the peripherals of a computer, components in a CPU and its function
- Work with MS-OFFICE
- Work with DOS commands
- Work with LINUX commands
- Understands different system tools in personal computer.

COMPULSORY EXERCISES:

1. Identification of the peripherals of a computer, components in a CPU and its function – Block diagram of the CPU along with the configuration of each peripheral. Disassembly and assembly of a personal computer.

2. Installation of MS windows on the personal computer.
3. One lamp controlled by a one-way switch and (b) Two-way switching for stair-case lamp.

ANY NINE EXPERIMENTS FROM THE FOLLOWING:

Carpentry: Making a Cross-half lap joint using wooden pieces.

Carpentry: Making a Mortise and Tenon joint using wooden pieces.

Fitting: Preparation of a V-fit between mild steel flat pieces.

Fitting: Preparation of a Square-fit between mild steel flat pieces.

Foundry: Preparation of a sand mould using a single piece pattern

Foundry: Preparation of a sand mould using a split piece pattern.

Tin-Smithy: Preparation of a sheet metal pipe-joint using tin-smithy tools.

Tin-Smithy: Preparation of a sheet metal funnel using tin-smithy tools.

Welding: Making a Lap joint through arc welding.

Lathe Machine: Demonstration of turning related activities on Lathe machine.

Black smithy: Demonstration of Plumbing trade.

Plumbing: Demonstration of plumbing trade

Operating System: Changing Boot Device Priority, Installation of Linux, putting passwords, Enabling and disabling external devices, Connectivity Boot Camp.

Hands on Exposure on Linux shell commands: Using man, info commands for finding information about commands. Using file processing commands (ls, cp, mv, ln, mkdir, rmdir, chmod etc..), Using text processing commands (grep, egrep, sed etc…), Using disk utility commands, mount commands (du, df, mount etc..), Vi-Editor.

MS-Word: Using Ms-Word, creating project abstract, creating newsletter, creating feedback form

MS- Excel: Excel orientation, creating scheduler, calculating CGPA, Performance Analysis

MS-PowerPoint: PPT Orientation, Slide Layouts, Custom Animation, Hyperlinks, inserting Images, Clip Art, Audio, Video, Objects, Tables, Charts.

System tools, Hardware Troubleshooting, Software Troubleshooting and Installations of Anti Virus.

Multimedia Flash (Adobe)

a. Introduction to Flash interface

b. Introducing the tools

c. Putting text into Flash

d. Smoothen/straighten drawings

e. Animation Part 1: Using layers, key frames and motion tweening

f. Animation Part 2: Shape tweening, motion guide and frame by frame animation

ENGLISH LANGUAGE LAB
(Common to all Branches)

Course Code : 13HE1102

L	T	P	C
0	0	3	2

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

Course Educational Objectives:

- ✤ To make students recognise the sounds of English and Phonemic transcription through Audio-Visual aids and Computer Software.
- ✤ To help them overcome their inhibitions and self- consciousness while communicating in English and to build their confidence.
- ✤ To enable them to speak English intelligibly with focus on Stress and Intonation.

Course Outcomes :

- ✤ Students will be able to recognise the sounds of English and Phonemic transcription, practice Stress & Intonation in speech.
- ✤ They will learn to communicate in Oral and Written English forms confidently.
- ✤ They will also be able to demonstrate skills like Publik Speaking & Oral Presentations. Students will also exhibit debating and discussion skills.

SYLLABUS:

The following course content is prescribed for the English Language Laboratory sessions:

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Listening for Comprehension

4. Situational Dialogues.
5. Oral Presentations- Prepared & Extempore
6. 'Just A Minute' Sessions (JAM)
7. Telephonic communication
8. Group Discussions
9. Debate
10. Team Presentations (PPTs).
11. Reference Skills

REFERENCES:

1. E. Suresh Kumar , P. Sreehari, *"A Handbook for English Language Laboratories"*, Foundation Books, Revised Edition 2009.
2. Simon Sweeny, *"English for Business Communication"*, CUP, First South Asian Edition, 2010.
3. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
4. Daniel Jones, English Pronouncing Dictionary with CD.
5. T. Balasubramanian, *"A Text book of English Phonetics for Indian Students"*, Macmillan, 1981.
6. Jeremy Comfort, Pamela Rogerson, Trish Stott & Derek Utley, *"Speaking Effectively : Developing Speaking Skills for Business English"*, Cambridge University Press, First South Asian Edition,2002.Reprint 2011.
7. T Samson, *"Innovate With English"*, New Delhi: Foundation Books, 2010.
8. Meenakshi Raman & Sangeeta Sharma, *"Technical Communication Principles & Practice"*, New Delhi: OUP, 2010.

CHEMISTRY LAB

(Common to all Branches)

Course Code: 13BC1103

L	T	P	C
0	0	3	2

Course Educational Objectives:

The course is to develop the basic experimental skills and analytical thinking.

The course attempt to provide information regarding various chemical techniques used in quantitative chemical analysis.

Course Outcomes:

The student will be able to determine the substance quantitatively and analyse the data obtained to resolve the prolem in their respective areas.

LIST OF EXPERIMENTS :

1. Determination of ferrous iron.
2. Determination of ferric iron.
3. Determination of total hardness of water.
4. Determination of carbonate and bicarbonate of water.
5. Determination of dissolved oxygen.
6. Determination of available chlorine in bleaching powder.
7. Determination of zinc by potassium ferrocyanide.
8. Determination of copper by EDTA method
9. Determination of calcium by permanganate.
10. Determination of iron-II by potentiometric method.
11. Determination of viscosity of lubricant by viscometer.
12. Determination of flash and fire points of lubricant.
13. Determination of percentage residue of carbon in oils.

14. Determination of calorific value of solid fuels.
15. Determination of fluoride by spectrophotometric method.
16. Determination of iron in cement by spectrophotometric method.

REFERENCE:

A.I.Vogel, *"A Text book of quantitive chemical analysis"*, 6th Edition, Pearson Education, Pvt. Ltd., 2002.

PROFESSIONAL ETHICS

(Common to all Branches)

Course Code: 13NM1101	L	T	P	C
	2	0	0	0

Course Educational Objectives:

- To educate and make the young generation students aware of their Social responsibilities make an Endeavour to tell them first we are humans and then we are scientists, engineers, technocrats and professionals.
- To make students accountable to whatever job they do whether it is less paid or heavily paid.
- To inculcate a spirit of togetherness, unity and team work in an organization.
- To make him reasonably a 'good' professional conscious of his duties to the society that graced this wonderful life.
- To induce the spiritual aspect of life in one's own practical and real life.
- To give an overview of a decent, dignified, humane, dedicated professional with a sense of social responsibility and security.

Course Outcomes:

By the end of this course, it is expected that the student will be able to

- Deal with complex situations while dealing with the people in the society (parents, friends, and co-professionals) in making the work environment congenial, encouraging and loving.
- Discriminate when he is forced through certain undesirable and ambiguous situations either in his day today life as a student and as a professional in his career further.
- Understand the basics regarding the leadership and to become a conscious professional.

- Be aware of codes of professional bodies.
- Implement these concepts in one's career for achieving excellent job satisfaction.

UNIT-I (6 Lectures)

BASIC HUMAN VALUES:

'Be a Human First and then one can become a good Professional'; so the basic Human Values-Truth, Right Conduct (Righteousness), Love, Non-violence and Peace, Humility and character. What is ethics? Core areas of ethics: Social ethics, personal ethics Integrity and Trustworthiness, Honesty, Loyalty, Courage, Prudence, Confidence, Confidentiality.

Character: definition, 'A bundle of Virtues and weaknesses of Head and Heart- the resulting individuality of a person from the balance sheet of 'good' and 'bad qualities' is his/her character.

TRAITS OF GOOD CHARACTER:

Honesty and integrity, sense of duties and obligations to one's own profession, Adherence to truth and principles, excellent team work with a good rapport with the subordinates and colleagues, self-discipline, Responsibilities and accountability, self-lessness. Unity in thought, word and deed (Case studies relating to these aspects can be drawn from history & epics or from one's own experience)

Human values as practiced in the Indian societal context-past and present. (Examples drawn from any standard scriptures and many other sources available may be illustrated, debated and discussed).

Spirit of Nationalism and Patriotism with examples from 'struggle for Freedom' (Case studies in the lives of Mahatma Gandhi & His team who strived for Freedom from the British, Scientists and Engineers like Bhaha, Sarabhai, Dhavan, Abdul J Kalam, and Benjamin Franklin, Martin Luther King, or any renowned personalities)

UNIT-II (6 Lectures)

What is a profession? Who is a Professional? Special criteria to meet the definition of professional, criteria to be a 'professional engineer (Pages 24-36) of Mike W Martin and Roland Schinzinger)

The 5 Ds (Discipline, Devotion, Dedication, Discrimination and Determination) against 3 Ps (Pay-Prospects and Promotion)

Personal ethics-Social ethics and professional ethics – are they different- How would you distinguish? –A debate

General and Applied ethics, Relationship between these two in day-to-day functioning of an Engineering Professional- (Pages 10-12 of Mike W Martin and Roland Schinzinger)

PROFESSIONAL AND ENGINEERING ETHICS:

Why Engineering ethics? Moral issues encountered by professional engineers during their day-to-day operations both at home and office/workplace- Moral problems that frequently arise in ones Profession, (case studies from Chapter 1 pages 2-9, analysis of the case studies on pages 13 &14)

MORAL AUTONOMY:

Moral integrity and social and professional behavior. Different theories proposed under moral autonomy-Kohlberg's and Gilligan's Theory. Heinz's Dilemma- Motive behind aggression (16-23 Pages)

LEADERSHIP IN PROFESSIONALISM:

Characteristics of a Leader? Case studies and examples (Leadership by Dr M L Chibber)

UNIT-III (6 Lectures)

Religion and Ethics and Morals-Debate and discussion- Spirituality, social consciousness and ethics

THEORY ABOUT MORALITY:

Virtue ethics, Utilitarianism, Duty ethics, Right ethics based on the concepts of Virtues and vices, most good for most people, Duties to respect for persons, Human rights respectively (pages 53-61, Study Questions for analysis and discussion on pages 60 &61)

Engineering Profession as a social responsibility, His responsibility and accountability while dealing with public issues such as safety, risk, hazards, Risk Analysis and assessment-a brief discussion (risk assessment problem on Page (Chapter 4, specified topics and Case studies)

(Present the case studies on Challenger space shuttle(97), Chernobyl (173), Bhopal tragedy (299), Titanic disaster (p 83), SLV-3, the Indian Space Shuttle (Wings of Fire) recent nuclear holocaust in Japan recent floods and other man-made and natural calamities or accidents we come across frequently in our society)

Environmental ethics (304-308) & Computer ethics 319-323328-330) (All Pages from Mike W Martin and Roland Schinzinger)

UNIT-IV (6 Lectures)

RESPONSIBILITIES AND RIGHTS OF ENGINEERS:

Collegiality (Ones attitude) towards other engineers working in the same Organization or outside) and Loyalty (to the Employer), obligation of Loyalty and misguided loyalty, Respect for authority and its limitations, Bootlegging, Collective bargaining, Commitments and Convictions (APJ Abdul Kalam's "Wings of Fire") Confidentiality while changing jobs, Conflicts of interests, Gifts, bribes, kickbacks -case studies related, Occupational Crime and industrial espionage

Whistle blowing and moral guide line (case studies), Discrimination, preferential treatment and harassment Rights of Engineers (page 284-286)

Selected topics from Ch 5 and 6 and case studies on pages 200-201,

UNIT-V (6 Lectures)

Engineers as Managers and leaders promoting ethical climate (350-358)

–Ethics in Engineering by Mike W Martin and Roland Schinzinger)

Why a code of Ethics for professional Engineers? ('A code of ethics is not something you post on the Bulletin board; it is something you live every day in your life and career)

Code of ethics for Engineers, Organizational Culture, and Guidelines for use with the Fundamental canons of ethics; (pages 142-162 Indian Culture and Professional Ethics by P S R Murty and 399-414 0f Mike W Martin and Roland Schinzinger)

PROFESSIONAL BODIES:

IEEE, IETE, IE, ASME, ASCE, ABET, NSPE, ISTE Etc…

{** Any topic can be discussed and debated with known live examples and illustrations we find in our day-to-day -living circumstances.}

TEXT BOOKS :

1. Mike W Martin and Ronald Schinzinger : *"Ethics Engineering"*, 3rd Edition, Tata McGraw Hill Education Pvt. Ltd., 2003.

2. P S R Murthy : *"Indian Culture Values and Professional Ethics"*, 2nd Edition, B S Publications, Hyderabad. 2013.

REFERENCES:

1. M. Govindarajan, S Natarajan and V.S. Senthil Kumar : *"Engineering Ethics and Human Values"*, 1st Edition, PHI Publications , 2013.

2. A. Alavudden, R. Kalil Rahaman & M . Jayakumaran : *"Professional Ethics & Human Values"*, 1st Edition, University Science Press (An Imprint of Laxmi Publications Pvt Ltd., Chennai, Bangalore. 2008.

3. Lieunt Gen Dr. M. L. Chibber : *"Leadership-Education in Human Values"*, Sri Sathya Sai Books and Publications Trust, Prasantinilayam, 1st Edition, 2009.

4. Kalam A P J : *"Wings of Fire"*, Universities Press Publications, 2013.

5. Charles B. Fleddermann : *"Engineering Ethics"*, 4th Edition, PHI, 2012.

NOTES

SYLLABI FOR II SEMESTER

MATHEMATICS-II

(Common to all Branches)

Course Code:13BM1102

L	T	P	C
4	0	0	3

Pre requisites:

- ✤ Basic formulae of differentiation and integrations.
- ✤ Basic terminology and elementary operations on Matrices.
- ✤ Basic concept of partial differentiation.

Course Educational Objectives:

- ✤ The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- ✤ The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.
- ✤ Understand the most basic numerical methods to solve simultaneous linear equations.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- ✤ Solve simultaneous linear equations using matrix methods.
- ✤ Calculate eigenvalues and eigen vectors of matrices that are essential for vibration/design analysis.
- ✤ Understand Fourier series, integral ,transforms and they are provided with practice in their application and interpretation in a range of situations.
- ✤ Identify/classify and solve the different types of partial differential equations.

UNIT-I (12 Lectures)

MATRICES:

Rank, Normal form, Echelon form, Consistency and Solution of system of simultaneous linear homogeneous and non-homogeneous equations. Finding eigenvalues and eigen vectors, properties, Cayley-Hamilton theorem, computing inverse and powers of a matrix by applying Cayley-Hamilton theorem, Diagonalisation of matrix.
(2.7, 2.10, 2.13 -2.16)

UNIT-II (12 Lectures)

NUMERICAL METHODS IN LINEAR ALGEBRA:

Solution of linear simultaneous equations: LU decomposition, Jacobi iteration and Gauss-Seidel methods. Determination of eigenvalues and eigen vectors by iteration (Rayleigh's Power Method) .

(28.5, 28.6(3), 28.7(1)(2), 28.9)

UNIT-III (12 Lectures)

DIFFERENCE EQUATIONS AND APPLICATIONS:

Difference operators (forward, backward and shift operators), Introduction to difference equation, formation of difference equation, Linear difference equations and it's complete solution. Rules for finding the complementary function and complete integral, Deflection of a loaded string.
(29.1, 29.4, 31.1 - 31.6, 31.8)

UNIT-IV (12 Lectures)

FOURIER SERIES:

Euler's formulae, Dirichlet's Conditions for a Fourier expansion, functions having points of discontinuities, Change of interval, even and odd functions, half range series, wave forms.

FOURIER TRANSFORMS :

Fourier integral theorem, Fourier transform and inverse Fourier transform, Fourier sine and cosine integrals. – Fourier sine and cosine transforms – properties of Fourier Transforms – Finite Fourier transforms.
(10.1 – 10.9, 22.1 – 22.5)

UNIT-V (12 Lectures)

PARTIAL DIFFERENTIAL EQUATIONS:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – solutions of first order linear (Lagrange) equation and nonlinear first order (standard type) equations.

APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS:

Method of separation of variables, Classification of second order linear Partial Differential Equations. Solutions of one dimensional heat equation, wave equation and two-dimensional Laplace's equation under initial and boundary conditions. (17.1 – 17.3, 17.5, 17.6, 18.1-18.7)

TEXT BOOK:

Dr.B.S.Grewal *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. Kreyszig E, "*Advanced Engineering Mathematics*", 8th Edition, John Wiley, Singapore, 2001.
2. Greenberg M D, "*Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, "*Advanced Engineering Mathematics*", 7th Edition, Cengage Learning, 2011.

PHYSICS

(Common to all Branches)

Course Code: 13BP1101

L	T	P	C
4	1	0	3

Course Educational Objectives:

The aim and objective of the course curriculum is to impart learners the basic knowledge that enables effective understanding of various core subjects of engineering branches through principles of physics such as architectural acoustics, wave mechanics, dielectrics, fiber optics, Electromagnetism and so on.

Course Outcomes:

- Students will acquire knowledge of basic physical principles and they can correlate the same to natural environment and social concern.
- Students will be able to apply the knowledge in the selection of materials for various engineering applications.
- Enables students to learn the characteristics and applications of laser devices and enhances information levels on fiber optic communications.
- Enables the students gain a research orientation and innovative spirit.

UNIT-I (10 Lectures)

ELASTIC PROPERTIES OF MATERIALS & ARCHITECTURAL ACOUSTICS:

Introduction – classification of stress, strain and Hooke's law – Elastic behavior of materials – Poisson's ratio and relationship between modulus of elasticity – Twisting couple on a solid shaft – bending of beams – bending moment - Y by cantilever – Uniform bending - Reverberation and reverberation time – absorption coefficient – Sabine's law (quantitative treatment) – Factors affecting the acoustics of buildings and their remedies – Acoustical design of a hall.

UNIT-II (15 Lectures)

ELECTROSTATICS AND DIELECTRICS:

Vectors - unit vectors - Gradient of a scalar field – divergence & curl of a vector field – Coulombs law - Electric flux - Gauss law in electrostatics – differential form of Gauss law – derivation of Coulombs law from Gauss Law – Applications of Gauss Law (Electric Field due to a solid charged sphere and thin sheet of charge) - Gauss law in dielectric medium - Dipole - Electric displacement vector - Dielectric permittivity and susceptibility- Dielectric constant and dielectric polarization in materials - Types of polarizabilities - Electronic polarizability derivation - Internal fields in solids and Claussius - Mosotti equation - frequency dependence of dielectric constant - Dielectric loss - Dielectric Strength and dielectric breakdown - important dielectric materials in electrical engineering.

UNIT-III (10 Lectures)

ELECTROMAGNETICS:

Biot-Savart Law - Magnetic flux – Magnetic scalar potential - Magnetic Vector Potential - Ampere's law – Force and torque on a magnetic dipole due to external magnetic field, Magnetization - Bound volume and surface current densities - auxiliary field H (Ampere's law in magnetized materials) - Magnetic susceptibility and permeability - Force on charged particle under electric and magnetic fields - Faraday's law of electromagnetic induction - Self and mutual Inductances - Displacement current density - Maxwell's equations – Physical Significance of Maxwell's equations.

UNIT-IV (10 Lectures)

WAVE MECHANICS & BAND THEORY OF SOLIDS:

Introduction to wave mechanics – wave particle duality – de-Broglie matter waves – Wave function characteristics and significance – Schrodinger's time independent wave equation – particle in one dimensional rigid box - Fermi-Dirac distribution function – Fermi level - Effect of temperature on Fermi function - Bloch theorem (Qualitative), Kronig - Penny model (Qualitative treatment) – Concept of effective mass, Origin of energy band formation in solids – Classification of materials in to conductors, semi-conductors and insulators based on number of effective electrons.

UNIT-V (15 Lectures)

OPTICS & LASERS

Introduction to optics – Interference phenomenon - interference through thin films in reflected light – Newton's rings – determination of wave length of a source – Diffraction due to single slit – intensity pattern discussion – Diffraction grating – Resolving Power of grating (qualitative) - Polarization – Law of Malus - Brewster's law – double refraction – Nicol prism - Basic principle of a LASER – Induced absorption, spontaneous and stimulated emissions – Einstein's coefficients – Population inversion – Ruby laser, CO_2 laser and Semiconductor laser – Laser Applications – Introduction to optical fibers – Classification of fibers on the basis of refractive index profile – Acceptance angle and numerical aperture definitions and expression for Numerical aperture – Applications relating to communication and sensors (force and temperature).

TEXT BOOKS:

1. D.J. Griffiths, *"Introduction to Electrodynamics"*, 3rd Edition, PHI (EEE series), 2009.
2. M.N. Avadhanulu, P.G. Kshirasagar, *"A Text book of Engineering Physics"*, 10th Edition, S. Chand & Company Limited, 2013.
3. V. Rajendran, *"Engineering Physics"*. 2011 Edition, TMH Publishing Company, 2011.

REFERENCES:

1. A.J. Dekker, *"Electrical Engineering Materials"*, 1st Edition, Macmillan Publishers, 2007.
2. C. Kittel, *"Introduction to Solid State Physics"*, John Wiley Publishers, 2007.
3. M.N.Sadiku, *"Elements of Electromagnetics"*, 4th Edition, Oxford University Press, 2007.
4. V. Raghavan, *"Materials Science"*, 5th Edition, PHI Publishers, 2007.
5. R.K. Gaur, S.L. Gupta, *"Engineering Physics"*, 8th Edition, Dhanapat Rai Publishers, 2003.

6. P.K. Palanisamy, *"Applied Physics"*, 2nd Edition, Scitech Publishers, 2010.

7. M. R. Srinivasan, *"Engineering Physics"*, New Age Publishers, 2012.

ENGINEERING MECHANICS

(Common to all Branches)

Course Code: 13ME1102

L	T	P	C
4	1	0	3

Course Educational Objectives:

To develop

- The skill of converting a physical problem into a suitable mathematical model
- Analytical skills of solving the mathematical model
- The skill of interpreting the results in terms of the given physical situation
- The skills of optimization

Course Outcomes:

The student will be able to

- Identify and list , for a given physical problem, all known's, intermediate unknowns, and final results
- Formulate suitable mathematical equations and the constraints.
- Resolve a given force into rectangular components, find the moment of a force about a given point and find the resultant of a set of forces
- Solve problems involving static and dynamic friction
- Locate the centroid and calculate the moments of inertia of a given plane area
- Find the resulting acceleration of a body subjected to a set of forces and moments
- Calculate the work done, energy, power and efficiency

UNIT-I (13 Lectures)

RESULTANTS OF FORCE SYSTEM:

Parallelogram law, forces and components, resultant of coplanar concurrent forces, components of forces in space, moment of force, principle of moments, coplanar applications, couples, resultant of any force system (coplanar concurrent cases only).

Equilibrium of force systems: Free body diagram, equations of equilibrium, equilibrium of planar systems, further discussion of planar equilibrium.

UNIT-II (09 Lectures)

FRICTION:

Theory of friction, angle of friction, laws of friction, static friction, kinetic friction, friction in bodies moving up or down on an inclined plane, wedge friction, screw friction and screw jack.

UNIT-III (14 Lectures)

CENTROIDS AND CENTERS OF GRAVITY:

Center of gravity of flat plate, centroids of areas and lines, importance of centroids of areas and lines, importance of centroids and moments of area, centroids determined by integration, centroids of composite figures, theorem of Pappus, center of gravity of bodies.

MOMENT OF INERTIA:

Definition of moment of inertia, polar moment of inertia, radius of gyration, parallel axis theorem, moments of inertia by integration, moments of inertia for composite areas.

UNIT-IV (12 Lectures)

MASS MOMENT OF INERTIA:

Introduction, radius of gyration, parallel axis theorem, mass moments of inertia by integration, moments of inertia of composite bodies.

KINEMATICS AND KINETICS OF A PARTICLE:

Motion of a particle, rectilinear motion, rectangular components of curvilinear motion, normal and tangential components of acceleration, radial and transverse components, cylindrical coordinates translation-analysis as a particle, further discussion of particle kinematics.

UNIT-V (10 Lectures)

KINEMATICS AND KINETICS OF A BODY UNDERGOING FIXED AXIS ROTATION:

Types of rigid-body motion, angular motion-fixed axis rotation, application of kinematic equations, kinetics of fixed axis rotation.

WORK-ENERGY METHOD:

Work-energy equation for translation, interpretation and computation of work, work-energy applied to particle motion, power, efficiency, applied to fixed-axis rotation, work-energy applied to connected systems, work-energy method.

TEXT BOOK:

Vijaya Kumar Reddy K and Suresh Kumar J(Adapters), "*Singer`s Engineering Mechanics : Statics and Dynamics*", Third edition (SI Units), BS Publications, Hyderabad, 2011.

REFERENCES :

1. Timoshenko sp and Young DH, Rao and Pytel, "*Engineering Mechanics*", fourth edition, McGraw Hill international editions, 2013.
2. Hibbeler RC, " *Engineering Mechanics : Statics* ", low price edition, Pearson Education,2000.
3. Hibbeler RC, " *Engineering Mechanics : Dynamics* ", low price edition, Pearson Education,2000.
4. Tayal AK "*Engineering Mechanics: Statics and Dynamics*", Thirteenth edition, Umesh Publications, Delhi, 2005.

ORGANIC CHEMISTRY

Course Code: 13BC1104

L	T	P	C
4	0	0	3

Course Educational Objectives:

Course is intended to understand a basic principles relating to the nature reactivity properties, mechanisims, structures and chemical transformations of organic molecules.

The course covers to the importance of synthetics reagents and their applications and also provide the information on theraputac activity on heterocyclic compounds which are used in drugs.

Course Outcomes:

The student shall be able to apply the knowledge of

- ✤ Basic principles of the Organic Chemistry
- ✤ Mechanisims of the Organic Reactions
- ✤ Synthetic Preparation of various commercially useful compounds.
- ✤ Therapeutic activity of heterocyclic compounds used in drugs.
- ✤ Synthetic Preparation of differents dies.
- ✤ Basic concepts of stereo chemistry usefull in the synthesis of biological active compounds.

UNIT-1 (8 Lectures)

ELECTRON DISPLACEMENT EFFECTS:

Inductive effect-applications

Inductomeric effect

Mesomeric (or) Resonance effect-applications

Electrometric effect

Hyper conjugation-applications

UNIT-II (14 Lectures)

Mechanism and applications of the following named reactions

i) Fridel-Crafts reaction

ii) Rimer-Tiemann reaction

iii) Aldol condensation,

iv) Benzoin condensation

v) Perkins's reaction,

vi) Cannizaro's reaction,

vii) Pinacol-Pinacalone rearrangement

viii) Beckmann rearrangement

UNIT-III (14 Lectures)

ACTIVE METHYLENE COMPOUNDS:

Preparation of Malonic ester, isomerism- Acid hydrolysis of malonic ester. Synthetic uses of malonic ester with reference to synthesis of mono carboxylic acids(n-butyric acid isobutyric acid, and isovaleric acid), dicarboxylic acids (succinic acid, á,-methylsuccinic acid and adipic acid), á, â- unsaturated acid(crotonic acid), amino acid(glycine), ketocarboxylic acid(acetoacetic acid) ketones (ethylmethylketone),alicyclic acids(cyclopropanecarboxylic acid) and heterocyclics(Barbituric acid).

Preparation of Acetoacetic ester, isomerism-tautomerism, and Ketonic and Acid hydrolysis. Synthetic uses of acetoacetic ester with reference to synthesis of mono carboxylic acids (n-butyric acid isobutyric acid and á,-methyl n-butyric acid and â-methyl n-butyric acid), dicarboxylic acids (succinic and adipic acids) , á, â- unsaturated acid(crotonic acid), amino acid(glycine), ketones (3-methyl-2-pentanone), 1, 3 & 1, 4diketones (acetylacetone and acetonylacetone) and alicyclic acids (acetylcyclohexane) and heterocyclics (4-methyluracil).

UNIT-IV (14 Lectures)

HETEROCYCLIC COMPOUNDS:

Nomenclature, preparation, structure, properties and uses of Furan, Pyrrole, Thiophene, Pyridine, Quinoline, Isoquinoline

DYES:

Definition of dye, Classification based on chemical structure and method of application.Witt's theory of color and chemical constitution. Synthesis and uses of the following dyes- Cong red, Bismark brown, Malachite green, Rosaniline and Fluorescein.

UNIT-V (10 Lectures)

STEREO CHEMISTRY:

Configurational isomerism: Optical isomerism, Conditions for an optically active compound, Optical activity of Lactic acid and Tartaric acid. Diastereomerism, Relative and Absolute configuration- Sequence rules, Geometrical isomerism-E & Z system of nomenclature.

Conformational Isomerism: Conformations of ethane, n-butane and 1,2-dihaloethane.Bayer's strain theory-limitations, Sachey and Mohr theory, conformations of cyclohexane

TEXT BOOKS:

1. Arun Bahl & B.S. Bahl *"Advanced Organic Chemistry"* –, Rev. Editiopn S.Chand & Company Ltd, New Delhi 2012
2. T. Morrison and Robert.N. Boyd *"Text book of Organic Chemistry"*, 6th Edition 1992
3. Paula Yurkanis *"Bruice Organic chemistry"*, 3rd Edition ,Pearson publishers,2010

REFERENCES:

1. I.L Finar, *"Organic Chemistry"*, Volume I6th Edition, Pearson Education Publishers, New Delhi, 2004.
2. Peter Skyes, *"Reaction mechanism"*, 6th Edition, Orient Longman Ltd. New Delhi, 1997.
3. O.P. Agrawal, *"Reaction and Reagents"*, Rev.Edition, Goel Publishing house, Meerut, 2005
4. Gaurikar and others, *"Polymer science"*, Ist Edition, New Age International Ltd, NewDelhi 1986.

5. O.P. Agrawal, *"Synthetic Organic Chemistry"*, 14th Edition, Goel Publishing house,Meerut, India,2006.
6. C.N.Pillai, *"Organic chemistry"*, University Press, New Delhi, 2009.
7. B.Mehata& M.Mehata, *"Organic chemistry"*, PHI Learning Pvt. Ltd., 2005.
8. P.Bahadur & N.V.Sastry, *"Principles of polymer science"*, Narosa Publishing house, New Delhi 2002.

COMPUTER PROGRAMMING THROUGH C

(Common to all Branches)

Course Code : 13CT1102

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course helps the student in understanding Computer Programming concepts. An individual will have ability to:

- ✤ Design Algorithmic solution for various problems and convert algorithms to C programs
- ✤ Design programs with Interactive Input and Output
- ✤ Design programs utilizing arithmetic expressions
- ✤ Design programs utilizing repetition and decision making
- ✤ Design programs utilizing arrays and structures
- ✤ Design programs using file Input and Output
- ✤ Test and verifying programs

Course Outcomes:

At the end of the course the student will be able to

- ✤ Know how to write algorithms and draw flowcharts and develop programs
- ✤ Write programs using sequential, condition, iterative control statements
- ✤ Write programs using derived data types like arrays, functions, pointers, strings, structures, unions
- ✤ Define user defined data types like type- def, enum
- ✤ Learn about files, their creation, and various operations that can be performed on files

UNIT-I (12 Lectures)

Introduction to Computers , Algorithm/ Pseudo code, Flow chart, Program Development steps, Basic structure of C Program, Input and Output statements (printf() & scanf()), A Simple C Program, Identifiers, Basic data types and sizes, Constants, Variables, Operators, Type Conversion, Expression Evaluation, Precedence & Associativity of operators.

CONTROL STATEMENTS:

If, switch, for, while and do- while statements, break, continue and goto statements.Sample programs covering all the above topics.

UNIT-II (12 Lectures)

FUNCTIONS:

Definition, Advantages, types of functions- user defined and standard library functions, categories of functions , scope rules, recursion, storage classes. Sample programs covering all the above topics.

UNIT-III (12 Lectures)

ARRAYS:

Introduction to arrays, 1 D Arrays: Definition, Declaration, Initialization, Accessing & storing the elements, 2 D Arrays: Definition, Declaration, Initialization, Accessing & storing the elements C Pre processors.

STRINGS:

String- Declaration, Initialization, pointers and strings, standard library string functions, array of pointers to strings. Sample programs covering all the above topics.

UNIT-IV (12 Lectures)

POINTERS:

Definition, Declaration of Pointer variables, the & and * operators, Pointer Expressions, Char, int, and float pointers, Pointer arithmetic, Passing addresses to functions, Functions returning pointers, Pointers & Arrays: Passing array elements to functions, pointer to pointer, array of pointers, Dynamic memory allocation functions, Sample programs covering all the above topics

UNIT-V (12 Lectures)

STRUCTURES & UNIONS:

Structures: Definition, Initialization, Accessing structures, nested structures, array of structures, additional features of structures, self referential structures, unions, type-def, bit fields, enum data type.

FILES:

Concept of a file, Text and Binary files, file I/O operations, Command line arguments. (Let Us C, Yashavant Kanetkar)

Sample programs covering all the above topics.

TEXT BOOKS:

1. B.A Forouzan and R.F. Gilberg, *"Computer science, A structured programming approach using C"*, 3rd Edition, Cengage Learning.
2. Yashavant Kanetkar, *"Let Us C"*, 12th Edition, BPB Publications, 2012.
3. Yashavant Kanetkar, *"Understanding pointers in C"*, 4th Edition, BPB Publications, 2009.

REFERENCES:

1. N. B. Venkateswarlu, E.V. Prasad, *"C & Data Structures"*, 1st Edition, S. Chand Publications, 2010.
2. K.R.Venugopal, S.R.Prasad, *"Mastering C"*, 1st Edition, TMH, 2007.

ENGINEERING DRAWING
(Common to all Branches)

Course Code:13ME1103

L	T	P	C
1	0	3	3

Course Educational Objectives:

To make the student

- ✤ Familiar with the drawing practices and conventions.
- ✤ Familiar with projections of points, lines, planes and solids
- ✤ Familiar with isometric views

Course Outcomes:

Student will be able to

- ✤ Draw various types of engineering curves
- ✤ Draw orthographic projections of points, lines, planes and solids inclined to one plane or both the planes
- ✤ Draw isometric views of simple solids

LIST OF EXERCISES

1. Introduction to engineering drawing & basics of geometrical construction
2. Construction of parabola, ellipse, hyperbola- general method
3. Cycloid, epicycloids, hypocycloid, involutes of circle and square
4. Projections of points
5. Projections of lines inclined to one plane
6. Projections of lines inclined to both the planes
7. Projections of planes inclined to one plane
8. Projections of planes inclined to both the planes
9. Projections of solids in simple positions

10. Projections of solids inclined to both the planes

11. Isometric views

TEXT BOOK:

N.D. Bhatt and V.M. Panchal, *"Engineering Drawing"*, Charotar Publication House, 49th Edition, 2008.

COMPUTER PROGRAMMING LAB

(Common to All Branches)

Course Code : 13CT1103

L	T	P	C
0	0	3	2

Course Educational Objectives:

The main objectives of the course are to give the basic knowledge of C Language with practical orientation of various features present in this language.

- To give exposure about RAPTOR tool to design flow charts.
- To give hands on exposure to the students in developing the programs.
- Develop programs by using simple and optimized logic.
- Maximizing the usage of various C programming features.
- To give hands on exposure to the students to work with files.

Course Outcomes:

Upon completion of the course the student will be able to

- Gets exposure on RAPTOR tool.
- Learn how to program basic mathematical operation using various loops like for, while, do while, and switch statement.
- Program various string handling functions.
- Program various file operations.
- Gets an idea on maximizing the usage of various C programming features?

LIST OF PROGRAMS:

1. Demonstration of RAPTOR Tool to generate flowcharts by considering simple algorithms. Generation of flow charts to solve problems such as Temperature Conversion, Swapping of Two numbers etc. using RAPTOR Tool.

2. Write C Programs to solve problems such as Student Grading, Income Tax Calculation, and Largest of three Numbers etc., which expose students to various categories of IF Statements. Generate flowcharts using RAPTOR Tool.

3. a) Write a C program to find the roots of a quadratic equation.

   b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

4. a) The total distance travelled by vehicle in 't' seconds is given by distance = $ut+1/2at^2$

   where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write a C

   program to find the distance travelled at regular intervals of time given the values of

   'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

   b) Write a C program to determine whether a given number is an Armstrong or not.

   (If the sum of the cubes of the number is equal to the original number, then the number

   Is called Armstrong number. Eg: 371 is Armstrong number ($3^3+7^3+1^3= 371$))

5. a) Write a C program to find the sum of individual digits of a positive integer.

   b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

6. a) Write a C program to calculate the following sum:

   Sum=$1-x^2/2! +x^4/4!-x^6/6! +x^8/8! -x^{10}/10!$

b) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

7. a) Write a C program to generate Pascal's Triangle.

   b) Write a C program to construct a Pyramid of Numbers.

8. Write C programs that use both recursive and non-recursive functions for the following

   a) To find the factorial of a given integer.

   b) To find the GCD (greatest common divisor) of two given integers.

9. a) Write a C function to read in two numbers, x and n, and then compute the sum of this geometric progression:

   $1+x+x^2+x^3+............ + x^n$. Also perform error checking by considering negative values for n and also check for illegal values of x.

   b) Write a C function to read in two numbers, x and n (no. of terms), and then compute sin(x) and cos(x).

10. a) Write a C program to find the largest and smallest number in a list of integers.

    b) Write a C program to perform Matrix Addition & Matrix Multiplication.

    c) Write a C program to compute Transpose of a Matrix.

11. a) Write a C program to exchange value of two integers using call by value and call by reference.

    b) Write C programs to demonstrate the use of Pointers.

12. Write user defined string handling functions to implement the following standard library functions: strlen(), strcpy(), strcat(), strrev(), strcmp().

13. a) Write a C program that displays the position/ index in the string S where the string T begins, or –1 if S doesn't contain T.

    c) Write a C program to determine whether a given string is Palindrome or not.

14. Write a C program that uses functions to perform the following operations:

    a) To insert a sub-string in to given main string from a given position.

    b) To delete n Characters from a given position in a given string.

    c) To replace a character of string either from beginning or ending or at a specified location.

15. a) Write a C program to find the two's complement of a binary number.

    b) Write a C program to convert a Roman numeral to its Decimal Equivalent.

16. Write a C program that uses functions to perform the following operations using Structures:

    a) Reading a complex number.

    b) Writing a complex number.

    c) Addition of two complex numbers.

    d) Multiplication of two complex numbers.

17. a) Write a C program which copies one file to another.

    b) Write a C program to count the number of characters, lines, words, tabs and spaces in a given file.

PHYSICS LAB

(Common to all Branches)

Course Code: 13BP1102	L	T	P	C
	0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to involve the students to learn the subject and gain knowledge in handling the apparatus which will help them in designing devices and to trouble shoot the problems in their future professional work. The experiments are designed to cater to the needs of the students of all branches.

Course Outcomes:

The course will help the student in handling different apparatus for conducting various experiments in different fields which enables the student to trouble shoot the problems in their future professional work.

ANY TEN OF THE FOLLOWING 15 EXPERIMENTS

ERROR ANALYSIS AND GRAPH DRAWING (LECTURE - DEMO)

1. Bending of beams – Elliptical and Hyperbolic fringes - Determination of ‘Y’.
2. Torsional pendulum - comparison of rigidity modulii of various wires.
3. Melde’s experiment – determination of frequency of electrically maintained tuning fork.
4. Determination of wavelength of laser light using diffraction through a graded scale.
5. Particle size determination using He-Ne laser (Lycopodium powder).
6. Diffraction grating – determination of wavelengths of spectral lines of Mercury spectrum by minimum deviation method.
7. Spectrometer – determination of dispersive power of the material of a prism.

8. Polarization of light – verification of Malu's law and to determine the Brewster's Angle for glass.
9. Determination of Planck's constant.
10. Solar cell characteristics – I-V characteristics, measurement of efficiency and Fill factor.
11. Stewart – Gee apparatus – study of variation of magnetic field along the axis of circular current carrying loop.
12. LCR series and parallel resonance circuit study the frequency response.
13. Familiarity of CRO – Lissajjou's figures - determination of time period, voltage, frequency and phase of a wave.
14. Newton's Rings- determination of wavelength of the source/radius of curvature of given convex lens.
15. Optical fibres- determination of Numerical aperture, acceptance angle and bending losses.

PHYSICAL CHEMISTRY LAB

Course Code: 13BC1105

L	T	P	C
0	0	3	2

Course Educational Objectives :

The course attempts to study quantative aspects and other chemical techniques used in physical chemistry.

Course Outcomes:

The students can be able to apply various chemical techniques like sepeation methods, electro anlytical methods, kinetic methods etc. wherever necessary.

The students can be able to interpret the chemical data obtained in quantative chemical analysis.

LIST OF EXPERIMENTS:

1. Distribution of iodine between Carbon Tetrachloride or Chloroform and Water
2. Distribution of benzoic acid between benzene and water
3. Study of kinetics of hydrolysis of an ester
4. Determination of order of reaction between persulphate and iodide
5. Conductometric titration of strong acid versus strong base
6. Conductometric titration of weak acid versus strong base
7. P^H metric titration of strong acid versus strong base
8. Determination of CST of Phenol-Water system
9. Determination eutectic temperature of binary systems (Urea-Benzoic Acid)
10. Potentiometric determination of solubility of sparingly soluble salt (AgCl)

11. Colorometric determination of Manganese in Steel
12. Study of inversion of sucrose by polarimetry.

REFENCE BOOK :

1. A.I. Vogel, *"A Text book of quantative chemical anlaysis"*, 6th Edition, Pearson Educational Pvt. Ltd., 2002.

NOTES

SYLLABI FOR III SEMESTER

PROBABILITY AND STATISTICS

(Common to Chemical and ME)

Course Code: 13BM1105

L	T	P	C
4	1	0	3

Pre requisites:

- ✤ Fundamentals of Set theory.
- ✤ Basic concepts of Probability.
- ✤ Basic concepts of calculus.

Course Educational Objectives:

To acquaint students with the fundamental concepts of probability and statistics and to develop an understanding of the role of statistics in engineering.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- ✤ Calculate fundamental concepts such as the cumulative distribution function, expectations, and distributions of random variables.
- ✤ Evaluate estimators, construct confidence intervals, and perform hypothesis tests.

UNIT-I (12 Lectures)

Discrete Random Variables, Mean and variance of a discrete distribution, Chebyshev's theorem, binomial distribution, Poisson Distribution, Poisson Process. (4.1, 4.2, 4.4, 4.5, 4.6, 4.7)

UNIT-II (12 Lectures)

Continuous Random variables - Probability density, Distribution. Calculating probabilities from Probability density, Determining Mean and Variance using Probability density, Normal Distribution- Density and Properties. Calculating Normal Probabilities, Normal Approximation to Binomial Distribution, Uniform Distribution. (5.1, 5.2, 5.3, 5.5)

UNIT-III **(12 Lectures)**

Population and sample, Sampling distribution of the mean(s known), Central Limit theorem (without Proof) and Problems, Sampling distribution of the mean(s unknown), Point Estimation, Maximum error and determination of sample size, Interval Estimation (Large sample and small sample)
(6.1, 6.2, 6.3, 7.1, 7.2)

UNIT-IV **(12 Lectures)**

Tests of Hypotheses (Introduction, Null hypotheses, Alternative hypotheses, Type –I,II errors, Level of significance, Hypotheses concerning one mean (Large and Small samples), Inference concerning two means (Large and Small samples), Paired t-test.

Estimation of Variances (point and Interval estimation), Hypotheses concerning one variance, Hypotheses concerning two variance, Estimation of Proportions, Hypotheses concerning one Proportion, Hypotheses concerning several Proportions.
(7.3, 7.4, 7.5, 7.8, 8.1, 8.2, 8.3, 9.1, 9.2, 9.3)

UNIT-V **(12 Lectures)**

Correlation regression: The method of least squares, curvilinear regression, multiple regression, correlation (excluding causation).
(11.1, 11.3, 11.4, 11.6)

TEXT BOOK:

Miller. Freund's, *"Probability and Statistics for Engineers"*, Richard A.Johnson, Seventh edition, Pearson education, 2005.

REFERENCE:

S.C. Gupta and V.K. Kapoor, *"Fundamentals of Mathematical Statistics"*, Ninth Revised Edition , Sultan Chand & Sons Educational Publishers, 2007.

CHEMICAL ENGINEERING THERMODYNAMICS-I

Course Code: 13CH1102

L	T	P	C
4	1	0	3

Course Educational Objectives:

This course introduces the student the following aspects.

- The scope of Thermodynamics, phase rule.
- Heat and work calculations for closed and open systems.
- Laws of Thermodynamics and their applications.
- Pressure –Volume- Temperature behavior of pure substances, and relations among thermodynamics properties.
- Second law of thermodynamics, and heat engines.
- Various refrigeration and liquefaction procedures.

Course Outcomes:

After completion of this course the student would be able to

- Make heat and work calculations for closed and open systems.
- Make use of ideal gas law, cubic equations of state in deducing the molar volume of pure substances given the phase rule variables.
- Use the steam tables, Lee/ Kesler tables.
- Apply both first and second laws of Thermodynamics to decide whether a machine is practically operable or not.
- Estimate efficiency of engines, given the temperatures of the heat reservoirs and coefficient of performance of refrigeration system.

UNIT-I (13 Lectures)

INTRODUCTION:

The scope of thermodynamics, force, temperature, pressure, work, energy, heat.

THE FIRST LAW AND OTHER BASIC CONCEPTS:

Joule's Experiments, the first law of thermodynamics, thermodynamic state and path functions, enthalpy, the steady-state steady-flow process, equilibrium, the phase rule, the reversible process, heat capacity, constant-V and constant- P processes.

UNIT-II (10 Lectures)

VOLUMETRIC PROPERTIES OF PURE FLUIDS:

The PVT behavior of pure substances, virial equations, the ideal gas, the applications of the virial equations, second virial coefficients from potential functions. Cubic equations of state, determination of Equation-of-State Parameters (The van der Waals and Redlich-Kwong equations of state only) generalized correlations for gases, generalized correlations for liquids.

UNIT-III (14 Lectures)

THE SECOND LAW OF THERMODYNAMICS:

Statements of the second law, heat engines, thermodynamic temperatures scales, thermodynamic temperature and the ideal gas scale

Entropy: Entropy changes of an ideal gas, mathematical statement of the second law, the third law of thermodynamics, and entropy from the microscopic view point

UNIT-IV (15 Lectures)

THERMODYNAMICS OF FLOW PROCESSES:

Principles of conservation of mass, entropy and energy for flow systems, analysis of expansion processes; turbines, throttling; compression processes –compressors and pumps;

REFRIGERATION AND LIQUEFACTION:

The Carnot refrigerator, the vapor compression cycle, the comparison of refrigeration cycles, the choice of refrigerant, absorption refrigeration, the heat pump, liquefaction processes.

UNIT-V (8 Lectures)

THERMODYNAMIC PROPERTIES OF FLUIDS:

Property relations for homogeneous phases, residual properties, two phase systems, thermodynamic diagrams, tables of thermodynamic properties.

TEXT BOOK:

Smith J.M. and Van Ness H.C, "*Introduction to Chemical Engineering Thermodynamics*", 7th Edition, Tata McGraw Hill, 2009.

REFERENCES:

1. Rao Y.V. C., "*Chemical Engineering Thermodynamics*", University Press Ltd., 2001.
2. Narayanan K. V., "*Chemical Engineering Thermodynamics*", PHI, 2000.
3. Kyle B.G., "*Chemical and Process Thermodynamics*", 3rd Edition, Pearson, Prentice Hall, 1999.
4. Abbott M.M, Van Ness H.C. "*Thermodynamics with chemical applications*", 2nd Edition, Tata McGraw-Hill Publishing company Limited, 2005.

MOMENTUM TRANSFER

Course Code: 13CH1103

L	T	P	C
4	0	0	3

Course Educational objectives:

This course introduces the student the following aspects

- ✤ Types of fluid flow.
- ✤ Quantitative laws and equation of fluid flow.
- ✤ Equipment used in transportation of fluids in industry.

Course Outcomes:

After completion of this course the student would be able to analyze

- ✤ Flow properties of fluid.
- ✤ Handle important engineering tasks of moving fluids through process equipment and measuring and controlling in flow.

UNIT-I (14 Lectures)

Unit operations, unit systems, dimensional analysis, basic concepts, Fluid statics and its applications-hydrostatic equilibrium, applications of fluid statics. Fluid flow phenomena - laminar flow, shear rate, shear stress, rheological properties of fluids, turbulence, boundary layers, Basic equation of fluid flow – mass balance in a flowing fluid, differential momentum balance and mechanical energy equations.

UNIT-II (10 Lectures)

Incompressible flow in pipes and channels- shear stress and skin friction in pipes, laminar flow in pipes and channels, turbulent flow in pipes and channels, friction from changes in velocity or direction.

UNIT-III (10 Lectures)

Flow of compressible fluids - definitions and basic equations, processes of compressible flow, isentropic flow through nozzles, adiabatic frictional flow, and isothermal frictional flow.

UNIT-IV **(14 Lectures)**

Flow past immersed bodies, drag and drag coefficient, flow through bed of solids, motion of particles through fluids, fluidization. Two phase flow: Applications of Gas-Liquid, Gas-Solid, Solid-Liquid flows in Chemical engineering.

UNIT-V **(12 Lectures)**

Transportation and metering of fluids- pipes, fittings and valves, pumps: positive displacement pumps and centrifugal pumps. Fans, blowers, and compressors, measurement of flowing fluids- full bore meters, insertion meters.

TEXT BOOKS:

1. McCabe W.L., Smith J.C. and Harriot P., "*Unit Operations of Chemical Engineering*", 7th Edition, McGraw-Hill, 2005.
2. De Nevers, N., "*Fluid Mechanics for Chemical Engineers*", 3rd Edition, McGraw Hill, 2005.

REFERENCE:

James O Wilkes., "*Fluid Mechanics for Chemical Engineers*", 2nd Edition, Prentice Hall, New Jersey, 2006.

CHEMICAL PROCESS CALCULATIONS-I

Course Code: 13CH1104

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course introduces the student the following aspects

- To develop systematic problem solving skills.
- To learn what material balance are, how to formulate, apply and solve them.
- To learn how to deal with the complex process problems.

Course Outcomes:

After completion of this course

- Student is able to solve simple problems on Stoichiometry.
- Able to solve the material balance problems.

UNIT-I (12 Lectures)

STOICHIOMETRIC RELATION:

basis of calculations, methods of expressing compositions of mixtures and solutions, density and specific gravity, Baume and API gravity scales.

UNIT-II (14 Lectures)

BEHAVIOR OF IDEAL GASES:

Kinetic theory of gases, application of ideal gas law, gaseous mixtures, gases in chemical reactions.

UNIT-III (10 Lectures)

VAPOR PRESSURE:

Liquefaction and liquid state, vaporization, boiling point, effect of temperature on vapor pressure, Antoine equation, vapor pressure plots, estimation of critical properties, vapor pressure of immiscible liquids and ideal solutions, Raoult's law. Non volatile solutes.

UNIT-IV (12 Lectures)

HUMIDITY AND SATURATION:

Relative and percentage saturation or dew point, wet bulb and dry bulb temperature, use of humidity charts for engineering calculations.

UNIT-V (12 Lectures)

MATERIAL BALANCES:

Tie substance, Yield, conversion, processes involving chemical reactions.

TEXTBOOKS:

1. Hougen. O. A, Watson K.M. and Ragatz R.A. "*Chemical Process Principles, Part -I, Material and Energy Balance*", 2nd Ed. John Wiley and Sons Inc, New York, 1963.
2. Himmelblau D.H. "*Basic principles and calculations in chemical engineering*", 5th Edition, PHI, 2001.

REFERENCES:

1. Bhatt B.I. and Vora S.M. "*Stoichiometry*", 3rd Edition, Tata McGraw Hill publishing company, Ltd. New Delhi,1996.
2. Richard M.Felder, Ronald W.Rousseau, "*Elementary Principles of Chemical Processes*", 3rd Edition, Wiley, 2004.

MECHANICAL UNIT OPERATIONS

Course Code: 13CH1105

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course introduces the student the following aspects

- Properties, handling and mixing of particulate solids.
- Transportation of solid particulate mass.
- Size reduction equipments and their operation.
- Screening equipments, cake filters centrifugal filters.
- Principles of cake filtration, micro and ultra filtration.
- Gravity settling processes and Centrifugal settling processes.
- Agitation and mixing of liquids.
- Crystallization.

Course Outcomes:

After studying the course the student will have good understanding on

- Properties, mixing and transportation of solids.
- Laws and equipment of size reduction.
- Separation processes like screening, filtration and crystallization.
- Mixing of solids with liquids.

UNIT-I (10 Lectures)

Properties, handling and mixing of particulate solids: Characterization of solid particles, properties of particulate masses, storage of solids, mixing of solids, types of mixers, mixers for cohesive solids, mixers for free-flowing solids.

UNIT-II (14 Lectures)

Size Reduction: Principles of comminution, size reduction equipment—crushers, grinders, ultrafine grinders, cutting machines, equipment operation.

UNIT-III (14 Lectures)

Mechanical Separations: Screening, screening equipment, filtration, cake filters, centrifugal filters, principles of cake filtration, clarifying filters, liquid clarification, gas cleaning, principles of clarification, cross flow filtration, types of membranes, permeate flux for ultra filtration, concentration polarization, partial rejection of solutes, microfiltration, separation based on the motion of particles through fluids, gravity settling processes and centrifugal settling processes.

UNIT-IV (12 Lectures)

Agitation and mixing of liquids: agitation of liquids, circulation velocities, power consumption in agitated vessels, blending and mixing of liquids, suspension of solid particles, dispersion operations.

UNIT-V (10 Lectures)

CRYSTALLIZATION:

crystal geometry, principles of crystallization, equilibria and yields, nucleation, crystal growth, application of principles to design, MSMPR crystallizer, crystallization from melts.

TEXT BOOK:

McCabe W.L., Smith J.C. and Harriott P, "*Unit Operations in Chemical Engineering*", 7th Edition, McGraw Hill, 2005.

REFERENCE:

Alan S. Foust, Leonard A. Wenzel, Curtis W. Clump, Louis Maus, L.Bryce Anderson, "*Principles of Unit Operations*", 2nd Edition, John Wiley & Sons, 2010.

PROCESS INSTRUMENTATION

Course Code: 13CH1106

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course introduces the student the following aspects

- ✤ Understand what is a process variable and how to measure.
- ✤ Study basic components of an instrument and their functions.
- ✤ Know the different types of instruments available, to measure a given variable, based on different working principles.
- ✤ Selection process of an instrument to measure a given variable.
- ✤ Brief understanding about the control room of a process industry where most of these instruments are located.

Course Outcomes:

After completion of this course the student would be able to

- ✤ Understand instrumentation requirement of a given process industry.
- ✤ Select the necessary instrument for controlling and efficient running of the process.

UNIT-I **(12 Lectures)**

Elements of instruments, static and dynamic characteristics, basic concepts of response of first order type instruments, mercury in glass thermometer, bimetallic thermometer, pressure spring thermometer, static accuracy and response of thermometry.

UNIT-II **(12 Lectures)**

Thermoelectricity industrial thermocouples, thermocouple wires, thermocouple wells and response of thermocouples, thermal coefficient of resistance, industrial resistance, thermometer bulbs and circuits

Radiation receiving elements, radiation photoelectric and pyrometers.

UNIT-III **(10 Lectures)**

Composition analysis, spectroscopic analysis by absorption, emission, mass and color measurement spectrometers, gas analysis by thermal conductivity, analysis of moisture, gas chromatography, refractometer.

UNIT-IV **(10 Lectures)**

Pressure vacuum and head: liquid column manometers, measuring elements for gauge pressure and vacuum, indicating elements for pressure gauges, measurement of absolute pressure, measuring pressure in corrosive liquids, static accuracy and response of pressure gauges.

UNIT-V **(16 Lectures)**

Head, density and specific gravity, direct measurement of liquid level, pressure measurement in open vessels, level measurements in pressure vessels, measurement of interface level, density measurement, and level of dry materials.

Head flow meters, area flow meters open channel meters, viscosity meters, quantity meters, flow of dry materials, viscosity measurements.

Recording instruments, indicating and signaling instruments, transmission of instrument readings, control center, instrumentation diagram, process analysis.

TEXT BOOK:

Eckman D.P. "*Industrial Instrumentation*", CBS Publishers & Distributors, New Delhi, Reprint-2004.

REFERENCE:

Patranabis D, "*Principles of Process Control*", 2nd Edition, Tata McGraw Hill, 2000.

ORGANIC CHEMISTRY LAB

Course Code: 13BC1106

L	T	P	C
0	0	3	2

Course Educational Objectives:

The course attempts to study to quantative analysis of organic compunds and techniques involve the preparation of organic compounds.

Course Outcomes:

The student will able to analyse the organic compounds quantatively and qualitatively.

Qualitative analysis of simple organic compounds by following systematic procedure.

Analysis includes the following three stages

STAGE-I: PRELIMINARY CHARACTERISTICS

i) State,

ii) Boiling point & Melting point

iii) Solubility test,

iv) Flame test

v) Un saturation test

vi) Neutral ferric chloride test

vii) Sodium fusion extract preparation for the detection of hetero elements-" N,S, Cl, Br, I"

STAGE-II DETECTION OF FUNCTIONAL GROUPS

i) carboxylic acids,

ii) Phenolic group

iii) Carbohydrate

iv) Aldehydes & ketones

v) amides,

vi) esters,

vii) amines

viii) nitro groups

Stage-II Confirmation of functional group through derivative

The functional group should be confirmed by the preparation of suitable derivative and this should be reported along with result.

2. PREPARATION OF THE FOLLOWING ORGANIC COMPOUNDS.

i) Aspirin

ii) Acetanilide

iii) Nitrobenzene

REFERENCE:

1. PWG.Smith & B.S.Furniss , *"Vogel's Text book of Practical Organic Chemistry"* 5th Edition, Longman Publisshers Pvt. Ltd., 1989

MOMENTUM TRANSFER LAB

Course Code: 13CH1107

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to impart the experimental skills in flow measurement and real fluid flow problems and be able to utilize the knowledge in the design of water supply pipe networks and measure the rate of flow in pipes and channels.

LIST OF EXPERIMENTS :

1. Identification of laminar and turbulent flows.
   Major equipment - Reynolds apparatus.
2. Verification of Bernoulli's equation.
   Major equipment – Bernoulli's Apparatus.
3. Variation of Orifice coefficient with Reynolds Number.
   Major equipment - Orifice meter Assembly.
4. Determination of Venturi coefficient.
   Major equipment – Venturi meter Assembly.
5. Friction losses in Fluid flow in pipes.
   Major equipment - Pipe Assembly with provision for Pressure measurement.
6. Determination of minor losses for various pipe fittings.
   Major equipment- A pipe system with sudden contraction, sudden enlargement, bend and elbow.
7. Pressure drop and void fraction in a fluidized bed.
   Major equipment-Fluidized bed with Pressure drop measurement.
8. Studying the coefficient of contraction for a given open orifice.
   Major equipment - Open Orifice Assembly.
9. Studying the coefficient of contraction for a given open orifice.
   Major equipment - Mouth Piece Assembly.

10. Studying the coefficient of discharge in a V-notch.
    Major equipment - V-notch Assembly.
11. Studying the Characteristics of a centrifugal pump
    Major equipment - Centrifugal Pump.
12. Viscosity determination using Stoke's law.
    Major equipment – Terminal Velocity determination column.
13. Determination of coefficient of impact on vanes.
    Major equipment- A Jet impinges on a flat plate, inclined plate and hemispherical dome.

NOTES

SYLLABI FOR IV SEMESTER

MANAGEMENT SCIENCE

(Common to Chemical, CSE, IT, ECE, EEE)

Course Code: 13HM1102	L	T	P	C
	4	0	0	3

Course Educational Objectives:

To familiarize with the process of management and to provide basic insights into to select contemporary management practices.

Course Outcomes :

To understand the management processes and evolve management levels for effective decision making

UNIT-I (16 Lectures)

INTRODUCTION TO MANAGEMENT:

Concept-nature and importance of management- functions of management- evolution of management thought- decision making process- designing organization structure- principles of organization – types of organization structure

UNIT-II (12 Lectures)

OPERATIONS MANAGEMENT:

Principles and types of plant layout- work study- statistical quality control- control charts(R Chart, P Chart & C Chart- Simple numerical problems) – materials management- Need for Inventory Control- EOQ, ABC Analysis(Simple numerical Analysis)- Types of Inventory Analysis(HML. SDE, VED, FSN Analysis)

UNIT-III (10 Lectures)

HUMAN RESOURCE MANAGEMENT:

Concept of HRM, HRD and PMIR- Functions of HR Manager- theories of motivation and leadership styles- Job Evaluation and Merit Rating,

Welfare measures-statutory and non statutory compliance – grievance handling

UNIT-IV (12 Lectures)

MARKETING MANAGEMENT:

Marketing Management- Functions of Marketing Management- Marketing mix-Market segmentation - Marketing strategies based on product life cycle- Channels of Distribution- Consumer Behavior and marketing research

UNIT-V (14 Lectures)

PROJECT MANAGEMENT:

Project planning and control- Project life cycle- Development of network- Difference between PERT and CPM- Identifying critical path- probability of completing the project within the given time, cost analysis, - project crashing(simple numerical problems)

TEXT BOOKS :

1 Ramanujam Naidu & Sastry, *"Management Science"*, 1st Himalaya Publisher, 2012.

2 Vijaya Kumar & Appa Rao, *"Management Science"*, 1st Cengage Publishers, 2012.

3 AR Aryasri, *"Management Science"*, 4th Edition, Tata McGraw-Hill, 2009.

REFERENCES :

1 O P Khanna, *"Industrial Engineering & Management"*, 2nd Edition, Dhanpat Rai, 2004.

2 Martand Telsang, *"Industrial Engineering & Production Management"*, 2nd Edition, S. Chand & Company, 2008.

HEAT TRANSFER

Course Code: 13CH1108

L	T	P	C
4	1	0	3

Course Educational Objectives:

This course introduces the student the following aspects

- ✤ Basics and applications of conduction, convection and radiation.
- ✤ Heat transfer in laminar & turbulent flow.
- ✤ Heat Transfer with & without phase change.
- ✤ Heat Transfer in forced and natural convection.
- ✤ To understand radiation, Heat exchangers & evaporators.

Course Outcomes:

After completion of this course the student would be able to

- ✤ Apply the basics of conduction, convection and radiation heat transfer in the areas pertaining to chemical engineering.
- ✤ Design heat exchangers and evaporators.

UNIT-I (16 Lectures)

HEAT TRANSFER BY CONDUCTION IN SOLIDS:

Fourier's law, thermal conductivity, steady state conduction in plane wall, cylinder and sphere, unsteady state heat conduction, heat conduction equation with and without internal heat generation, semi-infinite solid, finite solid, critical insulation thickness.

PRINCIPLES OF HEAT FLOW IN FLUIDS:

Typical heat exchange equipment, range, approach, temperature versus length curves, countercurrent and parallel current flows, energy balances, overall heat transfer coefficient, LMTD, resistance form of overall coefficient, fouling factors, effective coefficients for unsteady-state heat transfer.

UNIT-II (12 Lectures)

HEAT TRANSFER TO FLUIDS WITHOUT PHASE CHANGE:

Thermal boundary layer, heat transfer by forced convection in laminar and turbulent flows, viscosity correction factor, analogies between transfer of momentum and heat, heat transfer to liquid metals, heating and cooling of fluids in forced convection outside tubes, brief discussion about heat transfer to fluids in laminar flow with constant heat flux and constant wall temperature.

UNIT-III (10 Lectures)

NATURAL CONVECTION:

Natural convection to air from vertical shapes and horizontal planes, effect of natural convection in laminar-flow heat transfer, free convection in enclosed spaces, mixed free and forced convection.

HEAT TRANSFER TO FLUIDS WITH PHASE CHANGE:

Heat transfer from condensing vapors, heat transfer to boiling liquids.

UNIT-IV (12 Lectures)

RADIATION:

Introduction, properties and definitions, black body radiation, real surfaces and the gray body, absorption of radiation by opaque solids, radiation between surfaces, radiation shielding, radiation to semi transparent materials, combined heat transfer by conduction, convection and radiation.

UNIT-V (10 Lectures)

HEAT EXCHANGE EQUIPMENT:

General design of heat exchange equipment, heat exchangers, condensers, boilers and calendrias, extended surface equipment, heat transfer in agitated vessels, scraped surface heat exchangers, compact heat exchangers, plate type heat exchangers, heat transfer in packed beds, heat exchanger (effectiveness) NTU method, and LMTD method.

EVAPORATORS:

Evaporators, performance of tubular evaporators, capacity and economy, multiple effect evaporators, vapor recompression.

TEXT BOOK:

McCabe W.L., Smith J.C. and Harriott P., "*Unit Operations in Chemical Engineering*", 7th Edition, McGraw Hill, 2005.

REFERENCES:

1. Geankoplis,C.J., "*Transport processes and Unit operations*", 3rd Edition, PHI, 2002.
2. Kern D Q, "*Process Heat Transfer*", McGraw Hill, 1986.

CHEMICAL PROCESS CALCULATIONS-II

Course Code: 13CH1109

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course introduces the student the following aspects.

- ✤ To develop systematic problem solving skills.
- ✤ To learn what material balance are, how to formulate, apply and solve them.
- ✤ To learn what energy balances are and how to apply them.
- ✤ To learn how to deal with the complex process problems.

Course Outcomes:

After completion of this course the student would be able to

- ✤ Student is able to solve the energy balance problems.
- ✤ Able to solve Complex material balance problems.

UNIT-I **(14 Lectures)**

Material balance calculation involving drying, dissolution and crystallization.

UNIT-II **(10 Lectures)**

Processes involving recycle, bypass and purge.

UNIT-III **(11 Lectures)**

THERMOPHYSICS:

Energy, energy balances, heat capacity of gases, liquid and mixture solutions. Kopp's rule, latent heats, heat of fusion and heat of vaporization, Trouton's rule, Kistyakowsky equation for non polar liquids enthalpy and its evaluation.

UNIT-IV **(15 Lectures)**

THERMOCHEMISTRY:

Calculation and applications of heat of reaction, combustion, formation and neutralization, Kirchoff's equation, calculation of theoretical and actual flame temperatures.

UNIT-V **(10 Lectures)**

Introduction calorific value of fuels, various Fuels (Qualitative Analysis), combustion calculations, Orsat Analysis. Numerical simulation of material balance equations-Simultaneous and sequential modular approaches: Learning how to arrange equations and solve them using both techniques.

TEXTBOOKS:

1. Hougen O A, Watson K.M. and Ragatz R.A., "*Chemical process principles, Part -I, Material and Energy Balance*", 2nd Ed. John Wiley and Sons Inc, New York, 1963.
2. Himmelblau D.H. "*Basic principles and calculation in chemical engineering*", 5th Edition. PHI, 2001.

REFERENCES:

1. Bhatt B.I. and Vora S.M, "*Stoichiometry*", (3rd Ed.) Tata McGraw Hill publishing company, Ltd., New Delhi (1996).
2. Richard M.Felder, Ronald W.Rousseau, "*Elementary Principles of Chemical Processes*", 3rd Edition, Wiley, 2000.

CHEMICAL ENGINEERING THERMODYNAMICS-II

Course Code: 13CH1110

L	T	P	C
4	1	0	3

Course Educational Objectives:

This course introduces the student the following aspects

- Heat effects associated with physical and chemical processes.
- Solution Thermodynamics, theory and applications.
- Vapor-liquid equilibria-its qualitative treatment.
- Make dew point, bubble point and flash point calculations for both ideal binary mixtures and real binary mixtures .
- Reaction Equilibria.

Course Outcomes:

After completion of the course student would be able to

- Make a judgment of which model to use for estimating vapor liquid equilibrium data.
- Estimate fugacity coefficients, activity coefficients for real gas mixtures and non-ideal mixtures.
- Make dew point, bubble point calculation using Raoult's law and modified Raoult's law
- To obtain the flash calculations by K-value.
- Estimate the extent of reaction.

UNIT-I (10 Lectures)

Heat effects: Sensible heat effects, Evaluation of sensible heat integral, Latent heats of pure substances, standard heat of reaction, standard heat of formation, standard heat of combustion, temperature dependence of heat of reaction, Heat effects of Industrial Reactions.

UNIT-II **(14 Lectures)**

VLE at low to moderate pressure, the nature of equilibrium, the phase rule, VLE qualitative behaviour, Dew point and Bubble point calculations using Raoult's law and Modified Raoult's law.

VLE from K-value correlation, flash calculations, Dew point & bubble point calculations and Flash calculations for non-ideal solutions (Algorithms and flow charts only)

Thermodynamic properties and VLE from equations of state: properties of fluids from the virial equations of state, VLE from Vander Waals equations of state.

UNIT-III **(14 Lectures)**

SOLUTION THERMODYNAMICS:

Theory: Fundamental property relation, chemical potential as a criterion for phase equilibrium, partial properties, ideal gas mixtures, fugacity and fugacity coefficient for pure species, fugacity and fugacity coefficient for species in solutions, generalized correlations for Fugacity coefficient, ideal solutions, excess properties.

SOLUTION THERMODYNAMICS:

applications: models for the excess Gibbs energy (Margules, Van Laar and Wilson models), calculating the two constants using margules, Vanlaar and Wilson models from experimental data. VLE estimations using Margules, VanLaar and Wilson equations.

Basics of UNIFAC model, NRTL model, UNIQUAC model (Qualitative treatment only).

UNIT-IV **(12 Lectures)**

Topics in phase Equilibria: Equilibrium and stability, liquid-liquid equilibrium (LLE), vapor- liquid–liquid equilibrium (VLLE), solid-liquid equilibrium (SLE), solid vapor equilibrium (SVE), equilibrium absorption of gases on solids (Qualitative treatment only)

UNIT-V **(10 Lectures)**

Chemical reaction equilibria: The reaction coordinate, application of equilibrium criterion to chemical reactions, the standard Gibb's energy change and the equilibrium constant, effect of temperature on equilibrium constant, relation of equilibrium constant to composition, equilibrium conversion for single reaction, and multiple reactions, Phase rule for reacting systems.

TEXT BOOK:

Smith J.M. and Van Ness H.C, "*Introduction to Chemical Engineering Thermodynamics*", 7th Edition, Tata McGraw Hill, 2009.

REFERENCES:

1. Rao Y.V. C., "*Chemical Engineering Thermodynamics*", University Press Ltd., 2001.
2. Narayanan K. V., "*Chemical Engineering Thermodynamics*", PHI, 2000.
3. Kyle B.G., "*Chemical and Process Thermodynamics*", 3rd Edition, Pearson, Prentice Hall, 1999.
4. Abbott M.M. and Van Ness H.C. "*Thermodynamics with chemical applications*", 2nd Edition, Tata McGraw-Hill Publishing company Limited, 2005.

MASS TRANSFER OPERATIONS-I

Course Code: 13CH1111

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course introduces the student the following aspects

- Fundamentals of the mass transfer operations.
- Diffusion in gases, liquids and solids.
- Mass transfer coefficients and theories to calculate mass transfer coefficients.
- Mass, heat and momentum analogies.
- Interphase mass transfer.
- Different equipment for gas –liquid operations.
- Absorption and stripping.
- Humidification operations and drying.

Course Outcomes:

This course gives the student the ability to

- Estimate of diffusivity of gases and liquids.
- Estimate the mass transfer rate of a component in gases, liquids and solids and the mass transfer coefficients.
- Operate and select various equipment for Gas-liquid operations.
- Estimate tray efficiencies.
- Selection of solvent for absorption.
- Determine the number of plates and height of the continuous absorber.
- Design of packed humidifiers, dehumidifiers and cooling towers, spray chambers.
- Determine the rate of batch drying and operate various drying operations.

UNIT-I (14 Lectures)

INTRODUCTION:

Classification of the mass transfer operations, molecular diffusion in fluids, binary solutions, Fick's law, equation of continuity, steady state molecular diffusion in fluids at rest and in laminar flow, Stefan's diffusion, estimation of diffusivity of gases and liquids, application of molecular diffusion, mass transfer coefficients in turbulent flow, theories of mass transfer, Mass, heat-, and momentum- transfer analogies, mass transfer coefficients in laminar flow (Explanation of equations only and no derivation), Mass transfer coefficients in turbulent flow, correlation's for mass transfer coefficients in simple situations, diffusion in solids

UNIT-II (12 Lectures)

INTER PHASE MASS TRANSFER:

concept of equilibrium, diffusion between phases, material balances in steady state co-current and counter current stage processes.

EQUIPMENT FOR GAS - LIQUID OPERATIONS:

Sparged vessels (Bubble columns), mechanically agitated vessels for single phase liquids and gas-liquid mixtures, Tray towers, sieve tray design for absorption (Qualitative treatment), venturi scrubbers, wetted wall towers, packed towers, Comparison between Tray towers and packed towers.

UNIT-III (12 Lectures)

ABSORPTION AND STRIPPING:

Absorption equilibrium, ideal and non ideal solutions, selection of a solvent for absorption, one component transferred: material balances. Determination of number of plates (graphical), absorption factors, estimation of number of plates by Kremser Brown equation, continuous contact equipment; HETP, absorption of one component, determination of number of transfer units and height of the continuous absorber, overall coefficients and transfer units, dilute solutions, overall height of transfer units; Absorption with chemical reaction.

UNIT-IV (12 Lectures)

HUMIDIFICATION OPERATIONS:

Vapor gas mixtures, Humidity and relative saturation, dew point, adiabatic, saturation and wet bulb temperatures, psychometric charts, enthalpy of gas vapor mixtures, humidification and dehumidification, operating lines and design of packed humidifiers, dehumidifiers and cooling towers, spray chambers.

UNIT-V (10 Lectures)

DRYING:

Moisture contents of solids, equilibrium moisture content, bound and unbound moisture, drying conditions – rate of batch drying under constant drying conditions, mechanism of batch drying, drying time, thorough circulation drying, batch and continuous drying equipment, design of continuous counter current dryer.

TEXT BOOK:

Treybal R.E., "*Mass transfer operations*", 3rd Edition, McGraw Hill, 1980.

REFERENCES:

1. Cussler E. L., "*Diffusion: Mass Transfer in fluid system*", Cambridge University Press, 2009.
2. Geankoplis C.J., "*Transport processes and unit operations*", 3rd Edition, PHI, 2002.

NUMERICAL METHODS IN CHEMICAL ENGINEERING

Course Code: 13CH1112

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course introduces the student the following aspects

- ✤ Numerical techniques needed to solve non-linear algebraic problems.
- ✤ Numerical techniques needed to solve initial value problem, boundary value problems.

Course Outcomes:

After completion of this course the student would be able to

- ✤ Use these Numerical Techniques to solve simulations non-linear equations.
- ✤ Solve ordinary differential equations/PDE.

UNIT-I (14 Lectures)

Introduction and Importance of Numerical methods, Taylor series expansion of functions of single and two variables.

Finding the roots of a single variable functions by bisection, interval halving and Newton - Raphson methods.

Finding the optimum insulation thickness. Calculating volumes using cubic Equation of State, Flash calculations.

Finding the roots of a two variable function by Newton - Raphson method.

Solution of calculating pressure drop and friction factor in turbulent flows.

Calculating the extent of reactions for two equilibrium reactions.

Numerically calculating derivatives

UNIT-II **(10 Lectures)**

Solution of Linear simultaneous equations by Gauss Elimination and LU decomposition, Gauss Jordan elimination.

Solution of a Heat transfer composite slab.

UNIT-III **(12 Lectures)**

Linear Least squares method. Non Linear regression.

Function fitting using Lagrange Interpolation, Pade approximation.

Example of fitting specific heat capacity and thermal conductivity with temperature. Fitting Activity coefficients for non-ideal solutions and develop equation for excess Gibbs free energy.

UNIT-IV **(14 Lectures)**

Finite Differencing Scheme: Backward, Central and Forward Schemes. One sided and image schemes to handle boundary conditions.

Ordinary Differential equations: Initial Value problems, Implicit and Explicit Euler methods, Fourth order Runge-Kutta method.

Solution of unsteady Heat transfer problem treated as lumped system.

Time need to heat a mass of liquid from an initial temperature to final temperature.

Boundary value problems: Introduction to shooting method to convert a BVP to IVP:

Solution of a BVP using central differencing method: 1 D steady state heat conduction in slab.

UNIT-V **(10 Lectures)**

Partial differential equation (PDE): Classification of PDE's and boundary conditions. Illustration of finite difference schemes to solve the two dimensional Heat conduction problem.

One dimensional unsteady state heat conduction problem: Finite differencing in space and using Runge Kutta for integrating in time.

TEXT BOOK:

Gupta, S.K. "*Numerical Methods for Engineers*", Tata McGraw Hill, 2010.

REFERENCE:

Mark.E.Davis, "*Numerical Methods and Modeling for Chemical Engineers*", 1st Edition, willey, 1984.

HEAT TRANSFER LAB

Course Code: 13CH1113

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to enable the student to handle lab equipments like pin-fin apparatus, Double pipe heat exchanger etc., and to test practical applications of the heat transfer theory.

LIST OF EXPERIMENTS:

1. Determination of total thermal resistance and thermal conductivity of composite wall.
   Major equipment - Composite wall Assembly
2. Determination of thermal conductivity of a metal rod.
   Major equipment - Thermal Conductivity apparatus
3. Determination of natural convective heat transfer coefficient for a vertical tube.
   Major equipment - Natural convection heat transfer apparatus
4. Determination of critical heat flux point for pool boiling of water.
   Major equipment- Pool boiling apparatus
5. Determination of forced convective heat transfer coefficient for air flowing through a pipe
   Major equipment – Forced convection heat transfer apparatus
6. Determination of overall heat transfer coefficient in double pipe heat exchanger.
   Major equipment - Double pipe heat exchanger apparatus
7. Study of the temperature distribution along the length of a pin-fin under natural and forced convection conditions
   Major equipment - Pin fin apparatus
8. Estimation of un-steady state film heat transfer coefficient between the medium in which the body is cooled.

Major equipment - Heat transfer coefficient determination apparatus

9. Determination of Stefan – Boltzmann constant.
   Major equipment - Stefan Boltzmann apparatus

10. Determination of emissivity of a given plate at various temperatures.
    Major equipment - Emissivity determination apparatus

11. Determination of radiation constant of a given surface.
    Major equipment - Emissivity determination apparatus.

MECHANICAL UNIT OPERATION LAB

Course Code: 13CH1114

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to enable the student to handle unit operation like Roll crusher, Ball Mill etc., and to understand separation, size reduction techniques and average particle size calculation of the given material.

LIST OF EXPERIMENTS:

1. To determine the time of grinding in a ball mill for producing a product with 80 % passing a given screen.
   Major equipment - Ball mill Apparatus, Sieve shaker, Different sizes of sieves, weighing balance.
2. To verify the laws of crushing using any size reduction equipment like crushing rolls or vibrating mills and to find out the working index of the material.
   Major equipment – Jaw Crusher, Sieve shaker, Different sizes of sieves, Weighing balance, Energy meter.
3. To find the effectiveness of hand screening of a given sample by a given screen.
   Major equipment - Vibrating Sieve shaker, Different sizes of sieves, Weighing balance.
4. To separate a mixture of oil into two fractions using froth flotation technique.
   Major equipment - Froth flotation cell.
5. To obtain batch sedimentation data and to calculate the minimum thickener area under given conditions.
   Major equipment- Sedimentation apparatus.
6. To determine the specific cake resistance and filter medium resistance of a slurry in plate and frame filter press.
   Major equipment - Plate and Frame filter press.

7. To separate a mixture of particles by Jigging.
   Major equipment - Jigging apparatus
8. Studies on cyclone separator.
   Major equipment - Cyclone separator
9. Studies on pulverizer.
   Major equipment – Pulverizer.
10. Verification of Stoke's law.
    Major equipment – Stoke's law apparatus.
11. Grinding studies on hard/ soft materials.
    Major equipment – Grinder.

ENVIRONMENTAL STUDIES
(Common to all Branches)

Course Code: 13NM1102

L	T	P	C
2	0	0	0

Course Educational objectives:

This course introduces the students to the following

- ✤ Important & Scope of the Environment.
- ✤ Awareness about the resources and their limitations.
- ✤ Appreciate the variedness of nature and role of different species in nature.
- ✤ The importance of understanding the impact of any development of nature.
- ✤ Population control and its importance.

Course Outcomes:

After studying the course the student will have good understanding of

- ✤ Environment and its conservation.
- ✤ The impacts of human action on nature and remedial measures.
- ✤ Being proactive instead of reactive.

UNIT-I **(8 Lectures)**

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES & NATURAL RESOURCES

Definition, Scope and Importance – Need for Public Awareness.

Renewable and non-renewable resources– Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems -Mineral resources: Use and

exploitation, environmental effects of extracting and using mineral resources, case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Case studies. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT-II (7 Lectures)

ECOSYSTEMS, BIODIVERSITY AND ITS CONSERVATION:

Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Definition: genetic, species and ecosystem diversity.- Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a mega diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. - Endangered and endemic species of India Conservation of biodiversity: In-situ and Exsitu conservation of biodiversity.

UNIT-III (7 Lectures)

ENVIRONMENTAL POLLUTION:

Definition, Cause, effects and control measures of a) Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards.

SOLID WASTE MANAGEMENT:

Causes, effects and control measures of urban and industrial wastes. – Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT-IV (6 Lectures)

SOCIAL ISSUES AND THE ENVIRONMENT:

From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, and watershed management -Resettlement and rehabilitation of people; its problems and concerns. Case Studies Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. -Wasteland reclamation. -Consumerism and waste products. –Environment.

Protection Act. -Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution)

Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

UNIT-V (8 Lectures)

HUMAN POPULATION AND THE ENVIRONMENT:

Population growth, variation among nations. Population explosion - Family Welfare Programme. -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. -Women and Child Welfare. -Role of information Technology in Environment and human health. – Case Studies.

FIELD WORK:

Visit to a local area to document environmental assets

River /forest grassland/hill/mountain -Visit to a local polluted site-

Urban/ Rural/industrial/ Agricultural Study of common plants, insects, birds. - Study of simple ecosystems-pond, river, hill slopes, etc.

TEXT BOOKS:

1. Bharucha. E., "*Textbook of Environmental Studies for Undergraduate Courses*", University Press, 2005.
2. Rajagopalan. R., "*Environmental Studies*", Oxford University Press, 2005.

REFERENCE:

AnjiReddy. M., "*Textbook of Environmental Sciences and Technology*", BS Publications, 2010.

NOTES

SYLLABI FOR V SEMESTER

MATERIALS SCIENCE FOR CHEMICAL ENGINEERS

Course Code: 13CH1115

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course introduces the student the following aspects.

- ✤ To learn the structure-property processing interrelationship in engineering materials.
- ✤ Which materials are exactly suitable for a given set of process conditions.
- ✤ The protection methods available for a given material of construction in a real plant atmosphere.

Course Outcomes:

After completion of this course the student would be able to

- ✤ Enable students to select suitable materials for specific applications.
- ✤ Process the materials so as to tailor the material properties for a given application.

UNIT-I (12 Lectures)

INTRODUCTION AND CRYSTAL GEOMETRY:

Classification of Engineering Materials – Fundamental Blocks of Matter. A brief review on Atomic(micro) Structure and Atomic Bonding- Energy of the Atomic system . Ionization potential, Electron Affinity- Ionic radii and Equilibrium Distance, Bond Length, $\Delta H_{Crystal,}\ H_{Lattice}$, Ionic , Covalent and metallic Bonding , Secondary bonding- Property relation to Bond characteristics. Space lattice, Unit cell-Primitive cell, Double Cell, Triple Cell, Multiple Cell- Crystal and Crystalline Substance, Amorphous Material-Bravais lattices, Crystal systems and their characteristics with suitable examples. Lattice points –Lattice Co-ordinates, Miller indices for directions and planes, Miller-Bravais indices, Linear and Planer Densities, Slip Directions and slip Planes , Packing efficiencies and fractions Close Packed Structures(CPS) , C/A ratio for HCP Structures

UNIT-II (12 Lectures)

CRYSTAL STRUCTURE DETERMINATION AND CRYSTAL DEFECTS:

Bragg's law of X-Ray Diffraction and determination of Cubic Crystal structure, Lattice Constant and identification of metals using powder method, problems relating to these topics. What is a crystal defect and how does it arise in Crystal point (Zero dimensional and one dimensional defect) Types of point Defect, configurational Entropy, Determination of defect concentration , expression for one and two –dimensional defect concentration , Significance of point defects in the determination of properties of materials- Dislocations, Line defects- Edge and Screw Dislocations, Burgers Vector, Burgers Circuit , Dislocation motion – Dislocation reactions– Role of Dislocations on the properties of materials , dislocation density- surface defects, dislocation Energy , stress required to move a dislocation , multiplication of dislocation – Frank read source and mechanism of dislocations.

UNIT-III (12 Lectures)

BASIC THERMODYNAMIC FUNCTIONS :

Free Energy of Transformation – Criteria for transformation – Nucleation and Growth – Homogeneous and Heterogeneous nucleation and their applications. Solid Solutions- Polymorphs – Types of Solid Solutions – Temp – Time – Cooling curves for different systems – Solid – Solid phase equilibrium – Tie Line, Lever Rule and its application. Phase Rule, Phase Changes and its application to Thermal Equilibrium diagrams or Phase Diagrams of Unary System, - Binary Systems – Eutectic Eutectoid alloys – Cu-Ni, Bi-Cd, Pb-Sn, $Fe\text{-}Fe_3C$ systems. Phase transformations in steels – Modifications in structure of Steel by Heat Treatment – Time – Temperature – Transformation Curves for Eutectoid Steel – Classification of Steels and Cast Irons – Types and their properties. Alloys of Steel and their uses in Chemical Industry.

UNIT-IV (12 Lectures)

Mechanical behavior of metals and alloys- Elastic, Plastic and anelastic behavior of materials. Viscoelastic materials, behavior of polymers and plastics. Critical Resolved Shear strength, Schmidt's Law and prediction of Tensile Strength of materials, Strengthening mechanisms – Work Hardening or Strain Hardening, Alloying – Cold and Hot working – Recovery and Recrystallization, Grain Growth, Grain Size and Yield

Strength, Age hardening of Aluminum alloys – Al-Cu system. Composite Materials and their mechanical behavior, expressions for Tensile Strength and strains in Composite Materials – Fracture of Materials Ductile, Brittle, Creep and Fatigue fractures – Simple Problems related to these topics.

UNIT-V **(12 Lectures)**

Corrosion- Materials in the service of Chemical and Marine Environments – Basis for corrosion , Corrosion reactions and Mechanisms of Corrosion – Eight forms of Corrosion- Uniform Corrosion , Galvanic , Differential Aeration Corrosion , Stress corrosion Cracking, Intergranular Corrosion, Localized Corrosion and Fatigue Corrosion . Corrosion of Stainless steel- Oxidation, Tarnishing, behaviour of non-ferrous materials used in Chemical Industry – Effect of environmental factors on corrosion. Corrosion Prevention , Pilling – Bedworth ratios Conventional methods – Estimation of Corrosion rates, different Corrosion rate expressions, Remedial measures for Galvanic, Stress Corrosion Cracking , Intergranular and Pitting Corrosion , Anodic and Cathodic protection techniques, Conventional methods on organic and Inorganic coatings, Electroplating , Alloying – Cladding- Design Procedures of chemical equipment and structure to mitigate or completely prevent corrosion in Chemical Plants.

TEXT BOOKS:

1. Raghavan V., "*Materials Science and Engineering: A first course*", 5th Edition, Prentice Hall of India Pvt.Ltd., 2009.
2. Fontana M.G., "*Corrosion Engineering*", 3rd Edition, Tata McGraw Hill, 2005.

REFERENCES:

1. Manas chanda, "*Science of Engineering Materials Vol. 1 & 2*", McMillan Company of India Ltd. 1981.
2. Van Vlack, L.H, "*Elements of Materials Science and Engineering*", 6th Edition, Pearson Educational India, 2008.

CHEMICAL REACTION ENGINEERING-I

Course Code: 13CH1116

L	T	P	C
4	1	0	3

Course Educational Objectives:

This course introduces the student the follow aspects

- ✤ To understand how chemical reactors are modeled and designed.
- ✤ Design of batch reactor plug flow reactor, mired flow reactor.
- ✤ Non Isothermal reactors.

Course Objectives:

After completion of this course the student would be able to

- ✤ Design reactors.
- ✤ Calculate volume and conversion.
- ✤ Calculate the optimum temperature progression.

UNIT-I (8 Lectures)

Introduction to Chemical Reaction Engineering; Elementary and Non-elementary Reactions, Homogeneous and Heterogeneous Reaction, The definition of rate equation. The meaning of Arrhenius Rate law, searching for rate Mechanism.

UNIT-II (14 Lectures)

Batch Reactor: Design equation for isothermal case. Problems on constant and variable Volume isothermal Batch Reactor.

Find the Rate Equations from:

- Half life Data.
- Integral and Differential analysis of CA vs t and P vs t data.
- CSTR experimental Data at Isothermal operations, non isothermal operations.

UNIT-III (14 Lectures)

FLOW REACTORS:

Design Equations for isothermal CSTR and PFR. Problems on CSTR and PFR with and without expansion, size comparison of CSTR and PFR (Given volumes calculate conversion and given conversion calculate volumes). Problems on reactor sequencing for CSTR in series and PFR in series and their combination. Autocatalytic reactions and Recycle Reactors (Calculation of volumes needed for different Recycle Ratios and similar problems)

UNIT-IV (12 Lectures)

MULTIPLE REACTIONS:

Series Reactions in Batch, CSTR and PFR's

Parallel Reactions: Problems on Calculation of yields and selectivities in CSTR and PFR. Finding the best reactor for maximizing selectivities. Product distribution as a function of Temperature for Parallel and series reactions (Qualitatively only)

UNIT-V (12 Lectures)

NON ISOTHERMAL REACTORS:

Energy balance derivation for batch CSTR and PFR's. Calculating equilibrium conversion at different temperature.

Problems on Adiabatic CSTR, PFR: Calculating steady state conversion & temperature for a non-isothermal CSTR, concept and problems on interstage cooling, optimal temperature progression for batch reactors (Qualitative only)

TEXT BOOK:

Levenspiel. O., "*Chemical Reaction Engineering*", 3rd Edition, John Wiley and Sons, 2007.

REFERENCES:

1. Fogler, H.S., "*Elements of Chemical Reaction Engineering*", 3rd Edition, John Wiley, 1999.
2. Smith, J.M., "*Chemical Engineering Kinetics*", 3rd Edition, McGraw Hill, 1981.

MASS TRANSFER OPERATIONS-II

Course Code: 13CH1117

L	T	P	C
4	1	0	3

Course Educational Objectives:

This course introduces the student to the following aspects

- Distillation Operations, Mc Cabe Thiele and Ponchon Savarit methods.
- Liquid-liquid operations.
- Leaching and Adsorption operations.
- Membrane separations processes and membrane modules.

Course Outcomes:

This course gives the student the ability to

- Generate the VLE data.
- Determine the feed tray location, total reflux, minimum and optimum reflux ratios.
- Operate packed bed and Tray towers for distillation, Extraction and leaching operations.
- Select suitable solvent for extraction of solute.
- Design and operate various extractors and equipments for leaching.
- Select suitable adsorbent for recovery of solute and draw adsorption isotherms.

UNIT-I **(10 Lectures)**

Distillation: fields of application, VLE for miscible liquid, immiscible liquids, steam distillation VLE phase diagrams, tie lines, mixture rules, flash vaporization and differential distillation for binary and multi-component mixtures, batch distillation with reflux for binary mixtures.

UNIT-II **(10 Lectures)**

Continuous fractionation of binary mixtures, Ponchon-Savarit method, McCabe – Thiele methods for determination of ideal plates for binary mixtures, optimum reflux ratio, use of total and partial condensers and open steam, plate efficiencies, condenser and reboiler duties, packed bed distillation, principles of azeotropic and extractive distillation.

UNIT-III (14 Lectures)

LIQUID-LIQUID OPERATIONS:

fields of applications of ternary liquid systems, triangular and solvent free coordinate systems, choice of solvent selectivity, extraction with insoluble and partially soluble systems, single stage and multistage cross current and counter current extraction without reflux, multistage counter current extraction with reflux, continuous contact extraction (packed beds), equipment for liquid-liquid extraction operation

UNIT-IV (14 Lectures)

Leaching: Fields of applications, preparation of solid for leaching, types of leaching, leaching equilibrium, single stage and multi stage leaching calculations, constant under flow conditions, Unsteady state operation equipment – Percolation tanks, Shank system, filter press leaching, Agitated vessels, Steady state operation equipment- agitated vessels, thickeners, CCD, Classifiers, Leaching of Vegetable seeds.

UNIT-V (12 Lectures)

ADSORPTION:

Theories of adsorption, recovery of solvent vapors, industrial adsorbents, adsorption equilibria and isotherms. Single and multi- stage operations, unsteady state adsorption, and equipment for stage-wise and continuous contact.

TEXT BOOK:

Treybal R.E., "*Mass transfer operations*", 3rd Edition, McGraw Hill, 1980.

REFERENCES:

1. Cussler E. L., "*Diffusion: Mass Transfer in fluid system*", Cambridge University Press, 2009.
2. Geankoplis C.J., "*Transport processes and unit operations*", 3rd Edition, PHI, 2002.

INDUSTRIAL POLLUTION AND CONTROL

Course Code: 13CH1118

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course helps the student in understanding the following aspects

- ✤ Different types of pollution, their sources and effects.
- ✤ Detailed study of air and water pollution.
- ✤ Management of municipal, radioactive and biomedical wastes.
- ✤ Understanding of waste water treatment processes and their design aspects.
- ✤ Working principles of air pollution control equipment.

Course Outcomes:

After completion of this course the student would be able to

- ✤ Understand the need to control environment pollution.
- ✤ Apply different methods of pollution control and reduce the level of pollution from various sources in air, water and soil.
- ✤ Help maintain a clean and healthy environment.

UNIT-I (10 Lectures)

Types of pollution, types of emissions from chemical industries and effects of environment, environment legislation, , Effluent guidelines and standards.

UNIT-II (14 Lectures)

POLLUTANT SAMPLING AND MEASUREMENT:

Ambient air sampling: collection of gaseous air pollutants, collection of particulate air pollutants. Stack sampling:

Sampling system, particulate sampling, and gaseous sampling.

Analysis of air pollutants: Sulphur dioxide, nitrogen oxides, carbon monoxide, oxidants and Ozones, hydrocarbons, particulate matter.

Sources and characteristics of pollutants in fertilizer, paper and pulp industry, petroleum and petroleum industry. Treatment of liquid and gaseous effluent in fertilizer industry.

UNIT-III **(14 Lectures)**

AIR POLLUTION CONTROL METHODS AND EQUIPMENTS:

Source collection methods: raw material changes, process changes, and equipment modification. Cleaning of gaseous equipments particulate emission control: collection efficiency, control equipment like gravitational settling chambers, Cyclone separators, fabric filters, ESP and their constructional details and design aspects. Scrubbers: wet scrubbers, spray towers, centrifugal scrubbers, packed beds and plate columns, venturi scrubbers, their design aspects. Control of gaseous emissions: absorption by liquids, absorption equipments, adsorption by solids, equipment and the design aspects.

UNIT-IV **(12 Lectures)**

Characterization of effluent streams, oxygen demands and their determination (BOD, COD, and TOC), Oxygen sag curve, BOD curve mathematical, controlling of BOD curve, self purification of running streams, sources of wastewater. Introduction to waste water treatment, Methods of primary treatments: screening, sedimentation, flotation, neutralization. Biological treatment of wastewater, bacterial and bacterial growth curve, aerobic processes, suspended growth processes, activated aerated lagoons and stabilization ponds, Attached growth processes, trickling filters, rotary drum filters, anaerobic processes. Methods of tertiary treatment. A brief study of carbon absorption, ion exchange, reverse osmosis, ultra filtration, chlorination, ozonation, treatment and disposal.

UNIT-V **(10 Lectures)**

MUNICIPAL SOLID WASTE SOURCES, AND CONTROL METHODS HAZARDOUS WASTE MANAGEMENT:

Nuclear wastes: health and environment effects, sources and disposal methods. Chemical wastes: health and environmental effects, treatment and disposal: treatment and disposal by industry, off site treatment and disposal, treatment practices in various countries. Biomedical wastes: types of wastes and their control.

TEXT BOOKS:

1. Rao. C.S., "*Environmental Pollution and Control Engineering*", 2nd Edition, Revised, Wiley Eastern Limited, India, 2006.
2. Mahajan. S.P., "*Pollution Control in Process Industries*", Tata-McGraw Hill, New Delhi, 1985.

REFERENCES:

1. Narayana Rao, M. and Datta, A.K., "*Waste Water Treatment*", 2nd Edition, Oxford and IBH Publications, New Delhi, 2005.
2. Prathap Mouli, P. and Venkata Subbayya, N., "*Air Pollution Control*", Divya Jyothi Publishers, Jodhpur.
3. Swamy, A.V.N., "*Industrial Pollution Control and Engineering*", Galgotia Publications, Hyderabad, 2005.

PROCESS DYNAMICS AND CONTROL

Course Code: 13CH1119

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course introduces the student the following aspects.

- To understand the dynamics of first order and second order systems.
- Understand the open and closed loop performance for a control system.
- Understand the stability for a given control system.
- Design a controller for a better closed loop behavior.

Course Outcomes:

After completion of this course the student would be able to

- Develop the transfer functions for a given system.
- Analyze the open and closed loop performance for a control system.
- Analyze the stability for a given control system.
- Design a controller.

UNIT-I **(12 Lectures)**

Response of first order system, Physical examples of first order systems, Response of first order systems in series

UNIT-II **(12 Lectures)**

Higher order systems and transportation lag, Control systems, Controllers and final control elements

UNIT-III **(12 Lectures)**

Closed loop transfer functions, Transient response of simple control systems, Stability

UNIT-IV **(12 Lectures)**

Root locus, Introduction to frequency response: Bode diagrams of first and second order systems with and without lag, Control systems design by frequency response

UNIT-V **(12 Lectures)**

ADVANCED CONTROL STRATEGIES:

Cascade control, Feed forward control, Ratio control, Controller tuning and Process Identification, Control valves.

TEXTBOOK:

D R Coughanowr, "*Process systems Analysis and Control*", 2nd Edition, McGraw Hill, 1991.

REFERENCE:

G. Stephanopoulos, "*Chemical Process Control*", PHI, 1998.

CHEMICAL TECHNOLOGY

Course Code: 13CH1120

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course introduces the student the following aspects.

- ✤ Methods of manufacturing various chemicals in the chemical process industry.
- ✤ Know the unit operations and unit processes involved in the manufacture of chemicals.
- ✤ Engineering problems involved in the manufacture of various chemicals.

Course Outcomes:

After completion of this course the student would be able to

- ✤ Draw the qualitative flow sheets for the manufacturing process of the various chemicals involved.
- ✤ Give the process design information for a particular manufacturing process.

UNIT-I (12 Lectures)

Manufacturing of Soda ash, caustic soda and chlorine, Glass: manufacture of special glasses

INDUSTRIAL GASES:

carbon dioxide, hydrogen and oxygen – products of water gas, producer gas. Nitrogen industries: synthetic ammonia, urea, nitric acid (ammonium nitrate), ammonium chloride, ammonium phosphate and complex fertilizers

UNIT-II (12 Lectures)

Sulphur and sulphuric acid, manufacture of sulphuric acids, hydrochloric acid and some other chemicals like –Aluminum sulphate and alum, Cement manufacture, magnesium compounds.

UNIT-III **(12 Lectures)**

Manufacture of phenols, formaldehyde, vinyl chloride and vinyl acetate, manufacture of phenol- formaldehyde resin and polyvinyl chloride polymer, SBR.

Oils: Definition, constitution, extraction and expression of vegetable oils, refining and hydrogenation of oils.

UNIT-IV **(12 Lectures)**

Soaps and detergents: Definitions, continuous process for the production of fatty acids, glycerin and soap, production of detergents.

UNIT-V **(12 Lectures)**

Pulp and paper industry: methods of pulping, production of sulphate and sulphite Pulp, production of paper –wet process

TEXT BOOKS:

1. Austin. G.T.,"*Shreve's Chemical Process Industries*", McGraw-Hill, 5^{th} Edition,1985.
2. Gopal Rao M. and Sittig M., "*Dryden's Outlines of Chemical Technology*", 3^{rd} Edition, East–West Press Pvt Ltd., New Delhi, 2000.

REFERENCE:

Davis K.H., Berner F.S., and Bhatia S.C., "*Hand book of Industrial Chemistry Vol 1and II*", CBS publishers, India, 2004.

MASS TRANSFER OPERATIONS LAB

Course Code: 13CH1121

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to enable the student to learn the subject and gain knowledge in handling the lab equipments like Distillation column, Tray column etc., and to test practical applications of the theory.

LIST OF EXPERIMENTS:

1. Estimation of Vapor Diffusion Coefficient.
2. Estimation of Liquid Diffusion Coefficient.
3. Evaluation of Mass transfer coefficients by Surface Evaporation Unit
4. Evaluation of Mass transfer coefficients by Wetted Wall Column Unit.
5. Obtain the Rate of Drying using Tray Dryer.
6. Verify the law of Steam Distillation
7. Verify Rayleigh's equation using Differential Distillation
8. Determine the Vapor Liquid Equilibrium for the given system.
9. Determine the equilibrium distribution data for the given system using LLE.
10. Determine the saturation isotherm for the given system using TLE.
11. Height Equivalent Theoretical Plates.

BASIC COMPUTATIONS LAB

Course Code: 13ES11BC

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to enable the student to learn the basics of MATLAB Toolbox and to solve general mathematical problems.

Course Outcomes :

- ✤ Student will able to solve mathematical problems numerically.
- ✤ The student able to solve ODE-IVP, ODE-BVP, Regression using MAT LAB.

LIST OF EXERCISES:

1. Basic MATLAB commands like representing arrays, matrices, reading elements of a matrix, row and columns of matrices, random numbers.
2. Floor, ceil, and fix commands.
3. Eigen values and Eigen vectors of a matrix.
4. Plotting tools for 2 dimensional and 3 dimensional plots, putting legends, texts, using subplot tool for multiple plots.
5. Linear Regression, interpolation and polynomial regression.
6. Non linear regression.
7. Solving non linear algebraic equations.
8. ODE IVP problems using Runge - Kutta method.
9. ODE BVP problems using shooting method.
10. Using quadrature to evaluate integrals (1, 2 and 3 dimensional cases).
11. Symbolic manipulation to evaluate Laplace and Fourier transforms.
12. Finding the minimum of an unconstrained function.

TECHNICAL COMMUNICATION AND SOFT SKILLS LAB

Course Code : 13HE1103

L	T	P	C
0	0	3	2

Introduction

The introduction of the Advanced English Communication skills Lab is considered essential at B.Tech. level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context. The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

- ✤ Gathering ideas and information: organizing ideas relevantly and coherently
- ✤ Engaging in debates
- ✤ Participating in group discussions
- ✤ Facing interviews
- ✤ Writing project proposals / technical reports
- ✤ Making oral presentations
- ✤ Writing formal letters and essays
- ✤ Transferring information from non-verbal to verbal texts and vice versa
- ✤ Taking part in social and professional communication

Course Educational Objectives:

The Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- ✤ To improve the students' accuracy and fluency in English through a well-developed vocabulary, and enable them to listen to English

spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.

- To enable students face competitive exams such as, GRE, TOEFL, IELTS, UPSC and other Bank examinations.
- To enable them communicate their ideas relevantly and coherently in writing.

Course Outcomes:

- Students will be able to use language accurately, fluently and appropriately.
- They will be able to show their skills of listening, understanding and interpreting.
- They will be able to write project reports, reviews and resumes.
- They will be able to express their ideas relevant to given topics.
- Students will also exhibit advanced skills of interview, debating and discussion.

LIST OF TASKS :

1. Listening comprehension – Achieving ability to comprehend material delivered at relatively fast speed; comprehending spoken material in Standard Indian English, British English, and American English; intelligent listening in situations such as interview in which one is a candidate.
2. Vocabulary building, Creativity, using Advertisements, Case Studies etc.
3. Personality Development: Decision-Making, Problem Solving, Goal Setting, Time Management & Positive Thinking
4. Cross-Cultural Communication : Role-Play/ Non-Verbal Communication.
5. Meetings- making meeting effective, chairing a meeting, decision-making, seeking opinions , interrupting and handling interruptions, clarifications, closure- Agenda, Minute writing

6. Group Discussion – dynamics of group discussion, Lateral thinking, Brainstorming and Negotiation skills

7. Resume writing – CV – structural differences, structure and presentation, planning, defining the career objective

8. Interview Skills – formal & informal interviews,concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing

9. Writing Skills - Business Communication, Essays for competitive examinations.

10. Technical Report Writing/ Project Proposals – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.- Feasibility, Progress and Project Reports.

REFERENCES:

1. Simon Sweeny, *"English for Business Communication"*, CUP, First South Asian Edition, 2010.

2. M. Ashraf Rizvi, *"Effective Technical Communication"*, Tata McGraw-Hill Publishing Company Ltd. 2005.

3. Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, *"English Language Communication: A Reader cum Lab Manual"*, Anuradha Publications, Chennai, 2006.

4. Dr. Shalini Verma, *"Body Language- Your Success Mantra"*, S. Chand, 2006.

5. Andrea J. Rutherford, *"Basic Communication Skills for Technology"*, 2nd Edition, Pearson Education, 2007.

6. Sunita Mishra & C. Muralikrishna, *"Communication Skills for Engineers"*, Pearson Education, 2007.

7. Jolene Gear & Robert Gear, *"Cambridge Preparation for the TOEFL Test"*, 2010.

8. Meenakshi Raman & Sangeeta Sharma, *"Technical Communication"*, Oxford University Press, 2011.

9. Nick Ceremilla & Elizabeth Lee- Cambridge *"English for the Media"* CUP, 2010.

10. R.C. Sharma, Krishna Mohan, *"Business Correspondence and Report writing"*, 4th Edition, Tata Mcgraw-Hill Publishing Co. Ltd., 2010.

11. DELTA's key to the Next Generation TOEFL Test: *"Advanced Skill Practice,"* New Age International (P) Ltd., Publishers, New Delhi. 2010.

12. Books on TOEFL/GRE/GMAT/CAT by Barron's/ CUP, 2011.

13. IELTS series with CDs by Cambridge University Press, 2010.

SYLLABI FOR
VI SEMESTER

PROCESS MODELING AND SIMULATION

Course Code: 13CH1122

L	T	P	C
4	1	0	3

Course Educational Objectives:

This course introduces the student the following aspects.

- Present fundamental laws in developing model equations.
- Understand various chemical engineering systems.
- Mathematical models used for solving problems.

Course Outcomes:

After completion of this course the student would be able to Apply the fundamental laws to develop mathematical model.

UNIT-I (12 Lectures)

Mathematical models for Chemical Engineering systems, fundamentals, introduction to fundamental laws.

UNIT-II (12 Lectures)

Examples of mathematical models of Chemical Engineering systems, constant volume CSTRS, two heated tanks, gas phase pressurized CSTR.

UNIT-III (12 Lectures)

Non-isothermal CSTR, single component vaporizer, batch reactor, reactor with mass transfer. ideal binary distillation column, batch distillation with holdup.

UNIT-IV (12 Lectures)

Computer simulation examples: Non-isothermal CSTR, VLE dew point, bubble point calculations, countercurrent heat exchanger.

UNIT-V (12 Lectures)

Computer simulation examples: gravity flow tank, three CSTRs in series, binary distillation column, batch reactor.

TEXTBOOK:

Luyben. W. L., "*Process Modeling Simulation and Control for Chemical Engineers*" 2nd Edition, McGraw Hill, New York, 1990.

REFERENCES:

1. Balu. K. and Padmanabhan, K., "*Modeling and Analysis of Chemical Engineering Processes*", IK International Private Limited, India, 2007.

2. Bequette W.B, "*Process Control- Modeling, Design and Simulation*", Prentice Hall India.

CHEMICAL REACTION ENGINEERING-II

Course Code: 13CH1123

L	T	P	C
4	1	0	3

Course Educational Objectives:

This course introduces the student the following aspects

- To understand how chemical reactors are modeled and designed.
- Importance of residence time distribution studies.
- Compartment models for modeling of Non-ideal flow reacting vessels.
- Catalysis, Catalytic & Non-catalytic reactors.
- Design of fluid- solid reactors.

Course Outcomes:

After Completion of this course the student would be able to

- Diagnose reactor ills like stagnant zones & bypassing.
- Calculate Volumes & bypassing flow rates.
- Synthesize a rate law given the rate controlling step.
- Find the weight of catalyst needed in design of packed bed reactor.

UNIT-I (12 Lectures)

The importance of Residence Time Distribution studies. The concept of E and F curves. Diagnosing Reactor ills like stagnant zones and bypassing in a vessels (Qualitative only). Compartment Models for modeling of Non-Ideal Flow Reacting vessels. Problems on calculating volumes and bypassing flow rates in a CSTR and PFR and their combination given the F curve or E curve.

UNIT-II (12 Lectures)

Dispersion Model and Tanks in series model for modeling Non-Ideal reacting vessels problems to calculate N and D based on these models.

Problems on calculating conversion based on dispersion Model, Tanks in series and Segregated Flow Model.

UNIT-III **(12 Lectures)**

CATALYSIS:

the rate controlling step in Catalysis. Synthesizing a rate law given the rate controlling step. Effectiveness factor definition and calculation for rectangular and spherical catalyst particles. Finding the weight of catalyst needed in the design of Packed Bed Reactor for mixed flow and plug flow of fluid.

UNIT-IV **(12 Lectures)**

Deactivating catalyst, factors influencing catalyst decay, the role of pore diffusion on catalyst activity rate and performance equation for deactivating catalyst. Rate equation for batch solids and fluids in batch, mixed flow with constant and variable flow of fluid and PFR.

UNIT-V **(12 Lectures)**

Fluid- Solid, Non-Catalytic Reactions: Progressive conversion model and shrinking core model.

- Shrinking core model for spherical particles of unchanging size.
- Rate of Reaction for shrinking spherical particles.
- Determination of Rate controlling step.

Design of Fluid- Solid Reactors: Problems on

- Mixture of particles of different but unchanging sizes: plug flow of solids and uniform gas composition.
- Mixed flow of particles of a single unchanging size, uniform gas composition.
- Mixed flow of the size mixture of particles of unchanging size , uniform gas composition.

TEXT BOOK:

Levenspiel. O., "*Chemical Reaction Engineering*", 3rd Edition, John Wiley and Sons, 2007.

REFERENCES:

1. Fogler. H.S., "*Elements of Chemical Reaction Engineering*", 3rd Edition, Wiley, 1999.
2. Smith. J.M., "*Chemical Engineering Kinetics*", 3rd Edition, McGraw Hill, 1981.

CHEMICAL PROCESS EQUIPMENT DESIGN-I

Course Code: 13CH1124

L	T	P	C
2	0	3	3

Course Educational Objectives:

This course introduces the students the following aspects.

- ✤ Introduce the student to the fundamentals of design.
- ✤ Design of flow sheets for the Chemical Process.
- ✤ Selection of suitable materials of construction for the design.
- ✤ Mechanical Design of Pressure vessels, storage vessels and various components.
- ✤ Process design of Heat exchangers and evaporators.

Course Outcomes:

After completion of this course the student would be able to

- ✤ Design and develop the flow sheets of chemical process.
- ✤ Select and Design of pressure vessels and storage vessels for a process.
- ✤ Select and Design of heat transfer equipment for the particular process.

UNIT-I (10 Lectures)

Introduction to design, development of flow diagram from process description, Material and Energy balance, sizing of equipment. Materials of construction, selection procedure, corrosion prevention, selection of surface coatings.

UNIT-II (14 Lectures)

Stresses due to static loads, thermal stresses, stresses caused by bending and wind loads. Thin and thick wall cylinders under internal and external pressure. Thin and thick walled spherical shells under internal and external pressure, prediction of failure of vessels by maximum normal stress theory and maximum strain theory.

UNIT-III **(12 Lectures)**

Design of thin walled vessels and pressures vessels, nozzles, Jackets, flanges and vessels closures. Fabrication and inspection methods of storage tank, pressure vessels and heat exchangers.

UNIT-IV **(12 Lectures)**

Design of double pipe heat exchangers, LMTD, temperature cross. Shell and tube heat exchangers (1-2, 2-4) optimum design and heat recovery.

UNIT-V **(12 Lectures)**

Design of single and multiple effect evaporators with and without boiling point elevation.

TEXT BOOK:

Coulson J.M and Richardson J.F, "*Chemical Engineering*", 4th Edition, Vol. 6, Pergamon Press, 2005.

REFERENCES:

1. Thakore S.B. and Bhat, B.I, "*Introduction to Process Engineering and Design*", Tata McGraw-Hill Publishing Co., New Delhi, 2007.
2. Couper J.R., Penney W.R., Fair J.R. and Walas, S.M. "*Chemical Process Equipment – Selection and Design*" Elsevier, 2005.

BIO CHEMICAL ENGINEERING

Course Code: 13CH1125

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course introduces the student the following aspects

- To learn the principles Bio Technology.
- Write enzyme kinetics.
- To design unit process that involves biological organisms.

Course Outcomes:

After completion of this course students would be able to

- Understand the structure of any living cells.
- Design and analyze biological reactors.

UNIT-I (10 Lectures)

INTRODUCTION TO MICROBIOLOGY:

Biophysics and cell doctrine, the structure of cells, important cell types, RNA and DNA building blocks, proteins from amino acids.

UNIT-II (12 Lectures)

KINETICS OF ENZYME CATALYZED REACTION:

The enzyme substrate complex and enzyme action, simple enzyme kinetics with one and two substrates, other patterns of substrate concentration dependence, modulation and regulation of enzyme activity, other influences on enzyme activity.

UNIT-III (12 Lectures)

IMMOBILIZED ENZYME TECHNOLOGY:

Enzyme immobilization, immobilization of enzyme in industrial processes, utilization and regeneration of cofactors, biosynthesis, transport across cell membranes, passive and facilitated diffusion, and active transport, introduction of metabolic pathways and end products of metabolism.

UNIT-IV (14 Lectures)

IDEAL REACTORS FOR KINETIC MEASUREMENT:

The ideal batch reactor, the ideal continuous flow stirred tank reactor, Monod growth kinetics, growth cycle phases for batch cultivation. Design and analysis of biological reactors: batch reactors, enzyme catalyzed reactions in CSTR, CSTR reactors with recycle and cell growth, the ideal plug flow reactors

UNIT-V (12 Lectures)

FERMENTATION TECHNOLOGY:

Medium formulation, aseptic and aerobic fermentation processes, alternate bio-reactor configurations, product recovery trains.

Sterilization – methods, thermal death kinetics, batch, continuous air and media sterilization. Downstream processing: Strategies to recover and purify products; separation of insoluble products; separation of soluble products: final steps in purification.

TEXT BOOKS:

1. Bailey. J.E. and Ollis, D.F., "*Biochemical Engineering Fundamentals*", 2nd Edition, McGraw Hill., New York, 1986.
2. Shuler. M.L. and Kargi, F., "*Bioprocess Engineering: Basic Concepts*", 2nd Edition, Prentice Hall, USA, 2002.

REFERENCES:

1. Lee. J.M., "*Biochemical Engineering*", Prentice-Hall, USA, 1992.
2. Doran. P.M., "*Bioprocess Engineering Principles*", Academic Press, USA, 1995.
3. Blanch. H.W. and Clark, D.S., "*Biochemical Engineering*", Marcel Dekker, New York, 1997.

CORROSION ENGINEERING

Course Code: 13CH1126

L	T	P	C
4	0	0	3

Course Educational Objectives:

Corrosion is a major industrial problem and this course

- ✤ Introduces the student the basics of electro chemistry and corrosion engineering.

Course Outcomes:

after completion of the course the student would be able to

- ✤ Understand the factors responsible for corrosion.
- ✤ Devise methods to prevent corrosion.

UNIT-I (12 Lectures)

Definitions-explanation with suitable examples Factors affecting the choice of Engineering Material-Factors affecting Corrosion resistance-Dry Corrosion , Wet Corrosion- Corrosive media or environments- acidic, basic, neutral marine-Corrosion Rate expressions-Effect of aeration, flow rate of the medium, corrosive concentration, temperature, pH on the rates of Corrosion. Direct and indirect costs due to corrosion in Industrial practice- Corrosion rates determination from weight loss measurements.

Basic electrochemical relevant to corrosion-Anode, Cathode, electrolyte, conductivity, resistivity,

Electrochemical theories of Corrosion- relevant reactions at the respective metal/alloy electrodes, Mixed Potential theory of Electrochemical Corrosion, Electrode potentials- reversible and irreversible - EMF series, Galvanic Series their significance in corrosion monitoring-Corrosion Potential-representation by Evans Diagrams-Polarization-Over voltage, Activation and Concentration polarization- Tafels Equation, Tafels constants in determination of Corrosion Current densities and Corrosion rates-

Nernst Equation and determination of Corrosion potentials. Thermodynamic aspects of Corrosion reactions- Potential-pH phase diagram for Iron-Water system.

UNIT-II **(12 Lectures)**

A Corrosion Cell –its components with examples –types of corrosion cells generally encountered-concentration cells, galvanic or dissimilar metal cells, temperature differentiation cells, Differential aeration cells. Forms of Corrosion-Uniform, Pitting, crevice corrosion, Cavitation erosion, impingement attack, Corrosion fatigue- metallurgical aspects affecting corrosion reactions Area effect, Grain boundary effect.

UNIT-III **(12 Lectures)**

Dezincification, Intergranular Corrosion, mechanism and remedial measures, Stress Corrosion Cracking, Caustic embrittlement, Hydrogen embrittlement mechanism and remedial measures-mechanism of differential aeration corrosion and remedial measures. Biological corrosion due to bacterial habitat, Combination of two dissimilar metal electrodes and relevant current-potential diagrams to evaluate corrosion rates-galvanic Corrosion.

UNIT-IV **(12 Lectures)**

Combating Corrosion – Corrosion testing methods: Weight Loss methods, standard expression for corrosion rates-Huey Test, Streicher Test, Warren Test for corrosion. Linear Polarization Technique to evaluate corrosion, interpretation of corrosion data by Nelson's Method.

Corrosion Prevention Methods generally followed-Coatings, Organic (paints) and Inorganic coatings-Chemical Conversion coatings- Altering the environment, inhibitors organic and inorganic, altering or modifying the material, alloying essential design rules during fabrication and other precautions during the choice of the material for a given service environment.

Passivity, Anodic Protection and Cathodic Protection, Sacrificial anode Method –Current impressed Method- galvanizing of steel.

UNIT-V **(12 Lectures)**

Selection for a given Chemical Engineering Service Environment- Materials for Chemical Engineering Industry to resist the given chemical Environment.-

Ferritic, Austenitic steels and stainless steels-Copper and its alloys-Brasses, bronzes, Nickel and its alloys- Monel alloys-materials for a petroleum refinery industry.

TEXT BOOK:

Fontana. M.G, and Grene., "*Corrosion Engineering*", 3rd Edition, Tata McGraw Hill, New York, 2005.

REFERENCE:

Uhlig. H.H., "*Corrosion and Corrosion Control*", 3rd Edition, John Wiley and Sons, New York, 1985.

NANO TECHNOLOGY

Course Code: 13CH1127

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course introduces the student the following aspects.

- ✤ General considerations about nano materials.
- ✤ Synthesis of nano particles.
- ✤ Properties of nano materials
- ✤ Role of Chemical Engineer in the development of nano science and technology

Course Outcomes:

After completion of this course the student would be able to

- ✤ Correlate the theoretical knowledge of emerging technology to the practical applications which are under research.

UNIT-I (12 Lectures)

Introduction to Nano Technology, Carbon NanoTubes (CNTs), Porous Silicon, Aerogels, Zeolites, Ordered Porous Materials Using Micelles as Templates, Self Assembled Nanomaterials, Core- Shell Particles.

APPLICATIONS:

Electronics, Energy, Automobiles, Sports and Toys, Textiles, Cosmetics, Domestic Appliances, Biotechnology and Medical Fields, Space and Defense, Nanotechnology and Environment.

UNIT-II (12 Lectures)

STRUCTURE AND BONDING:

Arrangement of Atoms, Two Dimensional Crystal Structures, Three Dimensional Crystal structures, Some Examples of Three Dimensional Crystals, Planes in the Crystals, Crystallographic Directions, Reciprocal Lattice, Quasi Crystals, Bonding in Solids.

ANALYSIS TECHNIQUES:

Microscopes, Electron Microscopes, Scanning Probe Microscopes (SPM), diffraction Techniques, Spectroscopies, Magnetic Measurements.

UNIT-III (12 Lectures)

SYNTHESIS OF NANOMATERIALS-I (PHYSICAL METHODS):

Mechanical Methods, Methods based on Evaporation, Sputter Deposition, Chemical Vapor Deposition(CVD), Electric Arc Deposition, Ion Beam Techniques (Ion Implantation), Molecular Beam Epitaxy(MBE).

UNIT-IV (12 Lectures)

SYNTHESIS OF NANOMATERIALS-II (CHEMICAL METHODS):

Colloids and Colloids in solutions, Growth of Nanoparticles, Synthesis of Metal Nanoparticles by Colloidal Route, Synthesis of Semiconductor Nanoparticles by Colloidal Route, Langmuir- Blodgett(L-B) method, Microemulsion, Sol-Gel Methods.

SYNTHESIS OF NANOMATERIALS-III (BIOLOGICAL METHODS):

Synthesis Using Microorganisms, Synthesis Using Plant Extracts, Use of Proteins and Templates like DNA.

UNIT-V (12 Lectures)

PROPERTIES OF NANOMATERIALS:

Mechanical Properties, Structural Properties, Melting of Nanoparticles, Electrical Conductivity, Optical Properties, Magnetic Properties.

TEXT BOOKS:

1. Sulabha.K.Kulkarni., "*Nanotechnology: Principles and Practices*", Capital Publishing Company, New Delhi, 2006.
2. Wilson, M., Smith, G.,Simmons, M. and Raguse, B., "*Nanotechnology: Basic Science and Emerging Technologies*", Overseas Press, New Delhi,2008.

REFERENCE:

Ratner,M. and Ratner, D., "*Nanotechnology : A gentle Introduction to the next big idea*", Pearson Education, Dorling Kindersley Publishing, 2003.

DESIGN AND ANALYSIS OF EXPERIMENTS

Course Code: 13CH1128

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course introduces the student the following aspects.

- Which factors affect a given experiment?
- Find the most significant factor for an experiment.
- Calculate the factor levels that optimize the outcome of an experiment.
- Factorial Design of experiments.
- Response surface methodology for design of experiments.

Course Outcomes:

After completion of this course the student would be able to

- Given the number of important factor how many numbers of experiments are to be carried out.
- Design an experiment and calculate the factor levels that optimize a given objective.
- Use response surface methodology to optimize the process, by considering curvature effects.

UNIT-I (12 Lectures)

Strategy of Experimentation, Some Typical Applications of Experimental Design, Basic Principles, Guidelines for Designing Experiments, A Brief History of Statistical Design

SUMMARY: Using Statistical Techniques in Experimentation.

Sampling and Sampling Distributions, Inferences about the Differences in Means-Randomized Designs, Inferences about the Differences in Means-Paired Comparison Designs, Inferences about the Variances of Normal Distributions

UNIT-II **(10 Lectures)**

The Analysis of Variance, Analysis of the Fixed Effects Model Statistical Analysis of the RCBD

UNIT-III **(14 Lectures)**

Introduction to Factorial Designs, Basic Definitions and Principles, The Advantage of Factorials, The Two-Factor Factorial Design, The General Factorial Design

The 2k Factorial Design, Introduction, The 22 Design, The 23 Design, The General 2k Design, A single replicate of the 2k design, The addition of center points to the 2k design

UNIT-IV **(12 Lectures)**

Fitting Regression Models, Introduction, Linear Regression Models, Estimation of the Parameters in Linear Regression Models, Hypothesis testing in multiple regression, Confidence intervals in multiple regression

UNIT-V **(12 Lectures)**

Introduction to Response Surface Methodology, the Method of Steepest Ascent, Experimental Designs for Fitting Response Surfaces- Designs for Fitting the First-Order Model, Designs for Fitting the Second-Order Model, Evolutionary Operation

TEXT BOOK:

Montgomery. D.C., "*Design and Analysis of Experiments*", 5^{th} Edition, John Wiley and Sons Inc., New York, 2006.

REFERENCE:

George. E. P. Box, J. Stuart Hunter, William G. Hunter, "*Statistics for Experimenters: Design, Innovation, and Discovery*", 2^{nd} Edition, Wiley, 2005.

POLYMER ENGINEERING

Course Code: 13CH1129

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course helps the student in understanding the following aspects

- Classification of polymers and their molecular weight distributions.
- Methods of measuring mechanical properties.
- Various experimental methods of measuring molecular weight distribution of long chain Polymers.
- Steps of polymer processing.

Course Outcomes:

After completion of this course the student would be able to

- Understand how to measure MW distributions of a given polymer.
- Analyze the modification of polymers on addition of adhesives, plasticizers, antioxidants etc.
- Know the effect of temperature on polymers.

UNIT-I (12 Lectures)

INTRODUCTION :

Defining Polymers, Classification of Polymers and Some Fundamental Concepts, Chemical Classification of Polymers Based on Polymerization Mechanisms, Molecular-weight Distributions, Configurations and Crystallinity of Polymeric Materials, Conformation of Polymer Molecules, Polymeric Supports in Organic Synthesis.

UNIT-II (12 Lectures)

EFFECT OF CHEMICAL STRUCTURE ON POLYMER PROPERTIES:

Introduction, Effect of Temperature on Polymers, Additives for Plastics, Rubbers, Cellulose Plastics, Copolymers and blends, Cross-linking Reactions, Ion-Exchange Resins.

STEP-GROWTH POLYMERIZATION:

Introduction, Esterification of Homologous Series and the Equal Reactivity Hypothesis.

Chain-Growth Polymerization: Introduction, Radical Polymerization, Ionic Polymerization, Anionic Polymerization.

UNIT-III (12 Lectures)

MEASUREMENT OF MOLECULAR WEIGHT AND ITS DISTRIBUTION:

Introduction, End-Group Analysis, Colligative Properties, Light Scattering, Ultracentrifugation, Intrinsic Viscosity, Gel Permeation Chromatography.

UNIT-IV (12 Lectures)

THEORY OF RUBBER ELASTICITY:

Introduction, Elastic Force Between Chain Ends, Stress-Strain Behavior, The Stress Tensor (Matrix), Measures of Finite Strain, The Stress Constitutive Equation, Vulcanization of Rubber and Swelling Equilibrium.

UNIT-V (12 Lectures)

MECHANICAL PROPERTIES:

Introduction, Stress-Strain Behavior, The Glass Transition Temperature, Dynamic Mechanical Experiments, Time-Temperature Superposition, Polymer Fracture, Crazing and Shear Yielding, Fatigue Failure, Improving Mechanical Properties.

POLYMER PROCESSING:

Introduction, Extrusion, Injection Molding and Fiber Spinning.

TEXT BOOK:

Anil Kumar. Gupta, R.K. "*Fundamentals of Polymer Engineering*", 2nd Ed, Marcel Dekker, 2003.

REFERENCE:

Zehev Tadmor, Costas G. Gogos "*Principles of Polymer Processing*", 2nd Ed, John Wiley & sons, 2006.

PETROLEUM REFINING AND PETROCHEMICALS

Course Code: 13CH1130

L	T	P	C
4	0	0	3

Course Educational Objectives:

Refining operations constitute the major applications of chemical engineering This course

- ✤ Introduces the student to the scenario of petroleum refining.
- ✤ Operations involved in petroleum refining.

Course Outcomes:

After completion of the course the student would be able to

- ✤ Understand the importance of cracking.
- ✤ Understand the difference between thermal and catalytic cracking.
- ✤ Understand the reforming process.

UNIT-I (12 Lectures)

Origin, formation and composition of petroleum: Origin and formation of petroleum, Reserves and deposits of world, Indian Petroleum Industry.

Petroleum processing data: Evaluation of petroleum, thermal properties of petroleum fractions, important products, properties and test methods.

UNIT-II (12 Lectures)

Fractionation of petroleum: Dehydration and desalting of crudes, heating of crude pipe still heaters, distillation of petroleum, blending of gasoline.

Treatment techniques: fraction-impurities, treatment of gasoline, treatment of kerosene, treatment of lubes.

UNIT-III (12 Lectures)

Thermal and catalytic processes: Cracking, catalytic cracking, catalytic reforming, Naphtha cracking, coking, Hydrogenation processes, Alkylation processes, Isomerization process.

UNIT-IV **(12 Lectures)**

Petrochemical Industry – Feed stocks

Chemicals from methane: Introduction, production of Methanol, Formaldehyde, Ethylene glycol, PTFE, Methylamines.

UNIT-V **(12 Lectures)**

Chemicals from Ethane-Ethylene-Acetylene: Oxidation of ethane, production of Ethylene, Manufacture of Vinyl Chloride monomer, vinyl Acetate manufacture, Ethanol from Ethylene, Acetylene manufacture, Acetaldehyde from Acetylene.

TEXT BOOKS:

1. Nelson. W.L. "*Petroleum refining Engineering*", 4 Edition, Mc Graw Hill, New York, 1969.
2. Rao, B.K.B. "*Modern Petroleum Refining Processes*", 4 Edition, Oxford and IBH Publishing, 2002.

REFERENCES:

1. Goldstine. R.F. "*The Petroleum Chemicals Industry*", Taylor and Francis, London, 1967.
2. Gruese. W.S.and Stevens, D.R. "*Chemical Technology of Petroleum*", McGraw Hill, 1980.
3 Chauvel. A. and Lefevrev, "*Petro Chemicals*", Volume 1 and 2, Gulf Publishing company 1989.

ENERGY ENGINEERING

Course Code: 13CH1131

L	T	P	C
4	0	0	3

Course Educational Objectives:

Energy crisis has renewed interest in searching for alternate fuels. This course

- ✤ Introduces the student to various sources of energy like solar, biomass and batteries.

Course Outcomes:

After completion of the course the student would be able to

- ✤ Distinguish between the various sources of energy.
- ✤ Be able to judge the best possible source of energy for a given environmental condition.
- ✤ Understand the principles of batteries and their performance.

UNIT-I (12 Lectures)

Sources of energy, types of fuels- energy and relative forms. Calorific value- gross and net value, calculation of calorific value from fuel analysis, experimental determination energy resources present and future energy demands with reference to India.

COAL:

Origin, occurrence, reserves, petrography, classification, ranking, analysis, testing, storage, coal carbonization and byproduct recovery, liquefaction of coal, gasification of coal, burning of coal and firing mechanism, burning of pulverized coal.

LIQUID FUELS:

Petroleum: origin, occurrence, reserves, composition, classification, characteristics, fractionation, reforming, cracking, petroleum products, specification of petroleum products, burning of liquid fuels.

Natural gas, coke oven gas, producer gas, water gas, LPG, burning of gaseous fuels, hydrogen (from water) as future fuel., fuel cells, flue gas, analysis: Orsat apparatus,

UNIT-II **(12 Lectures)**

NONCONVENTIONAL RESOURCES:

Solar Energy: Introduction to solar radiation, solar constant, solar radiation on earth, solar radiation data for India. Solar thermal power and its conversion, solar collectors, flat plate, performance analysis of flat plate collector.

Wind Energy: Properties of wind, Availability of wind energy in India, Wind velocity, Wind machine fundamentals, Types of wind machines and their characteristics.

Bio Mass and Biogas: Principles of Bio-conversion, Photosynthesis, Bio gas production, Aerobic and anaerobic bio conversion process, Raw materials, properties of bio gas, producer gas, transportation of bio gas plant, biogas plant technology and status. **Geothermal Energy:** Structure of earth's interior, geothermal sites, earthquakes and volcanoes, geothermal resources.

Ocean Energy: Principle of ocean thermal energy conversion, wave energy conversion machines, power plants based on ocean energy.

UNIT-III **(12 Lectures)**

BATTERIES:

Fundamentals, EMF, reversible cells and irreversible cells, reversible electrodes, relationship between electrical energy and energy content of a cell, free energy changes and emf in cells, relationship between the energy changes accompanying a cell reaction and concentration of the reactants, effect of cell temperature on batteries, derivation of number of electrons involved in a cell reactions, thermodynamic calculation of the capacity of a battery, calculations of energy density of cells, heating effects in batteries, spontaneous reaction in electrochemical cells, pressure development in sealed batteries.

UNIT-IV **(12 Lectures)**

(I) FACTORS AFFECTING BATTERY PERFORMANCE :

Factors affecting battery capacity, voltage level current drain of discharge, types of Discharge continuous, intermittent, constant current, constant load, constant power, service life, voltage regulation, changing methods, battery age & storage condition, effect of battery design.

(II) TESTING OF BATTERY COMPONENTS:

Evaluation of active masses, porosity - mercury porosity meter, liquid absorption method, surface area measurement - BET method (nitrogen absorption.), internal resistance of cells - D.C. methods, polarization elimination method. I.E. polarization and flash current method A.C. methods, A.C. impedance method, testing of storage batteries

UNIT-V (12 Lectures)

FUEL CELLS & SUPER CAPACITOR:

Introduction to super capacitors, types of super capacitors, introduction to fuel cells, types of fuel cells and technology development

Fuel Cells: What is a fuel cell, Types of fuel cells, fuel cells applications, main components of a PEM fuel cell.

TEXT BOOKS:

1. Gupta, O.P. "*Fuels, Furnaces and Refractories*", Khanna Publishers,New Delhi,1990.
2. Samir Sarkar, "*Fuels and Combustion*", Orient Longman, 2nd Edition ,1998.
3. Rai, G.D. "*Non-Conventional Energy Resources*", Khanna Publsihers, New Delhi, 1993.
4. Linden D and Reddy T.B., "*Hand book on batteries and Fuel cells*", McGraw Hill Book Co., New York, 3rd Edition, 2002.
5. Frano B., "*PEM fuel cells: Theory and practice*", Elsevier, 2005.

REFERENCES:

1. Sukhathme , S.P. "*Solar Energy*". , Tata Mc Graw Hill, New Delhi, 1996.
2. Murphy, W.R., Mc.Kay, G. "*Energy Management*", Butterworth, 1st Edition, 2000.

PROCESS DYNAMICS AND CONTROL LAB

Course Code: 13CH1132

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to enable the student to learn the subject and gain knowledge in handling the lab equipments like Mercury in Glass thermometer, U-tube manometer etc., and to test practical applications of the theory.

LIST OF EXPERIMENTS:

1. Study of On-Off controller.
2. Determination of time constant and Response of a thermometer without thermal well.
3. Determination of time constant and Response of a thermometer with thermal well.
4. Study of two tank interacting Step response
5. Study of two tank interacting impulse response
6. Study of response of Single capacity system.
7. Study of Temperature control dynamics.
8. Estimation of Control valve flow coefficient
9. Estimation of Control valve flow characteristics.
10. Estimation of damping coefficient for U-tube manometer
11. Hysteresis of a control valve.

CHEMICAL REACTION ENGINEERING LAB

Course Code: 13CH1133

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to enable the student to learn the subject and gain knowledge in handling the lab equipments like Batch Reactor, CSTR, PFR etc., and to test practical applications of the chemical reaction engineering theory.

LIST OF EXPERIMENTS:

1. Determination of the order of a reaction using a batch reactor and analyzing the data by

   (a) Differential method (b) integral method.
   Major equipment - Batch reactor

2. Determination of the order of a reaction and rate constant using a packed bed reactor and analyzing the data by (a) differential method
   (b) integral method.
   Major equipment – Packed bed reactor

3. Determination of the activation energy of a reaction using a batch reactor
   Major equipment - Batch reactor

4. To determine the effect of residence time on conversion and to determine the rate constant using a CSTR. Major equipment – CSTR apparatus

5. To determine the specific reaction rate constant of a reaction of a known order using a batch reactor.
   Major equipment - Batch reactor

6. To determine the order of the reaction and the rate constant using a tubular reactor.
   Major equipment – PFR apparatus

7. CSTRs in series- comparison of experimental and theoretical values for space times and volumes of reactors.
   Major equipment - CSTRs in series setup

8. Mass transfer with chemical reaction (solid-liquid system) – determination of mass transfer coefficient.
   Major equipment – beaker, stirrer

9. Axial mixing in a packed bed. Determination of RTD and dispersion number for a packed-bed using a tracer
   Major equipment - Packed bed set up

10. Determination of RTD and dispersion number in a tubular reactor using a tracer.
    Major equipment - PFR set up

11. Determination of mass transfer coefficient using Sodium sulphite method.

INTELLECTUAL PROPERTY RIGHTS AND PATENTS

(Common to all Branches)

Course Code: 13NM1103

L	T	P	C
2	0	0	0

Course Educational Objectives:

- ✤ To acquaint the learners with the basic concepts of Intellectual Property Rights.
- ✤ To develop expertise in the learners in IPR related issues and sensitize the learners with the emerging issues in IPR and the rationale for the protection of IPR.

Course Outcomes:

At the end of this course, the student will be able to

- ✤ Gain knowledge on Intellectual Property assets and generate economic wealth
- ✤ Assist individuals and organizations in capacity building and work as a platform for development, promotion, protection, compliance, and enforcement of Intellectual Property & knowledge.

UNIT-I **(7 Lectures)**

Introduction to intellectual property Act and Law-the evolutionary past-the IPR tool kit- legal tasks in intellectual property law-ethical obligations in Para legal tasks in intellectual property law

UNIT-II **(8 Lectures)**

Introduction to trade mark – Trade mark registration process-Post registration procedures-Trade mark maintenance – transfer of rights- inter party's proceeding – Infringement-Dilution ownership of trade mark-likelihood of confusion – trademark claims- trademark litigations

UNIT-III **(6 Lectures)**

Introduction to copy rights- principles of copyright – subjects matter of copy right- rights afforded by copyright law- copyright ownership- transfer and duration – right to prepare derivative works- right of distribution- right to perform the work publicity- copyright formalities and registrations

UNIT-IV **(7 Lectures)**

Introduction to patent law- Rights and limitations- Rights under patent law- patent requirements- ownership – transfer- patent application process- patent infringement- patent litigation

UNIT-V **(6 Lectures)**

Introduction to transactional law- creating wealth and managing risk – employment relationship in the Internet and technologic cal sector- contact for internet and technological sector

TEXT BOOKS:

1 Kompal Bansal and Praishit Bansal, "*Fundamentals of IPR for Engineers*", 1st Edition,BS Publications, 2012.

2 Prabhuddha Ganguli, *"Intellectual Property Rights"*, 1st Edition, TMH, 2012.

REFERENCES:

1 R Radha Krishnan & S Balasubramanian, *"Intellectual Property Rights"*, 1st Edition, Excel Books, 2012.

2 M Ashok Kumar & mohd Iqbal Ali, *"Intellectual Property Rights"*, 2nd Edition, Serial publications, 2011.

SYLLABI FOR VII SEMESTER

CHEMICAL PROCESS EQUIPMENT DESIGN-II

Course Code: 13CH1134

L	T	P	C
2	0	3	3

Course Educational Objectives:

This course introduces the students the following aspects of unit operations of chemical process.

- Design methods of Tray towers and Packed towers.
- Design methods of Distillation column, Extractors.
- Design methods and techniques required for Reactors.
- Design methods and techniques required for piping and pumps and blowers.

Course Outcomes:

After completion of this course the student would be able to

- Design and develop the Mass Transfer equipment of chemical process.
- Select and Design of Reaction vessels of a given process.
- Select and Design piping and pumps and blowers for the particular process.

UNIT-I (16 Lectures)

Tray type of absorbers: criteria for selection, types of distributors, calculation of number of plates, and pressure drop.

Packed bed type of absorbers: Types of packing, Height of transfer unit, Number of Transfer units, overall column height, Pressure drop calculations.

UNIT-II (14 Lectures)

McCabe-Thiele method, for binary distillation, Fenske-Underwood-Gilliland method calculation of minimum reflux, minimum plates, Criteria for selection of distillation column.

Determination of distillation column diameter, selection of liquid flow pattern, total pressure drop in column, Tray efficiency and height equivalent of theoretical plate, Tray efficiency, calculation of flooding velocity.

UNIT-III **(10 Lectures)**

Types of extractors (mixer-settler, un-agitated columns, agitated columns, centrifugal extractor), selection of extractors, selection of solvents, process design of extractors.

UNIT-IV **(10 Lectures)**

Types of reactors, process design of batch reactor and continuous flow reactors, selection of reactor

UNIT-V **(10 Lectures)**

Process design of piping, process design of pumps blowers and extractors, flow meters, process design of orifice meters and rotameters.

TEXTBOOK:

Coulson J.M and Richardson J.F, "*Chemical Engineering*", 4^{th} Edition, Vol. 6, Pergamon Press, 2005.

REFERENCES:

1. Thakore. S.B. and Bhat, B.I, "*Introduction to Process Engineering and Design*", Tata McGraw-Hill Publishing Co., New Delhi, 2007.
2. Couper. J.R., Penney W.R., Fair J.R. and Walas, S.M. "*Chemical Process Equipment – Selection and Design*" Elsevier, 2005.

TRANSPORT PHENOMENA

Course code: 13CH1135

L	T	P	C
4	1	0	3

Course Educational Objectives:

This course introduces the student the following aspects.

- Present the fundamental equations.
- Understand the analogy between momentum, mass and energy transport.
- Concept of shell balances.
- Equation of change for isothermal and non-isothermal systems and multi-component mixtures.

Course Objectives:

After completion of this course the student would be able to

- Apply the fundamental equations to solve various chemical engineering problems.
- Develop expressions for velocity, temperature and concentration profiles using shell balances.
- Apply equations of change to solve flow problems.

UNIT-I (10 Lectures)

Transport properties, estimation of transport properties, pressure, and temperature and concentration dependence of transport properties.

UNIT-II (10 Lectures)

Shell momentum balances and velocity distributions in laminar flow: shell momentum balances and boundary conditions, flow of a falling film, flow through a circular tube, flow through annulus, flow of two adjacent immiscible fluids, creeping flow around a sphere.

UNIT-III **(14 Lectures)**

Shell energy balances and temperature distributions in solids and laminar flow: shell energy balances; boundary conditions, heat conduction with an electrical heat source, heat conduction with a nuclear heat source, heat conduction with a viscous heat source, heat conduction with a chemical heat source, heat conduction through composite walls, heat conduction in a cooling fin, forced convection, free convection.

UNIT-IV **(14 Lectures)**

Concentration distributions in solids and laminar flow: shell mass balances; boundary conditions, diffusion through a stagnant gas film, diffusion with a heterogeneous chemical reaction, diffusion with a homogeneous chemical reaction, diffusion into a falling liquid film (gas absorption), diffusion into a falling liquid film (solid dissolution), diffusion and chemical reaction inside a porous catalyst.

UNIT-V **(12 Lectures)**

The equations of change for isothermal systems: the equation of continuity, the equation of motion, the equation of mechanical energy, the equations of change in terms of the substantial derivative, use of the equations of change to solve flow problems. Velocity distributions in turbulent flow: comparisons of laminar and turbulent flows, time- smoothed equations of change for incompressible fluids.

The equations of change for non- isothermal systems: the energy equation.

The equations of change for multi component systems: the equations of continuity for a multi component mixture.

TEXT BOOK:

Bird R.B., Stewart W.S., Lightfoot E.N., "*Transport phenomena*", 2nd Edition, John Wiley and Sons, U.S.A, 2002.

REFERENCES:

1. Welty. J.R, Wicks C.E, Wilson R.E, "*Fundamental of Momentum, Heat and Mass Transfer*", 4th Edition, John Wiley, 2009.
2. Theodore. L. "*Transport Phenomena for Engineers*", International text book company, U.S.A., 1971.

OPTIMIZATION OF CHEMICAL PROCESSES

Course Code: 13CH1136

L	T	P	C
4	1	0	3

Course Educational Objectives:

Optimization plays an important role in all engineering problem. The course introduces the student to

- ✤ Basics of Optimization.
- ✤ Formulation of an optimization problem
- ✤ Role of constraints on the solution of an optimization problem

Course Outcomes:

After completion of the course the student would be able to

- ✤ Formulate and solve an optimization problem

The following syllabus is limited to Multi-variable problems with two variables only.

UNIT-I (12 Lectures)

Gradient of a single variable function, gradient vector of a multi-variable function, second derivative of a single variable function, Hessian of a multi-variable function, Eigen values of a matrix, convex functions, determination of convexity of a function by Eigen values.

Optimality conditions for a single-variable and multi-variable functions, classification of stationary points for single-variable and multi-variable functions.

UNIT-II (12 Lectures)

Structure of a single-variable and multi-variable optimization problems with and without constraints (qualitative treatment), single-variable optimization methods and problems: interval halving method, golden section method and Fibanocci method.

UNIT-III **(12 Lectures)**

Linear programming, Simplex method to solve LP problems, duality principle and converting a LP to dual LP.

UNIT-IV **(12 Lectures)**

MULTI-VARIABLE OPTIMIZATION WITHOUT CONSTRAINTS: Multi-variable optimization methods, such as steepest descent, Newton's method and unidirectional search method. Solving two-variable optimization problems using above methods.

MULTI-VARIABLE OPTIMIZATION WITH CONSTRAINTS: Lagrangian multiplier method, Karush-Kuhn-Tucker (KKT) conditions, penalty function method. Solving two-variable constrained optimization problems using above methods.

UNIT-V **(12 Lectures)**

Chemical engineering optimization problems

Part 1: Pipe diameter, multi-stage evaporator, reflux ratio of distillation column.

Chemical engineering optimization problems

Part 2: Thermal cracker, Alkylation reactor.

TEXT BOOKS:

1. Edgar,T.F., Himmelblau, D.M. and Lasdon L.S., "*Optimization of Chemical Processes*", 2nd Edition, McGraw-Hill International, 2001.
2. Kalyanmoy Deb "*Optimization for Engineering Design*", Prentice Hall, India, 2005.
3. Rao S.S., "*Engineering Optimization-Theory and Practice*", 3 Ed, New Age International Publishers, New Delhi, 1996.

REFERENCES:

1. Arora. J.S., "*Introduction to Optimum Design*", 2nd Edition, Elsevier Academic Press, San Diego, USA, 2004.
2. Ravindran. A., and Ragsdell, K.M., Reklaitis, G.V., "*Engineering Optimization-Methods and Applications*", 2nd Edition, Wiley, New York, 2006.

NOVEL SEPARATION PROCESSES

Course Code: 13CH1137

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course introduces the student the following aspects.

- ✤ To learn the preparation methods of synthetic membranes
- ✤ Which membrane materials are exactly suitable for a given separation process.
- ✤ The characterization of both porous and non-porous membranes.
- ✤ Understanding adsorption and ion exchange principles for industrial applications.

Course Outcomes:

After completion of this course the student would be able to

- ✤ To select suitable membrane materials for specific applications.
- ✤ Select the suitable preparation technique and module for the outcome.

UNIT-I (12 Lectures)

INTRODUCTION:

Separation processes, membrane processes, definition of a membrane, classification of membrane processes and membrane modules.

PREPARATION OF SYNTHETIC MEMBRANES:

Types of Membrane materials, phase inversion membranes, preparation technique for immersion precipitation, preparation technique for composite membranes.

CHARACTERIZATION OF MEMBRANES:

Introduction, membrane characterization, characterization of porous membranes, characterization of non-porous membranes.

UNIT-II (12 Lectures)

MEMBRANE PROCESSES:

Introduction, pressure driven membrane processes: Introduction, microfiltration: Introduction, membranes for microfiltration, industrial applications, ultrafiltration: membranes for ultrafiltration, industrial applications, reverse osmosis and nanofiltration: membranes for reverse osmosis and nanofiltration, industrial applications.

ELECTRICALLY DRIVEN PROCESSES:

Introduction, electrodialysis, Process parameters, membranes for electrodialysis, applications, Membrane electrolysis, Bipolar membranes, Fuel Cells.

UNIT-III (12 Lectures)

CONCENTRATION DRIVEN MEMBRANE PROCESSES:

Gas separation: Membranes for gas separation, applications, pervaporation: membranes for pervaporation, applications, dialysis: membranes for dialysis, applications, liquid membranes: aspects, liquid membrane development, choice of the organic solvent and carrier, applications.

UNIT-IV (12 Lectures)

ADSORPTION:

Adsorbents, Adsorption equilibrium, Interacting Adsorption systems: Interacting solutes, Adiabatic adsorbers, velocity effects. Adsorption-Desorption operations: Thermal desorption of gases, Activated carbon solvent recovery, Processing liquid using thermal regeneration, Pressure swing and vacuum swing adsorption, Regeneration with purge and desorbent.

UNIT-V (12 Lectures)

ION EXCHANGE:

Basics of Ion exchange, Ion exchange resins, Binary ion exchange equilibrium, Ion movement theory, Applications, Applications without exchange: Ion exclusion, Mass transfer in ion exchange systems.

TEXT BOOKS:

1. Marcel Mulder, "*Basic Principles of Membrane Technology*", 2 Ed., Springer Publications, 2007
2. Wankat, P. C. "*Rate- Controlled Separations*", Springer, 1994.

REFERENCES:

1. Nunes. S.P, Peinemann, K.V, "*Membrane Technology in the chemical industry*", 2nd Edition, Wiley-VCH, 2006.
2. Rautanbach and Albrecht. R., "*Membrane Process*", John Wiley and Sons.1989.
3. Crespo. J.G., Bodekes, K.W., "*Membrane Processes in separation and Purification*", Kluwer Academic Publications, Netherland, 1994.
4. Geankoplis. C.J. "*Transport processes and Unit Operations*", 3rd Edition, PHI, New Delhi, 2002.

CHEMICAL PLANT DESIGN AND ECONOMICS

Course Code: 13CH1138

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course introduces the student the following aspects.

- ✤ To make chemical engineering graduates well versed with economic and engineering principlesin the design of chemical plants.
- ✤ To impart knowledge on optimum design strategy.

Course Outcomes:

After completion of this course the student would be able to

- ✤ Estimate the total capital investment, total production cost for a particular manufacturing process.
- ✤ Calculate the taxes, insurance and depreciation charges which actually effect the profitability of investments.

UNIT-I (8 Lectures)

Introduction, Process Design development.

UNIT-II (10 Lectures)

General design considerations, Cost and asset accounting.

UNIT-III (14 Lectures)

Cash flow for industrial operations, factors effecting investment and production cost, capital investments, estimation of capital investments, cost indices, cost factors in capital investment.

Organizations for presenting capital investment: estimates by compartmentalization, estimation of total product of cost direction, production costs, fixed charges, plant overhead costs, financing.

Interest and investment cost, types of interests, nominal and effective interest rates, continuous interest, present worth and discount, annuities, cost due to interest on investment, source of capital.

UNIT-IV **(14 Lectures)**

Taxes and insurances, type of taxes: federal income taxes, insurance-types of insurance, self insurance. Depreciation: types of depreciation, service life, salvage value, present value, methods for determining depreciation, single unit and group depreciation

UNIT-V **(14 Lectures)**

Profitability, alternative investments and replacements: Profitability standards, discounted cash flow, capitalized cost, pay out period, alternative investments, analysis with small investment increments and replacements.

Optimum design and design strategy, incremental cost, general procedure for determining optimum condition, comparison of graphical and analytical methods, optimum production rates, semi continuous cyclic operation, fluid dynamics, mass transfer.

TEXT BOOK:

Peters. M.S. and Timmerhaus, K.D., "*Plant Design and Economics for Chemical Engineering*", 4th Edition, McGraw Hill, Singapore, 1991.

REFERENCE:

Schweyer. H.E., "*Process Engineering Economics*", McGraw Hill, New York, 1955.

WASTE WATER TREATMENT

Course Code: 13CH1139

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course introduces the student the following aspects.

- ✤ Understanding and removing of different chemicals from waste water.
- ✤ Understanding the activity of micro organisms.
- ✤ Using these concepts for removal of different low concentrated chemicals by biological means.

Course Outcomes:

- ✤ After completion of this course the student would be able to characterize industrial waste water from different industries.
- ✤ A Student can also able to suggest the best waste water treatment method for removal of chemical wastes.

UNIT-I **(12 Lectures)**

Characterization and degree of treatment of waste water, odour and its removal, Removal of color from waste water.

UNIT-II **(12 Lectures)**

Pulp and paper mill waster, Breweries Wineries and Distilleries Waste. Tannery waste, Textile mill waste, Dairy wastes.

UNIT-III **(12 Lectures)**

Fertilizer plant waste, sugar mill wastes, steel plant wastes, Oil Refineries Wastes.

UNIT-IV **(12 Lectures)**

Primary treatment of waste water, Design Principles in biological treatment facilities.

UNIT-V **(12 Lectures)**

Sludge treatment and disposal, Low cost waste treatment systems and their design.

TEXT BOOK:

Rao. M.N and Datta A.K, "*Waste Water Treatment*", 3rd Edition, Oxford&IBH Publishing Co.Pvt.Ltd., New Delhi.

REFERENCE:

Mark. J.Hammer, Mark J.Hammer, Jr., "*Water and Wastewater Technology*", 7th Edition, PHI, New Delhi, 2012.

COMPUTATIONAL FLUID DYNAMICS

Course code: 13CH1140	**L**	**T**	**P**	**C**
	4	**0**	**0**	**3**

Course Educational Objectives:

This course introduces the student

- ✤ The basics of computational fluid dynamics (CFD).
- ✤ What equations govern CFD.
- ✤ How these equations are solved.

Course Outcomes:

After completion of the course the student

- ✤ Will be able to set up the governing equation for any CFD problem.
- ✤ Use the correct discretisation method to solve these governing equations.

UNIT-I (12 Lectures)

Introduction to differencing schemes: Basics of Finite difference methods, finite element method and finite volume method. CFD Applications.

Final Governing differential equations of CFD and boundary conditions in Cartesian, cylindrical and spherical co-ordinate systems.

UNIT-II (12 Lectures)

Finite difference methods for diffusion problems(Theory):

Explicit Method and its Stability criteria, Implicit Method, Crank Nicholson method, Use of one Sided FDM to handle boundary conditions.

Finite difference methods for steady state convection- diffusion problems (Theory):

Use and importance of Upwinding difference method.

UNIT-III (12 Lectures)

Finite Volume method for steady sate diffusion (Theory):

One dimensional and two dimensional problems.

FINITE VOLUME METHOD FOR STEADY STATE CONVECTION-DIFFUSION PROBLEMS (THEORY):

One dimensional and two dimensional problems**.** Use and importance of Upwinding difference method, Hybrid method and Power Law method.

UNIT-IV (12 Lectures)

CASE STUDY-1:

Using FDM and FVM for solving steady and un-steady state one dimensional diffusive problem.

UNIT-V (12 Lectures)

CASE STUDY-2:

Using FDM and FVM for solving one and two dimensional convection and diffusion problem.

TEXT BOOKS:

1. Versteeg. H.K., and Malalasekera W, "*An Introduction to Computational Fluid Dynamics: The Finite Volume Method*", Longman, 1998.
2. Patankar. S.V., "*Numerical Heat Transfer and Fluid Flow*", Taylor and Francis, 1980.

REFERENCE:

Muralidhar.K and Sundararajan T., "*Computational Fluid Flow and Heat Transfer*", Narosa Publishing House, New Delhi 1995.

GREEN CHEMICAL ENGINEERING

Course Code: 13CH1141

L	T	P	C
4	0	0	3

Course Educational Objectives:

After reading this course the student would be able to understand

- ✤ The importance of green chemistry.
- ✤ Sustainable development.
- ✤ Some technologies that have minimized the material and energy usage.

Course Outcomes:

- ✤ After completion of this course the student would be able to
- ✤ To develop new methods for product manufacture that minimizes material and energy.

UNIT-I (12 Lectures)

Principles of Sustainable and Green Chemistry

- Green Chemistry and Industry
- Waste Minimization
- Reduction of Material Use
- Reduction of Energy requirements
- Reduction of Risk and Hazard
- Concept of Sustainability
- Green Chemistry and Sustainability Parameters.

Life Cycle Assessment: Tool for Identification of more sustainable products and processes

- Life Cycle Methodology.
- Application of Life Cycle assessment.

UNIT-II **(14 Lectures)**

Industrial Processes using Solid acid catalysts

- Concept of Acidity and solid acid catalyst
- Industrial application of solid acid catalysts
- Recent developments in Catalytic materials and processes

Micelle- templated silica as catalysts in Green Chemistry

- Mesoporous materials : introduction
- Catalytic applications : Oxidation Reactions like epoxidation, metal free epoxidation, arene hydroxylation, alkane oxidation, and base catalysis(other than oxidation)

UNIT-III **(12 Lectures)**

Polymer supported reagents for organic synthesis

- Polymeric tools for organic synthesis: Polymeric reagents, Polymeric carriers, polymeric catalysts.
- Synthesis with polymer supported reagents
- Acids Chlorides and Anhydrides
- Alcohols, Aldehydes,Ketones, Amides, amines, azodyes, carbodiamides, epoxides, Esters, ethers, fluoro derivatives etc

UNIT-IV **(12 Lectures)**

Bio Catalysis:

- Chemical Production using biocatalysis: bulk chemicals, Pharmaceuticals, Flavours and fragrance, Carbohydrates, polymers
- Green Biocatalytic processes: Biocatalysis in waste treatment and hydro-desulfurization
- Application of Sonochemistry, Microwave irradiation, electrochemistry and photochemistry in Green Chemistry

UNIT-V **(10 Lectures)**

Process Intensification in Green chemistry:

- Spinning Disc reactor, Micro reactors, Intensified cross- corrugated multifunctional membrane

TEXT BOOKS:

1. Clark..J., and Macquarie,D. (editors), "*Handbook of Green Chemistry and Technolog*y", Blackwell Science, Oxford, 2002.
2. Allen. D. T. and Shonnard, D. R., "*Green Engineering: Environmentally Conscious Design of Chemical Processes*", Prentice Hall, New Jersey, 2001.

COMPUTER AIDED DESIGN OF CHEMICAL EQUIPMENT LAB

Course Code: 13CH1142

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to enable the student to learn the subject and gain knowledge in designing the equipments like heat exchangers, evaporators etc., and to enhance the knowledge gained through theory.

LIST OF EXPERIMENTS:

1. Introduction of different basic symbols and drawing flow sheet symbols.
2. Design of a Double Pipe Heat Exchanger
3. Design of a 1-2 shell & tube Heat Exchanger-Rating
4. Design of a 1-2 shell & tube Heat Exchanger-Sizing
5. Design of a Evaporator
6. Design of a Tray Distillation Column
7. Design of a Packed Distillation Column
8. Design of a Batch Reactor
9. Process simulation of Absorber using PRO-II
10. Process simulation of Distillation Column using PRO-II
11. Process simulation of LLE columns using PRO-II

CONTROL SYSTEM DESIGN, SIMULATION AND OPTIMIZATION LAB

Course Code: 13CH1143

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to enable the student to learn the subject and gain knowledge in MATLAB Toolbox and to expose the student the state of the art simulation software and their applications.

LIST OF EXPERIMENTS:

Introduction to MATLAB Toolbox.

Control System design using MATLAB control system Toolbox.

1) Constructing Transfer functions.
2) Poles and zeros of a Transfer functions.
3) Bode plots and their analysis.
4) Inverse response.
5) Control system design using PI and PID controllers.
6) Control system simulation using SIMULINK for P, PI and PID Controllers in the closed loop response of first order and second order systems with time delay.
7) Control system simulation using SIMULINK for P, PI and PID Controllers in the closed loop response of first order and second order systems without time delay.
8) Unconstrained Optimization using MATLAB Optimization Toolbox.
9) Linear Optimization using MATLAB Optimization Toolbox.
10) Constrained Optimization using MATLAB Optimization Toolbox. Design of a PI controller using Optimization technique

SYLLABI FOR VIII SEMESTER

CHEMICAL ENGINEERING MATHEMATICS

Course Code: 13CH1144

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course introduces the student to the following aspects

- Formulation of physicochemical problems, boundary conditions
- Solution techniques for models yielding ordinary differential equations
- Series solution methods and special functions such as Bessel's functions
- Integral functions
- Modeling multiple stage processes and solution methods for linear finite difference equations.
- Laplace transformations, use of Laplace transformations to find solutions of ODE
- Solution techniques for models producing PDEs

Course Outcomes:

After studying the course the student will have good understanding on

- Solve the mathematical models using various analytical techniques
- Formulate the physic chemical problems and solve those using boundary conditions
- Solve ordinary differential equations either linear
- Non linear solve typical ODE's using series solution methods
- Solve integral functions
- Solve staged process models. Using methods of undetermined coefficients, invasive operation methods.
- Apply Laplace transformations to solve ODE's
- Solve PDE's using Laplace transformations.

UNIT-I (10 Lectures)

FORMULATION OF PHYSICOCHEMICAL PROBLEMS:

Introduction, Illustration of the Formulation Process (Cooling of Fluids), Combining Rate and Equilibrium Concepts (Packed Bed Adsorber), Boundary Conditions and Sign Conventions, Summary of the Model Building Process, Model Hierarchy and its Importance in Analysis.

UNIT-II (14 Lectures)

Solution Techniques for Models Yielding Ordinary Differential Equations **(ODE):** Geometric Basis and Functionality, Classification of ODE, First Order Equations, Exact Solutions, Equations Composed of Homogeneous Functions, Bernoulli's Equation, Riccati's Equation, Linear Coefficients, First Order Equations of Second Degree, Solution Methods for Second Order Nonlinear Equations, Derivative Substitution Method, Homogeneous Function Method, Linear Equations of Higher Order, Second Order Unforced Equations: Complementary Solutions, Particular Solution Methods for Forced Equations, Summary of Particular Solution Methods, Coupled Simultaneous ODE, Summary of Solution Methods of ODE.

UNIT-III (14 Lectures)

SERIES SOLUTION METHODS AND SPECIAL FUNCTIONS:

Introduction to Series Methods, Properties of Infinite Series, Method of Frobenius, Indicial Equation and Recurrence Relation, Summary of the Frobenius Method, Special Functions, Bessel's Equation, Modified Bessel's Equation, Generalized Bessel Equation, Properties of Bessel Functions, Differential, Integral and Recurrence Relations.

INTEGRAL FUNCTIONS:

Introduction, The Error Function, Properties of Error Function, The Gamma and Beta Functions, The Gamma Function, The Beta Function, The Elliptic Integrals, The Exponential and Trigonometric Integrals.

LAPLACE TRANSFORMATIONS:

Building Blocks, Taking the Transform, Transforms of Derivatives and Integrals, The Shifting Theorem, Transform of Distribution Functions, Practical Inversion Methods, Partial Fractions, Convolution Theorem, Applications of Laplace Transforms for Solutions of ODE.

UNIT-IV (12 Lectures)

STAGED-PROCESS MODELS:

The Calculus of Finite Differences: Introduction, Modeling Multiple Stages, Solutions Methods for Linear Finite Difference Equations, Complementary Solutions, Particular Solution Methods, Method of Undetermined Coefficients, Inverse operator Method, Nonlinear Equations (Riccaati Equation).

UNIT-V (10 Lectures)

SOLUTION TECHNIQUES FOR MODELS PRODUCING PDES:

Introduction, Classification and Characteristics of Linear Equations, Particular Solutions for PDEs, Boundary and Initial Conditions, Combination of Variables Method, Coated Wall Reactor, Orthogonal Functions and Sturm-Liouville Conditions, The Sturm-Liouville Equation, Inhomogeneous Equations, Applications of Laplace Transforms for Solutions of PDEs.

TEXT BOOK:

Rice R G. and. Do, D. D. "*Applied Mathematics and Modeling for Chemical Engineers*", John Wiley and Sons, New York, 1995.

REFERENCES:

1. Mickley. H.S.,Sherwood, T. K. and Reed, C.E, "*Applied Mathematics in Chemical Engineering*" , 2nd Edition, Tata McGraw-Hill, New Delhi Publications, 1975.
2. Jenson. V.J. and Jeffereys, G.V, "*Mathematical Methods in Chemical Engineering*", 2nd Edition, Academic Press New York, 1977.

INSTRUMENTAL METHODS FOR CHEMICAL ANALYSIS

Course Code: 13CH1145

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student understand the advanced instrumentation available for chemical analysis.

Course Outcomes:

After studying this course the student would be able to choose the instrument needed for analysis.

UNIT-I (12 Lectures)

AN INTRODUCTION TO INSTRUMENTAL METHODS:

Terms Associated With Chemical Analysis, Classification Of Instrumental Techniques, A Review Of The Important Considerations In Analytical Methods, Basic Functions of Instrumentation, Important Considerations in Evaluating an Instrumental Method.

MEASUREMENTS, SIGNALS AND DATA:

Introduction, Signal-to-Noise Ratio, Sensitivity and Detection Methods, Source of Noise, Hardware Techniques for Signal-to-Noise Enhancement, Software Techniques for Signal-to-Noise Enhancement, Evaluation of Results, Accuracy and Instrument Calibration, Chemometrics.

UNIT-II (12 Lectures)

AN INTRODUCTION TO ABSORPTION AND EMISSION SPECTROSCOPY:

The Nature of Electromagnetic Radiation, The Electromagnetic Spectrum, Atomic Energy Levels, Molecular Electronic Energy Levels, Vibrational Energy Levels, Raman Effect, Lasers, Nuclear Spin Behaviour, Electron Spin Behaviour.

ULTRAVIOLET AND VISIBLE SPECTROMETRY-INSTRUMENTATION:

Radiation Sources, Wave Length Selection, Cells and Sampling Devices, Detectors, Instruments for Absorption Photometry.

ULTRAVIOLET AND VISIBLE ABSORPTION METHODS:

Fundamental Laws of Photometry, Spectrophotometric Accuracy, Photometric Precision, Quantitative Methodology, Differential or Expanded-Scale Spectroscopy.

UNIT-III (12 Lectures)

FLAME EMISSION AND ATOMIC ABSORPTION SPECTROSCOPY:

Introduction, Instrumentation for Flame Spectrometric Methods, Flame Emission Spectrometry, Atomic Absorption Spectrometry, Interference Associated with Flame and Furnaces, Applications, Comparison of FES and AAS.

INFRARED SPECTROMETRY:

Correlation of Infrared Spectra with Molecular Structure, Instrumentation, Sample Handling.

UNIT-IV (12 Lectures)

MASS SPECTROMETRY:

Sample Flow in a Mass Spectrometer, Inlet Sample System, Ionization Methods in Mass Spectrometry, Mass Analyzers, Ion-Collection System, Vacuum System, Isotope- Ratio Spectrometry, Correlation of Mass Spectra With Molecular Structure.

GAS CHROMATOGRAPHY:

Gas Chromatographs, Derivative Formation, Gas Chromatographic Columns, Liquid Phases and Column Selection, Detectors for Gas Chromatography.

HIGH PERFORMANCE LIQUID CHROMATOGRAPHY:

HPLC Instrumentation, Mobile-Phase Delivery System, Sample Introduction, Separation Columns, Detectors.

X RAY DIFFRACTION:

General Principles, Braggs equation, Laue photographic method, Rotating crystal method, Oscillating crystal method, Powder method, Interpretation of the Diffraction pattern, Applications of XRD.

UNIT-V **(12 Lectures)**

CHROMATOGRAPHY: GENERAL PRINCIPLES:

Classification of Chromatographic Methods, Chromatographic Behaviour of Solutes, Column Efficiency and Resolution, Column Processes and Band Broadening, Time of Analysis and Resolution, Quantitative Determinations.

TEXT BOOK:

Willard,H.H, Merritt,L.L, Dean,J.A, and Settle, F.A, "*Instrumental methods of analysis*" CBS Publishers & Distributors, 7 Ed, 1986.

REFERENCES:

1. Srivastava. A.K. and. Jain, P.C, "*Instrumental Approach to Chemical Analysis*", 4th Edition , S Chand and Company Ltd, New Delhi, 2012.
2. Chatwal. G. R., Anand, Sham K., "*Instrumental Methods of Chemical Analysis*" 5th Edition, Himalaya Publishing House, 2005.

DOWN STREAM PROCESSESS IN BIO PROCESSING

Course Code: 13CH1146

L	T	P	C
4	0	0	3

Course Educational Objectives:

The Student would be able to understand bio-separation processes like Filtration, Centrifugation, Cell disruption, Extraction, Adsorption, Chromatography and Crystallization in detail.

Course Outcomes:

To be able to apply these principles in the preparation of bio-products in large scale.

UNIT-I (12 Lectures)

Introduction to bioseparations, Filtration and Micro filtration: - Equipment for Conventional Filtration, Pretreatment, General Theory for Filtration, Continuous Rotary Filters, Micro filtration.

Centrifugation, settling of solids, Centrifuges, Centrifugal filtration, Scale-Up of Centrifugation.

UNIT-II (12 Lectures)

CELL DISRUPTION:

Cell membranes, Chemical Methods, Mechanical Disruption.

EXTRACTION:

The chemistry of extraction, Batch extraction, Staged Extraction, Differential extraction, Fractional Extractions with stationary phase and Fractional Extractions with two moving phases.

UNIT-III (12 Lectures)

ADSORPTION :

The chemistry of adsorption, Batch adsorption, Adsorption in a continuous stirred tank, Adsorption in fixed beds.

Ultra filtration and Electrophoresis:

Basic ideas, Ultrafiltration, Electrophoresis, Electro dialysis and Isoelectric Focusing.

UNIT-IV (12 Lectures)

ELUTION CHROMATOGRAPHY:

Adsorbents yield and purity, discrete stage analysis, Kinetic analysis, Precipitation with a non solvent, Precipitation with salts, Precipitation with temperature change, Large Scale precipitation.

UNIT-V (12 Lectures)

CRYSTALLIZATION :

Basic concepts, crystal Size Distribution, Batch crystallization, Recrystalization.Drying: - Basic concepts, Drying Equipment, Conduction Drying, Adiabatic Drying.

TEXT BOOK:

Better. P. A., Cussler E. L.,Wei-Shou Hu,A, "*Downstream Processing for Biotechnology*" , Wiley- Interscience Publication, 1988.

SAFETY AND HAZARD ANALYSIS

Course Code: 13CH1147

L	T	P	C
4	0	0	3

Course Educational Objectives:

After the study of the subject students will be able to apply safety practices in any chemical industry and they will be able to design suitable equipment with safety standards.

Course Outcomes:

- ✤ After learning the subject, students will be able to know about all the safety requirements of chemical industry in general.
- ✤ They will be able to apply their knowledge to any specific chemical industry to maintain safe environment.
- ✤ They will be able to correct any hazardous situation to prevent accidents.

UNIT-I (12 Lectures)

INTRODUCTION:

Safety program, Engineering ethics, Accident and loss statistics, Acceptable risk, Public perception.

TOXICOLOGY:

How toxicants enter biological organisms, how toxicants are eliminated from biological organisms.

UNIT-II (10 Lectures)

INDUSTRIAL HYGIENE:

Government regulations, Identification, Evaluation, Control.

UNIT-III (14 Lectures)

FIRES AND EXPLOSIONS:

The fire triangle, Distinction between fire and explosions; Definitions, Flammability characteristics of liquids and vapors, LOC and inerting, ignition energy, Auto ignition, Auto oxidation, Adiabatic compression, Explosions.

Designs to prevent fires and explosions: Inerting, Explosion proof equipment and instruments, Ventilation, Sprinkler systems.

UNIT-IV (14 Lectures)

INTRODUCTION TO RELIEFS:

Relief concepts, Definitions, Location of reliefs, Relief types, Data for sizing reliefs, Relief systems.

Static electricity and its control

UNIT-V (10 Lectures)

HAZARDS IDENTIFICATION:

Process hazards checklists, Hazard surveys, Hazop safety reviews.

TEXT BOOK:

Crowl, D.A.and Louvar, J.F. "*Chemical Process Safety (Fundamentals with applications)*", 2nd Edition, Prentice Hall ,1990.

REFERENCES:

1. Fawcet, H.H. and Wood, W.S. "*Safety and Accident Prevention in Chemical Operations*", 2nd Edition, John Wiley, New York, 1982.
2. Sinnot, R.K. "*Coulson and Richardson's, Chemical Engineering*", Vol.6, Butterworth-Heinmann Limited 1996.

SEMESTER - I

Code	COURSE TITLE	L	T	P	C
13BM1101	Mathematics-I	4	1	0	3
13CE1101	Surveying-I	4	1	0	3
13CT1102	Computer Programming through C	4	0	0	3
13BC1101	Chemistry	4	0	0	3
13CE1102	Elements of EE & ME	4	0	0	3
13BC1103	Chemistry Lab	0	0	3	2
13CT1103	Computer Programming Lab	0	0	3	2
13ME1103	Engineering Drawing	1	0	3	3
13NM1101	Professional Ethics	2	0	0	0
	TOTAL	**23**	**2**	**9**	**22**

SEMESTER - II

Code	COURSE TITLE	L	T	P	C
13HE1101	English	4	0	0	3
13BM1102	Mathematics-II	4	1	0	3
13ME1102	Engineering Mechanics	4	1	0	3
13BP1101	Physics	4	0	0	3
13CE1103	Surveying-II	4	0	0	3
13HE1102	English Language Lab	0	0	3	2
13MT1101	Engineering Workshop	0	0	3	2
13BP1102	Physics lab	0	0	3	2
13CE1104	Surveying lab	0	0	3	2
	TOTAL	**20**	**2**	**12**	**23**

SEMESTER - III

Code	COURSE TITLE	L	T	P	C
13BM1103	Probability Statistics and Numerical Methods	4	1	0	3
13CE1105	Building Materials and Construction	4	0	0	3
13CE1106	Strength of Materials- I	4	1	0	3
13CE1107	Fluid Mechanics	4	0	0	3
13CE1108	Concrete Technology	4	0	0	3
13CE1109	Building Planning and Design	4	0	0	3
13CE1110	Strength of Materials Lab	0	0	3	2
13CE1111	Concrete Technology Lab	0	0	3	2
13NM1102	Environmental Studies	2	0	0	0
	TOTAL	**26**	**2**	**6**	**22**

SEMESTER - IV

Code	COURSE TITLE	L	T	P	C
13HM1101	Managerial Economics and Financial Accountaning	4	0	0	3
13CE1112	Strength of Materials - II	4	1	0	3
13CE1113	Hydraulics and Hydraulic Machinery	4	0	0	3
13CE1114	Structural Analysis- I	4	0	0	3
13CE1115	Reinforced Concrete Structures-I	4	1	0	3
13CE1116	Engineering Geology	4	0	0	3
13CE1117	Fluid Mechanics and Hydraulic Machines Lab	0	0	3	2
13CE1118	Engineering Geology Lab	0	0	3	2
	TOTAL	**26**	**02**	**6**	**22**

SEMESTER - V

Code	COURSE TITLE	L	T	P	C
13CE1119	Water Resources Engineering- I	4	0	0	3
13CE1120	Geotechnical Engineering- I	4	0	0	3
13CE1121	Structural Analysis- II	4	1	0	3
13CE1122	Transportation Engineering-I	4	0	0	3
13CE1123	Estimation and Quantity Surveying	4	0	0	3
13CE1124	Design of Steel Structures	4	1	0	3
13CE1125	Transportation Engineering Lab	0	0	3	2
13HE1103	Technical Communication and soft Skills Lab	0	0	3	2
13ES11BC	Basic Computations Lab	0	0	3	2
	TOTAL	**24**	**2**	**9**	**24**

SEMESTER - VI

Code	COURSE TITLE	L	T	P	C
13CE1126	Water Resources Engineering- II	4	0	0	3
13CE1127	Environmental Engineering- I	4	1	0	3
13CE1128	Transportation Engineering-II	4	0	0	3
13CE1129	Geotechnical Engineering- II	4	1	0	3
	ELECTIVE - I	4	0	0	3
13CE1130	Earthquake Resistant Design of Structures				
13CE1131	Industrial Waste and Waste Water Management				
13CE1132	Traffic Engineering				
13CE1133	Ports and Harbours				
	ELECTIVE - II	4	0	0	3
13CE1134	Air Pollution and Control				
13CE1135	Ground Improvement Techniques				
13CE1136	Advanced Structural Analysis				
13CE1137	Advanced Design of Steel Structures				
13CE1138	Computer Applications in Civil Engineering Lab	0	0	3	2
13CE1139	Geotechnical Engineering Lab	0	0	3	2
13NM1103	Intellectual Property rights and Patents	2	0	0	0
	TOTAL	**26**	**0**	**6**	**22**

SEMESTER - VII

Code	COURSE TITLE	L	T	P	C
13CE1140	Environmental Engineering-II	4	1	0	3
13CE1141	Prestressed Concrete	4	0	0	3
13CE1142	Construction Management	4	0	0	3
13CE1143	Reinforced Concrete Structures - II	4	1	0	3
13CE1144	Remote Sensing and GIS	4	0	0	3
	ELECTIVE - III	4	0	0	3
13CE1145	Introduction to Finite Element Method				
13CE1146	Transportation Planning and Design				
13CE1147	Soil Dynamics and Machine Foundations				
13CE1148	Design of Public Buildings				
13CE1149	Environmental Engineering Lab	0	0	3	2
13CE1150	Geomatics Lab	0	0	3	2
13CE11MP	Industry Oriented Mini-project	0	0	0	2
	TOTAL	**24**	**2**	**6**	**24**

SEMESTER - VIII

Code	COURSE TITLE	L	T	P	C
13CE1151	Reinforced Concrete Bridges	4	0	0	3
	ELECTIVE - IV	4	0	0	3
13CE1152	Environmental Impact Assessment				
13CE1153	Advanced Foundation Engineering				
13CE1154	Advanced Structural Design				
	OPEN ELECTIVE	4	0	0	3
13CE11SM	SEMINAR	0	0	3	2
13CE11CV	COMPREHENSIVE VIVA	0	0	0	2
13CE11PW	PROJECT WORK	0	0	16	8
	TOTAL	**12**	**0**	**19**	**21**

LIST OF OPEN ELECTIVES

CODE	COURSE TITLE	OFFERING DEPARTMENT
13CH1128	Design and Analysis of Experiments*	Chemical Engineering
13CE1155	Green Buildings and Infrastructure	Civil Engineering
13CE1156	Disaster Management	Civil Engineering
13CS1113	E-Commerce	Computer Science and Engineering
13CT1132	Software Project Management*	Computer Science and Engineering
13EC1140	Bio-Medical Instrumentation	Electronics and Communications Engineering
13EE1138	Electrical Safety Management	Electrical and Electronics Engineering
13EE1139	Reliability Evaluation of Engineering Systems	Electrical and Electronics Engineering
13EE1140	Design Concepts for Engineers	Electrical and Electronics Engineering
13EE1141	Special Electrical Machines for Industrial Applications	Electrical and Electronics Engineering
13IT1113	Neural Networks	InformationTechnology
13IT1114	Biometrics	InformationTechnology
13ME1143	Renewable Sources Of Energy*	Mechanical Engineering
13ME1153	Project Management*	Mechanical Engineering
13BP1103	Nano Technology	Physics
13HM 1104	Entrepreneurship and Small Business Management	Management Studies
13HM 1105	Financial Management	Management Studies
13HM 1106	Indian and International Business Environment	Management Studies

*These courses can be taken by the students of respective departments if they are not offered /opted earlier in the structure.

SYLLABI FOR I SEMESTER

MATHEMATICS-I

(Common to all Branches)

Course Code: 13BM1101

L	T	P	C
4	1	0	3

Pre requisites:

- ✤ Basic formulae of differentiation, product rule, and quotient rule.
- ✤ Basic Integration formulae, integration by parts, definite integrals and properties.
- ✤ Basic concept of partial differentiation.

Course Educational Objectives:

- ✤ The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- ✤ The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- ✤ Solve ordinary differential equations of first, second and higher order.
- ✤ Learn the technique of Laplace transform and apply it to solve differential equations.
- ✤ Understand the concept of Double and Triple integrals and their applications to calculation of areas, volumes .
- ✤ Extend the concept of integration to vector functions, understand the significance of the operators, gradient, divergence and curl.
- ✤ Find surface areas and volumes of certain solids using Green, Stokes and Gauss divergence theorems.

UNIT-I (12 Lectures)

ORDINARY DIFFERENTIAL EQUATIONS:

Linear equations of first order, Bernoulli differential equation, Linear differential equations of higher order with constant coefficients, Method of Variation of parameters, Linear differential equations with variable coefficients (Cauchy's homogeneous linear equation, Legendre's linear equation).

APPLICATIONS OF LINEAR DIFFERENTIAL EQUATIONS:

Orthogonal trajectories, Models on R-L-C circuits, Newton's law of cooling.
(11.9, 11.10, 13.1—13.7, 13.8(1), 13.9, 12.3, 12.5, 12.6)

UNIT-II (12 Lectures)

LAPLACE TRANSFORMS:

Laplace transform of elementary functions, properties, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, division by t, evolution of integrals by Laplace transforms.

INVERSE TRANSFORM:

Introduction, Finding inverse transforms by the method of partial fractions, other methods of finding Inverse Transform, Convolution theorem, Unit step function, and Unit impulse function.

APPLICATION OF LAPLACE TRANSFORMS:

Initial and Boundary Value Problems.
(21.1-21.5, 21.7-21.15, 21.17, 21.18

UNIT-III (12 Lectures)

PARTIAL DIFFERENTIATION:

Total derivative, change of variables, Jacobians, Tangent Plane and Normal to the Surface, Taylor's theorem for functions of two variables.

APPLICATIONS OF PARTIAL DIFFERENTIATION:

Maxima and Minima of functions of two variables, Lagrange method of undetermined multipliers.
(5.5 – 5.9, 5.11, 5.12)

UNIT-IV (12 Lectures)

MULTIPLE INTEGRALS:

Introduction to Non-Cartesian Coordinates, Double integrals, Change of order of integration, Double integral in polar co-ordinates, Triple integrals, Change of variables in double integrals, Change of variables in triple integrals. Simple Applications of Multiple Integrals: Area enclosed by plane curves, Volumes of solids.
(8.19, 8.21, 7.1, 7.7,)

UNIT-V (12 Lectures)

VECTOR DIFFERENTIATION:

Differentiation of vectors, curves in space, velocity, acceleration, Scalar and Vector point functions. Gradient of a scalar field and directional derivatives- Divergence and curl of a Vector field and it's physical interpretation.

VECTOR INTEGRATION:

Line integral, Circulation, work done, surface and volume integrals.

Vector integral theorems: Green's, Stoke's and Gauss Divergence theorems (without proofs) and related problems.
(8.1- 8.16)

TEXT BOOK:

Dr.B.S.Grewal *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. Kreyszig E, "*Advanced Engineering Mathematics*", 8th Edition, John Wiley, Singapore, 2001.
2. Greenberg M D, "*Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, "*Advanced Engineering Mathematics*", 7th Edition, Cengage Learning, 2011.

SURVEYING - I

Course Code: 13CE1101

L	T	P	C
4	1	0	3

Course Educational Objectives:

- To develop an understanding of the importance of Surveying in Civil Engineering.
- To impart the knowledge of various techniques of surveying in Civil Engineering.
- Student should be able to confidently use chains, compass and plane table to survey any ground profile.

Course Outcomes:

- Student will be able to demonstrate their ability to locate suitable sites for construction of Civil Engineering infrastructure projects using contours and levelling.
- Student will demonstrate an ability to compute volume of reservoirs using contours.

UNIT-I (15 Lectures)

INTRODUCTION:

Definition of Surveying- Primary divisions - Classification and principles of surveying- Difference between plan and map. Sources of errors-Linear and Direct measurements.

CHAIN SURVEYING:

Instrumentation for chaining – Types of Chains – Principles of chain surveying- Well conditioned triangle - Selection of Survey Stations - Check lines, Tie lines, Offsets. Errors due to incorrect chain- Chaining on un-even and sloping ground- Errors in chaining - Obstacles in chaining -Conventional signs.

UNIT-II (10 Lectures)

COMPASS SURVEYING :

Types of compass – Temporary adjustments – Types of Meridians and bearings – W.C.B. and R.B. – Conversion of bearings from one system to the other– Calculation of angles from bearings, Calculation of bearing from angles - Calculations of included angle from bearings – Dip of a magnetic needle – Magnetic declination – Local attraction and its Corrections – Chain and compass traversing - Checks in closed and open traverse - closed traverse and its adjustment by Bowditch's rule.

UNIT-III (8 Lectures)

PLANE TABLE SURVEYING:

Introduction - Accessories- Working operations. Methods of plane tabling- Plane table traversing- Three point problem – Two point problem- Errors in plane tabling.

UNIT-IV ((16 Lectures)

LEVELLING AND CONTOURING:

Levelling: Introduction and Terminology, Temporary and permanent adjustments- methods of leveling - Differential leveling, Profile levelling- Cross sections-Reciprocal leveling- Precise levelling . Booking and reduction of levels, H.I. methods - Rise and fall method-Checks, plotting of L.S & C.S.

Contouring: Contours- Uses of contours- Methods of conducting contour surveys and their plotting. Contour gradient-Uses of contour maps.

UNIT-V (12 Lectures)

AREAS AND VOLUMES:

Area from field notes, Computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes. Determination of the capacity of reservoir. Volume of barrow pits.

TEXT BOOKS:

1. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, *"Surveying"* (Vol – 1), 18th Edition by Laxmi Publications (P) ltd., New Delhi, 2011.
2. Duggal S K, *"Surveying"* (Vol – 1), 10th Edition, Tata McGraw Hill Publishing Co. Ltd. New Delhi, 2004.

REFERENCES:

1. Arthur R Benton and Philip J Taety, *"Elements of Plane Surveying"* 8th Edition, McGraw Hill – 2000, 2010.
2. Chandra A M, *"Plane Surveying"*, New age International Pvt. Ltd., Publishers, New Delhi, 2009.
3. Arora K R *"Surveying"* (Vol 1, 2 & 3) 9th Edition, Standard Book House, Delhi, 2008.

COMPUTER PROGRAMMING THROUGH C

(Common to all Branches)

Course Code : 13CT1102

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course helps the student in understanding Computer Programming concepts. An individual will have ability to:

- ✤ Design Algorithmic solution for various problems and convert algorithms to C programs
- ✤ Design programs with Interactive Input and Output
- ✤ Design programs utilizing arithmetic expressions
- ✤ Design programs utilizing repetition and decision making
- ✤ Design programs utilizing arrays and structures
- ✤ Design programs using file Input and Output
- ✤ Test and verifying programs

Course Outcomes:

At the end of the course the student will be able to

- ✤ Know how to write algorithms and draw flowcharts and develop programs
- ✤ Write programs using sequential, condition, iterative control statements
- ✤ Write programs using derived data types like arrays, functions, pointers, strings, structures, unions
- ✤ Define user defined data types like type- def, enum
- ✤ Learn about files, their creation, and various operations that can be performed on files

UNIT-I (12 Lectures)

Introduction to Computers , Algorithm/ Pseudo code, Flow chart, Program Development steps, Basic structure of C Program, Input and Output statements (printf() & scanf()), A Simple C Program, Identifiers, Basic data types and sizes, Constants, Variables, Operators, Type Conversion, Expression Evaluation, Precedence & Associativity of operators.

CONTROL STATEMENTS:

If, switch, for, while and do- while statements, break, continue and goto statements.Sample programs covering all the above topics.

UNIT-II (12 Lectures)

FUNCTIONS:

Definition, Advantages, types of functions- user defined and standard library functions, categories of functions , scope rules, recursion, storage classes. Sample programs covering all the above topics.

UNIT-III (12 Lectures)

ARRAYS:

Introduction to arrays, 1 D Arrays: Definition, Declaration, Initialization, Accessing & storing the elements, 2 D Arrays: Definition, Declaration, Initialization, Accessing & storing the elements C Pre processors.

STRINGS:

String- Declaration, Initialization, pointers and strings, standard library string functions, array of pointers to strings. Sample programs covering all the above topics.

UNIT-IV (12 Lectures)

POINTERS:

Definition, Declaration of Pointer variables, the & and * operators, Pointer Expressions, Char, int, and float pointers, Pointer arithmetic, Passing addresses to functions, Functions returning pointers, Pointers & Arrays: Passing array elements to functions, pointer to pointer, array of pointers, Dynamic memory allocation functions, Sample programs covering all the above topics

UNIT-V (12 Lectures)

STRUCTURES & UNIONS:

Structures: Definition, Initialization, Accessing structures, nested structures, array of structures, additional features of structures, self referential structures, unions, type-def, bit fields, enum data type.

FILES:

Concept of a file, Text and Binary files, file I/O operations, Command line arguments. (Let Us C, Yashavant Kanetkar)

Sample programs covering all the above topics.

TEXT BOOKS:

1. B.A Forouzan and R.F. Gilberg, *"Computer science, A structured programming approach using C"*, 3rd Edition, Cengage Learning.
2. Yashavant Kanetkar, *"Let Us C"*, 12th Edition, BPB Publications, 2012.
3. Yashavant Kanetkar, *"Understanding pointers in C"*, 4th Edition, BPB Publications, 2009.

REFERENCES:

1. N. B. Venkateswarlu, E.V. Prasad, *"C & Data Structures"*, 1st Edition, S. Chand Publications, 2010.
2. K.R.Venugopal, S.R.Prasad, *"Mastering C"*, 1st Edition, TMH, 2007.

CHEMISTRY

(Common to all Branches)

Course Code: 13BC1101

L	T	P	C
4	0`	0	3

Course Eductational Objectives:

The course attempts impart a sound knowledge on the principles of chemistry involving different application oriented topics to requied for all engineering branches.

Course Outcomes :

The student should able to apply

- ✤ The principles involved in corrosion and its control
- ✤ Treatment of water for industrial purpose and concepts of energy storage devices.
- ✤ Utillisation of polymer engineering materials towards different applications.

UNIT-I (10 Lectures)

ELECTROCHEMICAL CELLS:

Electrode potential, Nernst equation, EMF of electrochemical cell, Reference electrodes-Standard hydrogen electrode, calomel electrode. Electrochemical series, Concentration cell, Construction of glass electrode, determination of P^H of given solution using glass electrode

Batteries-Primary cell-Dry or Lachanche cell, alkaline battery; secondary cells (storage batteries or accumulators) – Lead-acid Accumulator, Nickel-cadmium battery, Lithium ion battery (LIB) and redox flow battery.

Fuel cells - hydrogen - oxygen fuel cell, phosphoric acid fuel cell, solid oxide fuel cells

UNIT-II (12 Lectures)

CORROSION AND ITS CONTROL:

Introduction - Direct chemical corrosion and electrochemical corrosion and its mechanisms, Types of electrochemical corrosion-Differential aeration corrosion, galvanic corrosion, concentration cell corrosion, corrosion and pitting, stress corrosion, Galvanic series, passivity, factors influencing corrosion.

Corrosion control-proper designing, cathodic protection-sacrificial anodic protection and impressed current cathodic protection, modifying the environment and use of inhibitors.

Protective coatings- Anodic and cathodic coatings, Hot dipping-Galvanizing and Tinning, Metal cladding, Electroplating, Electroless plating, cementation or diffusion coatings.

UNIT-III (10 Lectures)

POLYMER TECHNOLOGY:

Polymerization, classification, degree of polymerization, functionality and tacticity of polymer, Types of polymerization-addition and condensation polymerization, Mechanism of addition polymerization, Condensation polymerization, Preparation, properties and uses of polythene, PVC, Teflon, nylons-6,6, Polyester, Bakelite and Silicones.

Plastics- Thermo plastics and thermosetting plastics, compounding of plastic.

Elastomers-Natural and synthetic rubbers, Manufacture, properties and applications of natural rubber-vulcanization, compounding of rubber, Synthetic rubbers-Preparation, properties and applications of Buna-S and Buna-N.

UNIT-IV (12 Lectures)

WATER TECHNOLOGY:

Introduction-characteristics imparted by impurities, hardness of water – Temporary and permanent hardness- units, Determination of hardness by EDTA method, Disadvantages of hard water, Chemical aspects of scale and sludge formation in boilers, caustic embrittlement,boiler corrosion, priming and foaming, Municipal water treatment-sedimentation, coagulation,

and filtration, Desalination of brackish water, Water softening methods-lime -soda method, zeolite method and ion exchange process.

UNIT-V: (16 Lectures)

ENGINEERING MATERIALS:

Fuels- classification, characteristics of fuel, calorific value –determination of calorific value by bomb calorimeter and Junkers gas calorimeter, theoretical calculation of calorific value, Types and Analysis of coal - Proximate and ultimate analysis of coal, Manufacture of coke- Petroleum-classification based on sources of petroleum, Refining of petroleum, Knocking, octane value, cetane value, Cracking -thermal cracking and catalytic cracking-fixed bed & moving bed catalytic cracking, reforming.

Cement: Classification of cement, chemical composition, functions of ingredients in Portland cement, Manufacture of Portland cement- raw materials, setting and hardening of Portland cement.

Refractories- Classification and properties of refractories, Failures of refractory materials.

Lubricants-friction, lubrication, functions of lubricants, mechanism of lubrication-thick film, thin film and extreme pressure lubrication, types of lubricants- solid, semisolid and liquid lubricants and their properties .

TEXT BOOKS:

1. Jain& Jain, *"A text book of Engineering Chemistry"*, 15th Edition, Dhanapat Roy publishing company, 2010.
2. Sasichawla, *"Engineering Chemistry"*, 3rd Edition, Dhanapat Roy publishing company, 2004.

REFERENCES:

1, S.S. Dara, *"A Text book of Engineering Chemistry"*, 11th Edition, S.Chand & Co, 2006.
2. C. Parameswara Murthy, C.V. Agarwal and Andhra Naidu, *"A Text Book of Engineering Chemistry"*, 1st Edition, B.S. Publications, 2006.

ELEMENTS OF EE AND ME

Course Code:13CE1102

L	T	P	C
4	0	0	3

Course Educational Objectives:

This subject aims at the fundamental concepts of electrical engineering and its applications in daily life. Elements of EE and ME are a basic fundamental course for the discipline of civil engineering.

Course Outcomes:

After completion of this subject, the students shall have knowledge about electrical circuits and equipments.

Students will be able to

- Explain working of I.C.engines.
- Explain the basic concepts of general purpose machine tools.
- Differentiate various welding processes.
- Differentiate various power transmissions drives.

UNIT-I (12 Lectures)

FUNDAMENTALS OF ELECTRICAL ENGINEERING:

Basic circuit elements - Resistance, Inductance and capacitance - Ohm's law, Kirchhoff's laws - Faraday's law of Electromagnetic Induction. AC fundamentals- Average and effective value-Series RL and RC circuits - Active power, Reactive power, Apparent power, Power Factor - Simple problems.

UNIT-II (12 Lectures)

TRANSFORMERS:

Single phase and Three phase transformers – Operation and construction, EMF equation, losses and efficiency - Simple Problems.

UNIT-III (12 Lectures)

AC MACHINES:

Construction and Principle of operation of three phase and single phase induction motors - Torque slip characteristics - Applications. Principle of operation of Alternators - Types of Alternators

UNIT-IV (12 Lectures)

MACHINE TOOLS:

General purpose machine tools – lathe, drilling machine, shaping machine, planing machine, milling machine.

WELDING:

Principles of welding, fundamentals of arc welding and arc cutting, gas welding and gas cutting.

UNIT-V (12 Lectures)

I.C.ENGINES:

Introduction, classification of I.C. engines, I.C. engine-parts and terminology, four stroke cycle engines –petrol and diesel, two stroke cycle engines – petrol and diesel, comparison between four stroke and two stroke cycle engines, comparison between petrol engine and diesel engine.

POWER TRANSMISSION:

Types of drives – belt drives – flat and V belts, Rope and Chain drives.

TEXT BOOKS:

1. K.VenuGopal & V.PrabhuRaja, *"Basic Mechanical Engineering"*, 10 Edition, Anuradha Agencies, 2011. (UNIT I and UNIT II)
2. R.K. Rajput, *"Basic Mechanical Engineering"*, 3 Edition, University Science Press, 2012. (UNIT-I)
3. V.K.Mehta and Rohit Mehta, *"Principles of Electrical Engineering"*, S.Chand Publications, 2008.
4. M.S Naidu and S.Kamakshaiah, *"Electrical Technology"* , TMH Publishers, 2006.

REFERENCES:

1. Basant Agarwal and C.M. Agarwal, *"Basic Mechanical Engineering,"* 3rd Edition, Wiley India, 2011
2. S.K.Hajra Choudary and A.K. Hajra Choudary, *"Elements of Workshop Technology"*, Vol1: Manufacturing Processes, 2007.
3. I.J. Nagrath and D.P Kothari, "*Theory and Problems of Basic Electrical Engineering"*, PHI Publications.
4. David V. Kerns, JR. J. David Irwin, "*Essentials of Electrical and Computer Engineering"*.
5. Vincent Del Toro, *"Electrical Engineering Fundamentals"*, PHI Publishers second Edition.

CHEMISTRY LAB
(Common to all Branches)

Course Code: 13BC1103

L	T	P	C
0	0	3	2

Course Educational Objectives:

The course is to develop the basic experimental skills and analytical thinking.

The course attempt to provide information regarding various chemical techniques used in quantitative chemical analysis.

Course Outcomes:

The student will be able to determine the substance quantitatively and analyse the data obtained to resolve the prolem in their respective areas.

LIST OF EXPERIMENTS :

1. Determination of ferrous iron.
2. Determination of ferric iron.
3. Determination of total hardness of water.
4. Determination of carbonate and bicarbonate of water.
5. Determination of dissolved oxygen.
6. Determination of available chlorine in bleaching powder.
7. Determination of zinc by potassium ferrocyanide.
8. Determination of copper by EDTA method
9. Determination of calcium by permanganate.
10. Determination of iron-II by potentiometric method.
11. Determination of viscosity of lubricant by viscometer.
12. Determination of flash and fire points of lubricant.
13. Determination of percentage residue of carbon in oils.

14. Determination of calorific value of solid fuels.
15. Determination of fluoride by spectrophotometric method.
16. Determination of iron in cement by spectrophotometric method.

REFERENCE:

A.I.Vogel, *"A Text book of quantitive chemical analysis"*, 6th Edition, Pearson Education, Pvt. Ltd., 2002.

COMPUTER PROGRAMMING LAB

(Common to all Branches)

Course Code : 13CT1103

L	T	P	C
0	0	3	2

Course Educational Objectives:

The main objectives of the course are to give the basic knowledge of C Language with practical orientation of various features present in this language.

- ✤ To give exposure about RAPTOR tool to design flow charts.
- ✤ To give hands on exposure to the students in developing the programs.
- ✤ Develop programs by using simple and optimized logic.
- ✤ Maximizing the usage of various C programming features.
- ✤ To give hands on exposure to the students to work with files.

Course Outcomes:

Upon completion of the course the student will be able to

- ✤ Gets exposure on RAPTOR tool.
- ✤ Learn how to program basic mathematical operation using various loops like for, while, do while, and switch statement.
- ✤ Program various string handling functions.
- ✤ Program various file operations.
- ✤ Gets an idea on maximizing the usage of various C programming features?

LIST OF PROGRAMS:

1. Demonstration of RAPTOR Tool to generate flowcharts by considering simple algorithms. Generation of flow charts to solve problems such as Temperature Conversion, Swapping of Two numbers etc. using RAPTOR Tool.

2. Write C Programs to solve problems such as Student Grading, Income Tax Calculation, and Largest of three Numbers etc., which expose students to various categories of IF Statements. Generate flowcharts using RAPTOR Tool.

3. a) Write a C program to find the roots of a quadratic equation.

   b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

4. a) The total distance travelled by vehicle in 't' seconds is given by distance = $ut+1/2at^2$

   where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write a C

   program to find the distance travelled at regular intervals of time given the values of

   'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

   b) Write a C program to determine whether a given number is an Armstrong or not.

   (If the sum of the cubes of the number is equal to the original number, then the number

   Is called Armstrong number. Eg: 371 is Armstrong number ($3^3+7^3+1^3= 371$))

5. a) Write a C program to find the sum of individual digits of a positive integer.

   b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

6. a) Write a C program to calculate the following sum:

   Sum=$1-x^2/2! +x^4/4!-x^6/6! +x^8/8! -x^{10}/10!$

b) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

7. a) Write a C program to generate Pascal's Triangle.

   b) Write a C program to construct a Pyramid of Numbers.

8. Write C programs that use both recursive and non-recursive functions for the following

   a) To find the factorial of a given integer.

   b) To find the GCD (greatest common divisor) of two given integers.

9. a) Write a C function to read in two numbers, x and n, and then compute the sum of this geometric progression:

   $1+x+x^2+x^3+\ldots\ldots\ldots\ldots + x^n$. Also perform error checking by considering negative values for n and also check for illegal values of x.

   b) Write a C function to read in two numbers, x and n (no. of terms), and then compute sin(x) and cos(x).

10. a) Write a C program to find the largest and smallest number in a list of integers.

    b) Write a C program to perform Matrix Addition & Matrix Multiplication.

    c) Write a C program to compute Transpose of a Matrix.

11. a) Write a C program to exchange value of two integers using call by value and call by reference.

    b) Write C programs to demonstrate the use of Pointers.

12. Write user defined string handling functions to implement the following standard library functions: strlen(), strcpy(), strcat(), strrev(), strcmp().

13. a) Write a C program that displays the position/ index in the string S where the string T begins, or –1 if S doesn't contain T.

    c) Write a C program to determine whether a given string is Palindrome or not.

14. Write a C program that uses functions to perform the following operations:

    a) To insert a sub-string in to given main string from a given position.

    b) To delete n Characters from a given position in a given string.

    c) To replace a character of string either from beginning or ending or at a specified location.

15. a) Write a C program to find the two's complement of a binary number.

    b) Write a C program to convert a Roman numeral to its Decimal Equivalent.

16. Write a C program that uses functions to perform the following operations using Structures:

    a) Reading a complex number.

    b) Writing a complex number.

    c) Addition of two complex numbers.

    d) Multiplication of two complex numbers.

17. a) Write a C program which copies one file to another.

    b) Write a C program to count the number of characters, lines, words, tabs and spaces in a given file.

ENGINEERING DRAWING

(Common to all Branches)

Course Code:13ME1103

L	T	P	C
1	0	3	3

Course Educational Objectives

To make the student

- ✤ Familiar with the drawing practices and conventions.
- ✤ Familiar with projections of points, lines, planes and solids
- ✤ Familiar with isometric views

Course Outcomes:

Student will be able to

- ✤ Draw various types of engineering curves
- ✤ Draw orthographic projections of points, lines, planes and solids inclined to one plane or both the planes
- ✤ Draw isometric views of simple solids

LIST OF EXERCISES

1. Introduction to engineering drawing & basics of geometrical construction
2. Construction of parabola, ellipse, hyperbola- general method
3. Cycloid, epicycloids, hypocycloid, involutes of circle and square
4. Projections of points
5. Projections of lines inclined to one plane
6. Projections of lines inclined to both the planes
7. Projections of planes inclined to one plane
8. Projections of planes inclined to both the planes
9. Projections of solids in simple positions

10. Projections of solids inclined to both the planes

11. Isometric views

TEXT BOOK:

N.D. Bhatt and V.M. Panchal, *"Engineering Drawing"*, Charotar Publication House, 49th Edition, 2008.

PROFESSIONAL ETHICS

(Common to all Branches)

Course Code: 13NM1101

L	T	P	C
2	0	0	0

Course Educational Objectives:

- To educate and make the young generation students aware of their Social responsibilities make an Endeavour to tell them first we are humans and then we are scientists, engineers, technocrats and professionals.
- To make students accountable to whatever job they do whether it is less paid or heavily paid.
- To inculcate a spirit of togetherness, unity and team work in an organization.
- To make him reasonably a ‘good’ professional conscious of his duties to the society that graced this wonderful life.
- To induce the spiritual aspect of life in one’s own practical and real life.
- To give an overview of a decent, dignified, humane, dedicated professional with a sense of social responsibility and security.

Course Outcomes:

By the end of this course, it is expected that the student will be able to

- Deal with complex situations while dealing with the people in the society (parents, friends, and co-professionals) in making the work environment congenial, encouraging and loving.
- Discriminate when he is forced through certain undesirable and ambiguous situations either in his day today life as a student and as a professional in his career further.
- Understand the basics regarding the leadership and to become a conscious professional.

- Be aware of codes of professional bodies.
- Implement these concepts in one's career for achieving excellent job satisfaction.

UNIT-I **(6 Lectures)**

BASIC HUMAN VALUES:

'Be a Human First and then one can become a good Professional'; so the basic Human Values-Truth, Right Conduct (Righteousness), Love, Non-violence and Peace, Humility and character. What is ethics? Core areas of ethics: Social ethics, personal ethics Integrity and Trustworthiness, Honesty, Loyalty, Courage, Prudence, Confidence, Confidentiality.

Character: definition, 'A bundle of Virtues and weaknesses of Head and Heart- the resulting individuality of a person from the balance sheet of 'good' and 'bad qualities' is his/her character.

TRAITS OF GOOD CHARACTER:

Honesty and integrity, sense of duties and obligations to one's own profession, Adherence to truth and principles, excellent team work with a good rapport with the subordinates and colleagues, self-discipline, Responsibilities and accountability, self-lessness. Unity in thought, word and deed (Case studies relating to these aspects can be drawn from history & epics or from one's own experience)

Human values as practiced in the Indian societal context-past and present. (Examples drawn from any standard scriptures and many other sources available may be illustrated, debated and discussed).

Spirit of Nationalism and Patriotism with examples from 'struggle for Freedom' (Case studies in the lives of Mahatma Gandhi & His team who strived for Freedom from the British, Scientists and Engineers like Bhaha, Sarabhai, Dhavan, Abdul J Kalam, and Benjamin Franklin, Martin Luther King, or any renowned personalities)

UNIT-II **(6 Lectures)**

What is a profession? Who is a Professional? Special criteria to meet the definition of professional, criteria to be a 'professional engineer (Pages 24-36) of Mike W Martin and Roland Schinzinger)

The 5 Ds (Discipline, Devotion, Dedication, Discrimination and

Determination) against 3 Ps (Pay-Prospects and Promotion)

Personal ethics-Social ethics and professional ethics – are they different-How would you distinguish? –A debate

General and Applied ethics, Relationship between these two in day-to-day functioning of an Engineering Professional- (Pages 10-12 of Mike W Martin and Roland Schinzinger)

PROFESSIONAL AND ENGINEERING ETHICS:

Why Engineering ethics? Moral issues encountered by professional engineers during their day-to-day operations both at home and office/workplace-Moral problems that frequently arise in ones Profession, (case studies from Chapter 1 pages 2-9, analysis of the case studies on pages 13 &14)

MORAL AUTONOMY:

Moral integrity and social and professional behavior. Different theories proposed under moral autonomy-Kohlberg's and Gilligan's Theory. Heinz's Dilemma- Motive behind aggression (16-23 Pages)

LEADERSHIP IN PROFESSIONALISM:

Characteristics of a Leader? Case studies and examples (Leadership by Dr M L Chibber)

UNIT-III (6 Lectures)

Religion and Ethics and Morals-Debate and discussion- Spirituality, social consciousness and ethics

THEORY ABOUT MORALITY:

Virtue ethics, Utilitarianism, Duty ethics, Right ethics based on the concepts of Virtues and vices, most good for most people, Duties to respect for persons, Human rights respectively (pages 53-61, Study Questions for analysis and discussion on pages 60 &61)

Engineering Profession as a social responsibility, His responsibility and accountability while dealing with public issues such as safety, risk, hazards, Risk Analysis and assessment-a brief discussion (risk assessment problem on Page (Chapter 4, specified topics and Case studies)

(Present the case studies on Challenger space shuttle(97), Chernobyl (173), Bhopal tragedy (299), Titanic disaster (p 83), SLV-3, the Indian Space Shuttle (Wings of Fire) recent nuclear holocaust in Japan recent

floods and other man-made and natural calamities or accidents we come across frequently in our society)

Environmental ethics (304-308) & Computer ethics 319-323328-330) (All Pages from Mike W Martin and Roland Schinzinger)

UNIT-IV (6 Lectures)

RESPONSIBILITIES AND RIGHTS OF ENGINEERS:

Collegiality (Ones attitude) towards other engineers working in the same Organization or outside) and Loyalty (to the Employer), obligation of Loyalty and misguided loyalty, Respect for authority and its limitations, Bootlegging, Collective bargaining, Commitments and Convictions (APJ Abdul Kalam's "Wings of Fire") Confidentiality while changing jobs, Conflicts of interests, Gifts, bribes, kickbacks -case studies related, Occupational Crime and industrial espionage

Whistle blowing and moral guide line (case studies), Discrimination, preferential treatment and harassment Rights of Engineers (page 284-286)

Selected topics from Ch 5 and 6 and case studies on pages 200-201,

UNIT-V (6 Lectures)

Engineers as Managers and leaders promoting ethical climate (350-358)

–Ethics in Engineering by Mike W Martin and Roland Schinzinger)

Why a code of Ethics for professional Engineers? ('A code of ethics is not something you post on the Bulletin board; it is something you live every day in your life and career)

Code of ethics for Engineers, Organizational Culture, and Guidelines for use with the Fundamental canons of ethics; (pages 142-162 Indian Culture and Professional Ethics by P S R Murty and 399-414 0f Mike W Martin and Roland Schinzinger)

PROFESSIONAL BODIES:

IEEE, IETE, IE, ASME, ASCE, ABET, NSPE, ISTE Etc…

{** Any topic can be discussed and debated with known live examples and illustrations we find in our day-to-day -living circumstances.}

TEXT BOOKS :

1. Mike W Martin and Ronald Schinzinger : *"Ethics Engineering"*, 3rd Edition, Tata McGraw Hill Education Pvt. Ltd., 2003.
2. P S R Murthy : *"Indian Culture Values and Professional Ethics"*, 2nd Edition, B S Publications, Hyderabad. 2013.

REFERENCES:

1. M. Govindarajan, S Natarajan and V.S. Senthil Kumar : *"Engineering Ethics and Human Values"*, 1st Edition, PHI Publications , 2013.
2. A. Alavudden, R. Kalil Rahaman & M . Jayakumaran : *"Professional Ethics & Human Values"*, 1st Edition, University Science Press (An Imprint of Laxmi Publications Pvt Ltd., Chennai, Bangalore. 2008.
3. Lieunt Gen Dr. M. L. Chibber : *"Leadership-Education in Human Values"*, Sri Sathya Sai Books and Publications Trust, Prasantinilayam, 1st Edition, 2009.
4. Kalam A P J : *"Wings of Fire"*, Universities Press Publications, 2013.
5. Charles B. Fleddermann : *"Engineering Ethics"*, 4th Edition, PHI, 2012.

SYLLABI FOR II SEMESTER

ENGLISH
(Common to all Branches)

Course Code: 13HE1101

L	T	P	C
4	0	0	3

Course Educational Objectives:

Enabling the students to

- ✤ Understand class room lectures in different subjects
- ✤ Read technical and general materials including literary, scientific, political, economic and cultural topics of interest
- ✤ Develop effective written communication in academic, technical and professional contexts
- ✤ Develop creative and critical thinking skills necessary to become employable

Course Outcomes:

The learners will be able to show:

- ✤ Skills in reading including skimming, scanning, intensive and extensive and comprehension
- ✤ Enriched vocabulary and become better communicators
- ✤ Skills of communicating in descriptive, analytical and narrative modes with felicity
- ✤ Creative and critical thinking skills for employability

Course work:

To achieve the above objectives, instruction will be imparted through relevant ESP materials, articles and editorials from newspapers, technical journals, magazines in classes and laboratory. Students will be given individual and integrated practice in LSRW skills.

Contents:

Reading Comprehension - Reading in various degrees of speed (slow, fast, very fast); reading different kinds of texts for different purposes (for example, for relaxation, for information, for understanding, for discussion at a later stage etc.); reading between the lines, skimming and scanning and so on.

Vocabulary –synonyms, antonyms, prefixes, suffixes, confusables, one-word substitutes, Idioms and phrases

- Grammar: Common errors, articles, prepositions, tenses, concord, phrasal verbs, modal verbs, conditionals, transformation of sentences, punctuation and spelling
- Selecting materials for expository, descriptive, and argumentative pieces summarizing and abstracting
- Paragraph writing with coherence, cohesiveness and clarity,
- Essay writing- variety in sentences and paragraphs, précis writing
- Business letter writing
- Reference skills; use of dictionary, library and internet sources

SYLLABUS

UNIT-I (13 Lectures)

1. Story of Insects (English Today)
2. Bringing up Boys & Girls (Academic Encounters)
3. The Lunatic, the Lover and the Poet (The Siren's Song)
4. Vocabulary Building: Prefixes, Suffixes, One-Word Substitutes etc.

UNIT-II (14 Lectures)

1. Unity of Minds by Dr. A.P.J. Kalam (English Today)
2. On His Blindness (The Siren's Song)
3. Cultural Variation & Change (Academic Encounters)
4. Grammar: Tenses & Concord

UNIT-III **(11 Lectures)**

1. Three Years She Grew in Sun and Shower (The Siren's Song)
2. Advertising in the Media (Academic Encounters)
3. Grammar: Articles & Prepositions
4. Paragraph Writing; Technical Description-Process, Object

UNIT-IV **(12 Lectures)**

1. A Special Kind of Blessing (English Today)
2. Techniques of Solving Crimes (Academic Encounters)
3. La Belle Dame Sans Merci (The Siren's Song)
4. Précis writing &Letter Writing

UNIT-V **(10 Lectures)**

1. I Have A Dream (English Today)
2. Because I Could not Stop for Death (The Siren's Song)
3. Writing: Note Taking & Note Making ,Essay writing
4. Grammar: Simple, Compound & Complex Sentences

TEXTBOOKS:

1. Kristine Brown & Susan Hood, *"Academic Encounters: Life in Society Reading, Study Skills, Writing, London"*, Cambridge University Press/ Foundation Books, 2006.
2. K Durga Bhavani, G. K. Subbarayuydu, C. Vijayasree, D. Prema Kumari & Y. L. Srinivas, *"English Today: A Course in Reading and Writing"*, Foundation Books, 2005.
3. David Murdoch, The Siren's Song, "*An Anthology of British and American Verse*", Madras, Orient Longman, 1993.

REFERENCS:

1. Alec Fisher, *"Critical Thinking An Introduction"*, New Delhi: CUP, First South Asian Edition, 2011.
2. Bikram K. Das, Kalyani Samantray, Rath Nayak, Susmita Pani & Saveeta Mohanty, "*An Introduction to Professional English and Soft Skills*", New Delhi, Foundation Books, 2009.

3. *"Regional Institute of English, English for Engineers"*, New Delhi, Foundation Books, 2006.
4. Sharon J.Gerson, Steven M.Gerson, *"Technical Writing"*, New Delhi, Pearson education, 2007.

SUGGESTED READING:

Stories of humour, adventure, mystery and autobiographies of eminent scientists.

MATHEMATICS-II

(Common to all Branches)

Course Code:13BM1102

L	T	P	C
4	1	0	3

Pre requisites:

- Basic formulae of differentiation and integrations.
- Basic terminology and elementary operations on Matrices.
- Basic concept of partial differentiation.

Course Educational Objectives:

- The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.
- Understand the most basic numerical methods to solve simultaneous linear equations.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- Solve simultaneous linear equations using matrix methods.
- Calculate eigenvalues and eigen vectors of matrices that are essential for vibration/design analysis.
- Understand Fourier series, integral ,transforms and they are provided with practice in their application and interpretation in a range of situations.
- Identify/classify and solve the different types of partial differential equations.

UNIT-I (12 Lectures)

MATRICES:

Rank, Normal form, Echelon form, Consistency and Solution of system of simultaneous linear homogeneous and non-homogeneous equations. Finding eigenvalues and eigen vectors, properties, Cayley-Hamilton theorem, computing inverse and powers of a matrix by applying Cayley-Hamilton theorem, Diagonalisation of matrix.
(2.7, 2.10, 2.13 -2.16)

UNIT-II (12 Lectures)

NUMERICAL METHODS IN LINEAR ALGEBRA:

Solution of linear simultaneous equations: LU decomposition, Jacobi iteration and Gauss-Seidel methods. Determination of eigenvalues and eigen vectors by iteration (Rayleigh's Power Method) .

(28.5, 28.6(3), 28.7(1)(2), 28.9)

UNIT-III (12 Lectures)

DIFFERENCE EQUATIONS AND APPLICATIONS:

Difference operators (forward, backward and shift operators), Introduction to difference equation, formation of difference equation, Linear difference equations and it's complete solution. Rules for finding the complementary function and complete integral, Deflection of a loaded string.
(29.1, 29.4, 31.1 - 31.6, 31.8)

UNIT-IV (12 Lectures)

FOURIER SERIES:

Euler's formulae, Dirichlet's Conditions for a Fourier expansion, functions having points of discontinuities, Change of interval, even and odd functions, half range series, wave forms.

FOURIER TRANSFORMS :

Fourier integral theorem, Fourier transform and inverse Fourier transform, Fourier sine and cosine integrals. – Fourier sine and cosine transforms – properties of Fourier Transforms – Finite Fourier transforms.
(10.1 – 10.9, 22.1 – 22.5)

UNIT-V **(12 Lectures)**

PARTIAL DIFFERENTIAL EQUATIONS:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – solutions of first order linear (Lagrange) equation and nonlinear first order (standard type) equations.

APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS:

Method of separation of variables, Classification of second order linear Partial Differential Equations. Solutions of one dimensional heat equation, wave equation and two-dimensional Laplace's equation under initial and boundary conditions. (17.1 – 17.3, 17.5, 17.6, 18.1-18.7)

TEXT BOOK:

Dr.B.S.Grewal *"Higher Engineering Mathematics"*, 42^{nd} Edition, Khanna Publishers, 2012.

REFERENCES:

1. Kreyszig E, "*Advanced Engineering Mathematics*", 8^{th} Edition, John Wiley, Singapore, 2001.
2. Greenberg M D, "*Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, "*Advanced Engineering Mathematics*", 7^{th} Edition, Cengage Learning, 2011.

ENGINEERING MECHANICS

(Common to all Branches)

Course Code: 13ME1102

L	T	P	C
4	1	0	3

Course Educational Objectives:

To develop

- The skill of converting a physical problem into a suitable mathematical model
- Analytical skills of solving the mathematical model
- The skill of interpreting the results in terms of the given physical situation
- The skills of optimization

Course Outcomes:

The student will be able to

- Identify and list , for a given physical problem, all known's, intermediate unknowns, and final results
- Formulate suitable mathematical equations and the constraints.
- Resolve a given force into rectangular components, find the moment of a force about a given point and find the resultant of a set of forces
- Solve problems involving static and dynamic friction
- Locate the centroid and calculate the moments of inertia of a given plane area
- Find the resulting acceleration of a body subjected to a set of forces and moments
- Calculate the work done, energy, power and efficiency

UNIT-I (13 Lectures)

RESULTANTS OF FORCE SYSTEM:

Parallelogram law, forces and components, resultant of coplanar concurrent forces, components of forces in space, moment of force, principle of moments, coplanar applications, couples, resultant of any force system (coplanar concurrent cases only).

Equilibrium of force systems: Free body diagram, equations of equilibrium, equilibrium of planar systems, further discussion of planar equilibrium.

UNIT-II (09 Lectures)

FRICTION:

Theory of friction, angle of friction, laws of friction, static friction, kinetic friction, friction in bodies moving up or down on an inclined plane, wedge friction, screw friction and screw jack.

UNIT-III (14 Lectures)

CENTROIDS AND CENTERS OF GRAVITY:

Center of gravity of flat plate, centroids of areas and lines, importance of centroids of areas and lines, importance of centroids and moments of area, centroids determined by integration, centroids of composite figures, theorem of Pappus, center of gravity of bodies.

MOMENT OF INERTIA:

Definition of moment of inertia, polar moment of inertia, radius of gyration, parallel axis theorem, moments of inertia by integration, moments of inertia for composite areas.

UNIT-IV (12 Lectures)

MASS MOMENT OF INERTIA:

Introduction, radius of gyration, parallel axis theorem, mass moments of inertia by integration, moments of inertia of composite bodies.

KINEMATICS AND KINETICS OF A PARTICLE:

Motion of a particle, rectilinear motion, rectangular components of curvilinear motion, normal and tangential components of acceleration, radial and transverse components, cylindrical coordinates translation-analysis as a particle, further discussion of particle kinematics.

UNIT-V (10 Lectures)

KINEMATICS AND KINETICS OF A BODY UNDERGOING FIXED AXIS ROTATION:

Types of rigid-body motion, angular motion-fixed axis rotation, application of kinematic equations, kinetics of fixed axis rotation.

WORK-ENERGY METHOD:

Work-energy equation for translation, interpretation and computation of work, work-energy applied to particle motion, power, efficiency, applied to fixed-axis rotation, work-energy applied to connected systems, work-energy method.

TEXT BOOK:

Vijaya Kumar Reddy K and Suresh Kumar J(Adapters), "*Singer`s Engineering Mechanics : Statics and Dynamics*", Third edition (SI Units), BS Publications, Hyderabad, 2011

REFERENCES :

1. Timoshenko sp and Young DH, Rao and Pytel, "*Engineering Mechanics*", fourth edition, McGraw Hill international editions, 2013.
2. Hibbeler RC, " *Engineering Mechanics : Statics* ", low price edition, Pearson Education,2000.
3. Hibbeler RC, " *Engineering Mechanics : Dynamics* ", low price edition, Pearson Education,2000.
4. Tayal AK "*Engineering Mechanics: Statics and Dynamics*", Thirteenth edition, Umesh Publications, Delhi, 2005

PHYSICS
(Common to all Branches)

Course Code: 13BP1101

L	T	P	C
4	0	0	3

Course Educational Objectives:

The aim and objective of the course curriculum is to impart learners the basic knowledge that enables effective understanding of various core subjects of engineering branches through principles of physics such as architectural acoustics, wave mechanics, dielectrics, fiber optics, Electromagnetism and so on.

Course Outcomes:

- Students will acquire knowledge of basic physical principles and they can correlate the same to natural environment and social concern.
- Students will be able to apply the knowledge in the selection of materials for various engineering applications.
- Enables students to learn the characteristics and applications of laser devices and enhances information levels on fiber optic communications.
- Enables the students gain a research orientation and innovative spirit.

UNIT-I (10 Lectures)

ELASTIC PROPERTIES OF MATERIALS & ARCHITECTURAL ACOUSTICS:

Introduction – classification of stress, strain and Hooke's law – Elastic behavior of materials – Poisson's ratio and relationship between modulus of elasticity – Twisting couple on a solid shaft – bending of beams – bending moment - Y by cantilever – Uniform bending - Reverberation and reverberation time – absorption coefficient – Sabine's law (quantitative treatment) – Factors affecting the acoustics of buildings and their remedies – Acoustical design of a hall.

UNIT-II (15 Lectures)

ELECTROSTATICS AND DIELECTRICS:

Vectors - unit vectors - Gradient of a scalar field – divergence & curl of a vector field – Coulombs law - Electric flux - Gauss law in electrostatics – differential form of Gauss law – derivation of Coulombs law from Gauss Law – Applications of Gauss Law (Electric Field due to a solid charged sphere and thin sheet of charge) - Gauss law in dielectric medium - Dipole - Electric displacement vector - Dielectric permittivity and susceptibility- Dielectric constant and dielectric polarization in materials - Types of polarizabilities - Electronic polarizability derivation - Internal fields in solids and Claussius - Mosotti equation - frequency dependence of dielectric constant - Dielectric loss - Dielectric Strength and dielectric breakdown - important dielectric materials in electrical engineering.

UNIT-III (10 Lectures)

ELECTROMAGNETICS:

Biot-Savart Law - Magnetic flux – Magnetic scalar potential - Magnetic Vector Potential - Ampere's law – Force and torque on a magnetic dipole due to external magnetic field, Magnetization - Bound volume and surface current densities - auxiliary field H (Ampere's law in magnetized materials) - Magnetic susceptibility and permeability - Force on charged particle under electric and magnetic fields - Faraday's law of electromagnetic induction - Self and mutual Inductances - Displacement current density - Maxwell's equations – Physical Significance of Maxwell's equations.

UNIT-IV (10 Lectures)

WAVE MECHANICS & BAND THEORY OF SOLIDS :

Introduction to wave mechanics – wave particle duality – de-Broglie matter waves – Wave function characteristics and significance – Schrodinger's time independent wave equation – particle in one dimensional rigid box - Fermi-Dirac distribution function – Fermi level - Effect of temperature on Fermi function - Bloch theorem (Qualitative), Kronig - Penny model (Qualitative treatment) – Concept of effective mass, Origin of energy band formation in solids – Classification of materials in to

conductors, semi-conductors and insulators based on number of effective electrons.

UNIT-V **(15 Lectures)**

OPTICS & LASERS:

Introduction to optics – Interference phenomenon - interference through thin films in reflected light – Newton's rings – determination of wave length of a source – Diffraction due to single slit – intensity pattern discussion – Diffraction grating – Resolving Power of grating (qualitative) - Polarization – Law of Malus - Brewster's law – double refraction – Nicol prism - Basic principle of a LASER – Induced absorption, spontaneous and stimulated emissions – Einstein's coefficients – Population inversion – Ruby laser, CO_2 laser and Semiconductor laser – Laser Applications – Introduction to optical fibers – Classification of fibers on the basis of refractive index profile – Acceptance angle and numerical aperture definitions and expression for Numerical aperture – Applications relating to communication and sensors (force and temperature).

TEXT BOOKS:

1. D.J. Griffiths, *"Introduction to Electrodynamics"*, 3rd Edition, PHI (EEE series), 2009.
2. M.N. Avadhanulu, P.G. Kshirasagar, *"A Text book of Engineering Physics"*, 10th Edition, S. Chand & Company Limited, 2013.
3. V. Rajendran, *"Engineering Physics"*. 2011 edition, TMH publishing company, 2011.

REFERENCES:

1. A.J. Dekker, *"Electrical Engineering Materials"*, 1st Edition, Macmillan Publishers, 2007.
2. C. Kittel, *"Introduction to Solid State Physics"*, John Wiley Publishers, 2007.
3. M.N.Sadiku, *"Elements of Electromagnetics"*, 4th Edition, Oxford University Press, 2007.

4. V. Raghavan, *"Materials Science"*, 5th Edition, PHI Publishers, 2007.

5. R.K. Gaur, S.L. Gupta, *"Engineering Physics"*, 8th Edition, Dhanapat Rai Publishers, 2003.

6. P.K. Palanisamy, *"Applied Physics"*, 2nd Edition, Scitech Publishers, 2010.

7. M. R. Srinivasan, *"Engineering Physics"*, New Age Publishers, 2012.

SURVEYING - II

Course Code: 13CE1103

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To develop an understanding of the importance of Advanced Surveying techniques.
- To impart the knowledge of Trigonometric levelling and Setting out of curves.
- To familiarize the Student with theodolites and Advanced Surveying equipment.

Course Outcomes:

- To impart experimental skills to determine the heights and distances of inaccessible objects.
- Student will demonstrate the ability to identify and solve problems relevant to surveying.
- Students will have the confidence to apply surveying techniques to align highway and railway curves.

UNIT-I (12 Lectures)

THEODOLITE:

Types of theodolites – Temporary Adjustments of theodolite, Measurement of horizontal angle - Method of repetition and reiteration, Measurement of vertical angle – Uses of theodolite – Errors and Permanent adjustments of a theodolite.

UNIT-II (10 Lectures)

TRAVERSING :

Theodolite traversing – Open and closed traverse – Closing errors, balancing the error – Bowditch method – Transit method, omitted measurements.

Trigonometric levelling – Elevation of top of the tower - same plane - Different planes – Axis signal correction.

UNIT-III **(14 Lectures)**

TACHEOMETRY:

Tacheometry – Principle of tacheometry – Stadia methods – Fixed hair method – Movable hair method – Tangential method – Subtense bar – Beaman's stadia Arc.

Triangulation – Classification-inter visibility of station – Signals and towers-base line measurements – Corrections – Satellite station and Reduction to centre – Base net.

UNIT-IV **(15 Lectures)**

CURVES

TYPES OF CURVES:

Simple curves – Elements of simple curves – Methods of setting simple curves – Rankine's method – Two theodolite method– Compound curves – Elements of compound curves. Reverse curves – Elements of reverse curve – Determination of various elements – Transition curves - Setting out methods.

UNIT-V **(08 Lectures)**

ADVANCED SURVEYING:

Introduction to geodetic surveying, Total station and global positioning system- Introduction to Geographic Information System (GIS)

TEXT BOOKS :

1. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain *"Surveying"* (Vol – 1&2) 18th Edition, by Laxmi Publications (P) ltd., New Delhi, 2011.
2. Duggal S K, *"Surveying"* (Vol – 1&2), 10th Edition, Tata McGraw Hill Publishing Co. Ltd. New Delhi, 2004.

REFERENCES:

1. Arthur R Benton and Philip J Taety, *"Elements of Plane Surveying"* 8th edition, McGraw Hill – 2000, 2010.

2. Chandra A M, *"Plane Surveying"*, 4th Edition, New Age International Pvt. Ltd. New Delhi, 2009.
3. Arora K R *"Surveying"* (Vol 1, 2 & 3), 9th Edition, Standard Book House, Delhi, 2008.

ENGLISH LANGUAGE LAB
(Common to all Branches)

Course Code : 13HE1102

L	T	P	C
0	0	3	2

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

Course Educational Objectives:

- To make students recognise the sounds of English and Phonemic transcription through Audio-Visual aids and Computer Software.
- To help them overcome their inhibitions and self- consciousness while communicating in English and to build their confidence.
- To enable them to speak English intelligibly with focus on Stress and Intonation.

Course Outcomes :

- Students will be able to recognise the sounds of English and Phonemic transcription, practice Stress & Intonation in speech.
- They will learn to communicate in Oral and Written English forms confidently.
- They will also be able to demonstrate skills like Publik Speaking & Oral Presentations. Students will also exhibit debating and discussion skills.

SYLLABUS:

The following course content is prescribed for the English Language Laboratory sessions:

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Listening for Comprehension

4. Situational Dialogues.
5. Oral Presentations- Prepared & Extempore
6. 'Just A Minute' Sessions (JAM)
7. Telephonic communication
8. Group Discussions
9. Debate
10. Team Presentations (PPTs).
11. Reference Skills

REFERENCES:

1. E. Suresh Kumar , P. Sreehari, *"A Handbook for English Language Laboratories"*, Foundation Books, revised edition 2009.
2. Simon Sweeny, *"English for Business Communication"*, CUP, First South Asian Edition, 2010.
3. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
4. Daniel Jones, English Pronouncing Dictionary with CD.
5. T. Balasubramanian, *"A Text book of English Phonetics for Indian Students"*, Macmillan, 1981.
6. Jeremy Comfort, Pamela Rogerson, Trish Stott & Derek Utley, *"Speaking Effectively : Developing Speaking Skills for Business English"*, Cambridge University Press, First South Asian Edition,2002.Reprint 2011.
7. T Samson, *"Innovate With English"*, New Delhi: Foundation Books, 2010.
8. Meenakshi Raman & Sangeeta Sharma, *"Technical Communication Principles & Practice"*, New Delhi: OUP, 2010.

ENGINEERING WORKSHOP
(Common to all Branches)

Course Code :13MT1101

L	T	P	C
0	0	3	2

Course Educational Objectives:

To provide hands on experience on basic Engineering and IT related skills.

- ✤ To train the student in the basics of computer components, maintenance software(s) installation
- ✤ To train the students in office tools.
- ✤ To give the student exposure to DOS commands and LINUX commands.
- ✤ To demonstrate and train the students in basic professional trades.
- ✤ To train the students to know about different system tools in personal computer.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Identify the peripherals of a computer, components in a CPU and its function
- ✤ Work with MS-OFFICE
- ✤ Work with DOS commands
- ✤ Work with LINUX commands
- ✤ Understands different system tools in personal computer.

COMPULSORY EXERCISES:

1. Identification of the peripherals of a computer, components in a CPU and its function – Block diagram of the CPU along with the configuration of each peripheral. Disassembly and assembly of a personal computer.

2. Installation of MS windows on the personal computer.
3. One lamp controlled by a one-way switch and (b) Two-way switching for stair-case lamp.

ANY NINE EXPERIMENTS FROM THE FOLLOWING:

Carpentry: Making a Cross-half lap joint using wooden pieces.

Carpentry: Making a Mortise and Tenon joint using wooden pieces.

Fitting: Preparation of a V-fit between mild steel flat pieces.

Fitting: Preparation of a Square-fit between mild steel flat pieces.

Foundry: Preparation of a sand mould using a single piece pattern

Foundry: Preparation of a sand mould using a split piece pattern.

Tin-Smithy: Preparation of a sheet metal pipe-joint using tin-smithy tools.

Tin-Smithy: Preparation of a sheet metal funnel using tin-smithy tools.

Welding: Making a Lap joint through arc welding.

Lathe Machine: Demonstration of turning related activities on Lathe machine.

Black smithy: Demonstration of Plumbing trade.

Plumbing: Demonstration of plumbing trade

Operating System: Changing Boot Device Priority, Installation of Linux, putting passwords, Enabling and disabling external devices, Connectivity Boot Camp.

Hands on Exposure on Linux shell commands: Using man, info commands for finding information about commands. Using file processing commands (ls, cp, mv, ln, mkdir, rmdir, chmod etc..), Using text processing commands (grep, egrep, sed etc…), Using disk utility commands, mount commands (du, df, mount etc..), Vi-Editor.

MS-Word: Using Ms-Word, creating project abstract, creating newsletter, creating feedback form

MS- Excel: Excel orientation, creating scheduler, calculating CGPA, Performance Analysis

MS-PowerPoint: PPT Orientation, Slide Layouts, Custom Animation, Hyperlinks, inserting Images, Clip Art, Audio, Video, Objects, Tables, Charts.

System tools, Hardware Troubleshooting, Software Troubleshooting and Installations of Anti Virus.

Multimedia Flash (Adobe)

a. Introduction to Flash interface

b. Introducing the tools

c. Putting text into Flash

d. Smoothen/straighten drawings

e. Animation Part 1: Using layers, key frames and motion tweening

f. Animation Part 2: Shape tweening, motion guide and frame by frame animation

PHYSICS LAB
(Common to all Branches)

Course Code: 13BP1102

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to involve the students to learn the subject and gain knowledge in handling the apparatus which will help them in designing devices and to trouble shoot the problems in their future professional work. The experiments are designed to cater to the needs of the students of all branches.

Course Outcomes:

The course will help the student in handling different apparatus for conducting various experiments in different fields which enables the student to trouble shoot the problems in their future professional work.

ANY TEN OF THE FOLLOWING 15 EXPERIMENTS

ERROR ANALYSIS AND GRAPH DRAWING (LECTURE - DEMO).

1. Bending of beams – Elliptical and Hyperbolic fringes - Determination of 'Y'.
2. Torsional pendulum - comparison of rigidity modulii of various wires.
3. Melde's experiment – determination of frequency of electrically maintained tuning fork.
4. Determination of wavelength of laser light using diffraction through a graded scale.
5. Particle size determination using He-Ne laser (Lycopodium powder).
6. Diffraction grating – determination of wavelengths of spectral lines of Mercury spectrum by minimum deviation method.
7. Spectrometer – determination of dispersive power of the material of a prism.

8. Polarization of light – verification of Malu's law and to determine the Brewster's Angle for glass.
9. Determination of Planck's constant.
10. Solar cell characteristics – I-V characteristics, measurement of efficiency and Fill factor.
11. Stewart – Gee apparatus – study of variation of magnetic field along the axis of circular current carrying loop.
12. LCR series and parallel resonance circuit study the frequency response.
13. Familiarity of CRO – Lissajjou's figures - determination of time period, voltage, frequency and phase of a wave.
14. Newton's Rings- determination of wavelength of the source/radius of curvature of given convex lens.
15. Optical fibres- determination of Numerical aperture, acceptance angle and bending losses.

SURVEYING LAB

Course Code : 13CE1104

L	T	P	C
0	0	3	2

Course Educational Objectives:

- To impart Experimental skills of conventional surveying techniques.
- To familiarize with the working operations of advanced surveying equipment.

Course Outcomes:

The student will be able to:

- Demonstrate an ability to conduct surveying for any infrastructure project.
- Demonstrate the ability to interpret and analyses data and report results.

LIST OF EXERCISES:

1. Measuring of an area by Chain Surveying and Plotting.
2. An exercise on Chaining/ Ranging across obstacles.
3. Determination of distance between two in accessible points using compass.
4. Closed Traversing by compass & graphical adjustment.
5. Open traversing by compass and plotting.
6. Measurement of elevation difference between two points using dumpy level by Height of Instrument & Rise and fall methods (by taking atleast two change points)
7. Profile levelling – an exercise of Longitudinal Section and Cross Section and plot the profile.
8. Contouring of a small area by method of blocks / grids.

9. Measurement of horizontal angles by method of repetition and reiteration by Theodolite.
10. Trignometric levelling – determination of a given Tower / Building height with base is accessible and in-accessible.
11. Heights and distance using principle of tachometric surveying.
12. Setting out simple curve.

SYLLABI FOR III SEMESTER

PROBABILITY, STATISTICS AND NUMERICAL METHODS
(Common to CSE, IT & CE)

Course Code: 13BM1103

L	T	P	C
4	1	0	3

Pre requisites:

- ✤ Fundamentals of Set theory and calculus.
- ✤ Basic concepts of Probability and Discrete Random Variables.

Course Educational Objectives:

To acquaint students with the fundamental concepts of probability and statistics and to develop an understanding of the role of statistics in engineering. Also to introduce Numerical techniques to solve the real world applications.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- ✤ Calculate fundamental concepts such as the cumulative distribution function, expectations, and distributions of random variables.
- ✤ Evaluate estimators, construct confidence intervals, and perform hypothesis tests.
- ✤ Solve engineering problems using Numerical techniques.

UNIT-I (12 Lectures)

Review of basic concepts in Probability and Discrete Random variables, Continuous Random variables - Probability density, Distribution. Calculating probabilities from Probability density, Determining Mean and Variance using Probability density, Normal Distribution- Density and Properties. Calculating Normal Probabilities, Normal Approximation to Binomial Distribution, Uniform Distribution.

(5.1, 5.2, 5.3, 5.5 of [1])

UNIT-II **(12 Lectures)**

Population and sample, Sampling distribution of the mean(s known), Central Limit theorem

(without Proof) and Problems, Sampling distribution of the mean(s unknown), Point Estimation, Maximum error and determination of sample size, Interval Estimation (Large sample and small sample)
(6.1, 6.2, 6.3, 7.1, 7.2 of [1])

UNIT-III **(12 Lectures)**

Tests of Hypotheses (Introduction, Null hypotheses, Alternative hypotheses, Type –I,II errors, Level of significance, Hypotheses concerning one mean (Large and Small samples), Inference concerning two means (Large and Small samples), Paired t-test.

Estimation of Variances (point and Interval estimation), Hypotheses concerning one variance, Hypotheses concerning two variance, Estimation of Proportions, Hypotheses concerning one Proportion, Hypotheses concerning several Proportions.
(7.3, 7.4, 7.5, 7.8, 8.1, 8.2, 8.3, 9.1, 9.2, 9.3 of [1])

UNIT-IV **(12 Lectures)**

Introduction to Numerical Methods, Solution of algebraic and transcendental equations-Bisection method, Method of false position Newton's method.

Finite differences-Forward differences Backward differences, Central differences, Differences of a polynomial, Other Difference operators – Shift operator, Average operator, Relations between the operators.
(28.1 to 28.3, 29.1 to 29.5 of Text book [2])

UNIT-V **(12 Lectures)**

Newton's interpolation formulae- Newton's forward interpolation formula Newton's backward interpolation formula, Interpolation with un equal intervals: Lagrange interpolation, Divided differences, Newton's divided difference formula Difference formula, Inverse interpolation.

Numerical solutions of Ordinary differential equations: Euler's Method, Modified Euler's Method, Runge-Kutta method of order 4.
(29.6, 29.9 - 29.13, 32.4, 32.5, 32.7 of Text book [2])

TEXT BOOKS:

1. Richard A.Johnson, C.B.Gupta, *"Miller. Freund's Probability and Statistics for Engineers"*, Seventh edition, Pearson education, 2005.
2. Dr.B.S.Grewal, *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. S. S. Sastry, *"Introductory Methods of Numerical Analysis"*, 4th Edition, Prentice Hall India Pvt., Limited, 2005.
2. S.C. Gupta and V.K. Kapoor, *"Fundamentals of Mathematical Statistics"*, Ninth Revised Edition , Sultan Chand & Sons Educational Publishers, 2007.

BUILDING MATERIALS AND CONSTRUCTION

Course Code: 13CE1105

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To create a strong understanding on the importance of various building materials used in civil engineering construction projects.
- To impart knowledge on characteristics, properties of various building components and materials.

Course Outcomes:

- Student should demonstrate the ability to select an appropriate building materials used in construction.
- Student should demonstrate the ability to apply different construction techniques in buildings.

UNIT-I (15 Lectures)

BRICKS & STONES:

Properties of building stones – Relation to their structural requirements. Classification of stones – Stone quarrying – Precautions in blasting, Dressing of stone, Composition of good brick earth, Qualities of a good brick, Various methods of manufacture of bricks. Comparison between clamp burning and kiln burning, Other types of bricks.

FERROUS AND NON-FERROUS METALS:

Ferrous metals, Desirable characteristics of reinforcing steel. Principles of cold working. Detailed discussion on reinforcing steel, Mechanical and Physical properties Chemical composition. Aluminum- Brief description on properties and uses.

UNIT-II (8 Lectures)

TIMBER:

Timber Structure – Properties – Seasoning of timber, Classification of various types of timbers used in buildings – Defects in timber, Preservation of timber, fire resistance of timber and testing of timber.

UNIT-III (15 Lectures)

MASONRY:

Brick masonry – Bonding of bricks, Method of laying of bricks, Inspection of brick work, Construction of half brick masonry wall, height of walls in brick masonry and brick piers. Stone masonry – Classification of stone masonry – Random Rubble, Coursed Rubble and Ashlar masonry.

UNIT-IV (12 Lectures)

BUILDING COMPONENTS:

Lintels, Arches and Vaults - Staircases – Types. Different types of flooring-Concrete, Mosaic, Terrazo floors; Different types of roofs-Pitched, Flat and Curved Roofs. Lean-to-Roof, Coupled Roofs, Trussed roofs- King and Queen Post Trusses. Doors & Windows – Types, Sizes and Rate.

UNIT-V 10 Lectures)

OTHER CONSTRUCTION TECHNIQUES:

Damp Proofing and Water Proofing- materials used- Specifications of Dam Proof Course in walls, Basic principles of water proofing of basements, Plastering, Pointing, White washing, Distempering and Painting. Form work and Scaffolding.

TEXT BOOKS:

1. S K Duggal, *"Building materials"*, 2nd Edition, New Age International Publishers, 2010.
2. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, *"Building Construction"* - Laxmi Publications (P) ltd., New Delhi.
3. P.C. Varghese, *"Building Construction"*, Prentice-Hall of India private Ltd, New Delhi

REFERENCES:

1. R.Chudly *"Construction Technology"*, (Volumes I and II), 2nd Edition, Longman, UK, 1987.
2. P.C. Varghese *"Building materials"* by Prentice-Hall of India private Ltd, New Delhi
3. P.C. Varghese, *"Building Construction"*, Prentice-Hall of India private Ltd, New Delhi

STRENGTH OF MATERIALS-I

Course Code : 13CE1106

L	T	P	C
4	1	0	3

Course Educational Objectives:

- To create a strong understanding about the behaviour of engineering materials under deformable bodies under the action of various types of loads.
- To understand various types and analysis of trusses, structural systems and their configurations.
- To develop an ability to draw Shear force diagram and bending moment diagrams for beams subjected to various types of loading.

Course Outcomes:

- Demonstrate the ability to draw the stress diagrams, deflections of structural system.
- To equip the importance of deflection in various beams and its application.

UNIT-I (15 Lectures)

SIMPLE STRESSES AND STRAINS:

Elasticity and plasticity – Types of stresses and strains – Hooke's law – stress – strain diagram for mild steel and HYSD – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic constants and the relationship between them – Bars of varying section – composite bars – Temperature stresses. Resilience – Gradual, sudden, impact and shock loadings – simple applications.

UNIT-II (12 Lectures)

SHEAR FORCE AND BENDING MOMENT:

Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, U.D.L., uniformly varying loads and combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT-III (14 Lectures)

FLEXURAL STRESSES:

Theory of simple bending – Assumptions – Derivation of bending equations, Neutral axis – Determination of bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections.

SHEAR STRESSES:

Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

UNIT-IV (10 Lectures)

DEFLECTION OF BEAMS:

Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, - UDL, UVL - Moment area method – application to simple cases.

UNIT-V (12 Lectures)

ANALYSIS OF PIN-JOINTED PLANE FRAMES:

Determination of Forces in members of plane, pin-jointed, perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever and simply – supported trusses- by method of joints, method of sections.

TEXT BOOKS:

1. R.K.Bansal, *"Introduction to text book of Strength of materials"*, 4th Edition, Laxmi publications Pvt. Ltd., New Delhi, 2008.
2. Sadhu Singh, *"Strength of Materials"*, 2nd Edition, Khanna Publications, 2001.
3. S.Ramamrutham and R.Narayanan *"Strength of Materials"* 11th Edition, Dhanpat Rai publications, 2009.

4. Timoshenko & Gere *"Mechanics of Materials"*, 4^{th} Edition, Mc Graw hill, 2003.

REFERENCES:

1. Ferdinand Beer and Johnston, *"Mechanics of Solids"*, 6^{th} Edition, Tata Mc Graw hill Publications, 2000.
2. Schaum's out line series, *"Strength of Materials"* 10^{th} Edition, Mc Graw hill International Editions, 2007.
3. R. Subramanian, *"Strength of materials"*, 1^{st} Edition, Oxford university press, New Delhi, 2011.
4. Bhavi Katti, *"Strength of Materials"*, 7^{th} Edition, 2010.
5. Timoshenko & Young, *"Strength of Materials"*, 4^{th} Edition, Tata Mc Graw hill, 2003.

FLUID MECHANICS

Course Code: 13CE1107

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To introduce the concepts of fluid mechanics (along with application) and fluid flow measurements.
- To familiarize the students with fluid statics and fluid dynamics.

Course Outcomes:

- Students will demonstrate the ability to apply the boundary layer theory in aircraft structures.
- Students will be capable of understanding the behaviour in their static and dynamic conditions of a fluid along with simple applications.

UNIT-I (10 Lectures)

INTRODUCTION :

Dimensions and units – Physical properties of fluids, density, specific weight, specific volume, specific gravity, viscosity, surface tension, vapour pressure and their influences on fluid motion- fluid continuum- pressure at a point, Pascal's law, Hydrostatic law - atmospheric, gauge and vaccum pressure- measurement of pressure, Pressure gauges, Manometers: Differential and Micro Manometers.

HYDROSTATIC FORCES:

Hydrostatic forces on submerged plane (Horizontal, Vertical, inclined) and curved surfaces – Center of pressure, Derivations and problems.

UNIT-II (14 Lectures)

FLUID KINEMATICS:

Description of fluid flow, velocity, acceleration – convective, local and total, Stream line, path line and streak lines and stream tube. Classification of flows: Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity- one, two, three dimensional flows – stream and velocity potential functions, flownet analysis.

UNIT-III (15 Lectures)

FLUID DYNAMICS:

Surface and body forces, Lagrangean and Eularian approaches – Concepts of fluid system and control volume – control volume approach for fluid flow problems – Euler's and Bernoulli's equations for flow for 2-D flow, Momentum equation and its application – forces on pipe bend.

MEASUREMENT OF FLOW:

Pitot tube, Venturi meter and Orifice meter – classification of orifices and mouth pieces–flow over rectangular, triangular and trapezoidal notches–Broad crested weirs.

UNIT-IV (15 Lectures)

VISCOUS FLOW:

Reynolds experiment – Classification of Laminar & Turbulent flows. Flow between two parallel plates, Flow through long pipes.

CLOSED CONDUIT FLOW:

Laws of Fluid friction – Darcy-Weisbach equation, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic gradient line, variation of friction factor with Reynolds number – Moody's Chart.

UNIT-V (10 Lectures)

BOUNDARY LAYER (BL) THEORY:

Concepts, Prandtl's contribution, Characteristics of boundary layer along a thin flat plate, laminar and turbulent Boundary layers (no derivations), BL in transition, separation of BL, control of BL separation, flow around submerged objects-Drag and Lift- Magnus effect.

TEXT BOOKS:

1. V.L.Streeter, E. Benjamin Wiley and W. Bedford, *"Fluid Mechanics"*, 9th Edition, McGraw-Hill Companies, 1997.
2. P.N Modi and S.M. Seth, *"Hydraulics and Fluid Mechanics Including Hydraulic Machines"*, 14th Edition, Standard Book House, 2002.

3. K.L. Kumar, *"Fluid Mechanics"*, 6th Edition, Eurasia Publishing House, 1995.

REFERENCES:

1. Frank.M. White, *"Fluid Mechanics"*, 14th Edition, Tata McGraw hill Pvt. Ltd, 2002.
2. A.K. Mohanty, *"Fluid Mechanics"*, 14th Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 2002.
3. J.F. Douglas, J.M. Gasirock and J.A. Swaffield, *"Fluid Mechanics"*, 14th Edition, Pearson Education Publishers, 2002.
4. A.K.Jain, *"Fluid Mechanics Including Hydraulic Machines"*, 8th Edition, Khanna Publishers, New Delhi, 2003.

CONCRETE TECHNOLOGY

Course Code: 13CE1108

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To familiarize the students with various types of cements, concretes and their properties.
- To impart an awareness of various admixtures for specific concreting purposes.
- To produce Civil Engineering students who have strong foundation in testing of fresh and hardened concrete.

Course Outcomes:

- Student will be able to select proper ingredients of concrete and acquire knowledge about the testing of materials for quality assurance.
- Student will be able to select special concretes for specific purposes.

UNIT-I (10 Lectures)

CONSTITUENTS OF CONCRETE:

Concrete as a Building Material

CEMENT:

Chemical Composition, Chemical and Physical processes of Hydration, Structure of Hydrated Cement, Blended Cements, Properties of cement and their effect on properties of Concrete. (Test procedures not required)

Aggregates: Classification, Mechanical, Physical and Thermal properties of Fine and Course aggregates that affect the properties of concrete. (Test procedures not required) Quality of mixing water: Specifications for quality of mixing water and Curing water (test procedures not required)

MANUFACTURING OF CONCRETE AND SPECIAL PROCESSES OF CONCRETING:

Manufacture of Concrete: Mixing – Transporting – Placing – Compacting

– Curing, Safe Stripping Time.

SPECIAL PROCESSES OF CONCRETING:

Hot and cold weather concreting – Sprayed Concrete – Underwater Concrete –Grouted concrete – Mass concrete – Pumped concrete – Concrete for Liquid Retaining Structures – Slip form construction – Concrete coatings & surface treatments.

UNIT-II (15 Lectures)

FRESH CONCRETE:

Properties of Fresh Concrete: Need for study

WORKABILITY:

Definition, Factors affecting workability, significance, Tests available for measurement (test procedures not required)

SEGREGATION AND BLEEDING :

Definitions – causes and effects, measurement – Laittance, Factors effecting performance of Hardened concrete, Water/ Cement Ratio, Abram's law, Powers law, Gel space ratio, Maturity concept.

HARDENED CONCRETE:

Properties of Hardened concrete: Compressive strength – Tensile Strength – Flexural Strength – Young's Modulus and Poisson's ratio, Deformation characteristics: Creep – Shrinkage – Soundness & Thermal properties, Durability.

UNIT-III (12 Lectures)

TESTING OF HARDENED CONCRETE QUALITY CONTROL:

Destructive, partially destructive and Non- Destructive testing of concrete, Codal provisions, relationship between tensile strength and compressive strength, cube strength and cylinder strength.

Variability of Concrete Strength, Concept of Quality, Stages and means of Control, Statistical methods of measuring Variability, Acceptance Criteria, applications. Mix design as per IS code.

UNIT-IV (10 Lectures)

ADMIXTURES:

Mineral Admixtures: Fly ash, GGBS, Silica Fume – origin and manufacture, Chemical Composition, Chemical and Physical processes of hydration, effects on properties of concrete.

Chemical Admixtures: Classification, origin and manufacture, chemical composition, actions and interactions, applications.

UNIT-V **(15 Lectures)**

SPECIAL CONCRETE-I :

Plain concrete – Reinforced Concrete – Pre-stressed Concrete – Light weight concrete – Cellular concrete – No fines concrete – Aerated and foamed concrete – Smart Concrete – Fiber reinforced concrete – Polymer concrete – Fly ash concrete – Self compacting concrete.

SPECIAL CONCRETE-II:

High performance concrete – Very high strength concrete – High density concrete – Lime concrete – Sulphur impregnated concrete – Refractory concrete – Radiation shielding concrete – Recycled concrete – Roller compacted concrete-Ready Mix Concrete.

TEXT BOOKS:

1. A.M.Neville, J.J.Brookes, *"Concrete Technology",* 5th Edition, Pearson Education, 2009.
2. M.S.Shetty, *"Concrete Technology",* 6th Edition, Chand Publication, 2010.

REFERENCES:

1. A.M.Neville, *"Properties of Concrete"*, 2nd Edition, Pearson Education, 2000.
2. A.R.Shanta Kumar, *"Concrete Technology"*, 1st Edition, Oxford University Press, New Delhi, 2010.
3. N.Krishna Raju, *"Design of Concrete Mixes"*, 2nd Edition, CBS Publishers and distributors, 2007.
4. M.L.Gambhir, *"Concrete Technology"*, 3rd Edition, Tata McGraw hill Publishers, New Delhi, 2008.
5. IS456:2000, *"Code of practice of plain and reinforced concrete"* 4th Revision, August 2000.

BUILDING PLANNING AND DESIGN

Course Code: 13CE1109

L	T	P	C
4	0	0	3

Course Educational Objectives:

- ✤ The student shall understand the climatic design, principles of planning, and building byelaws of residential building.
- ✤ To impart requisite skills to design different types of buildings.

Course Outcome:

- ✤ Student will be able to draw plan, section and elevation of dwelling units which are functional and climatically comfortable.

UNIT-I (10 Lectures)

RESIDENTIAL BUILDINGS :

Different types – Selection of site – Brief information about housing colonies for HIG, MIG, LIG and EWS in India – Sizes of plots – Public spaces – Volutionary housing concept.

UNIT-II (12 Lectures)

CLIMATOLOGY:

ELEMENTS OF CLIMATES:

SUN, WIND, Relative Humidity, Temperature effects, Comfort conditions for a house, Macroclimatic zones. Design of houses and layouts with reference to climate, Orientation of buildings. Solar charts, Ventilation wind rose, Principles of planning of a house such as 1) Aspects 2) Prospect 3) Privacy 4) Grouping 5) Roominess 6) Furniture requirements 7) Flexibility 8) Circulation 9) Sanitation 10) Practical considerations 11) Elegance 12) Economy– Anthropometric data.

UNIT-III (10 Lectures)

Design of House: Design of Individual rooms with the particular attention to functional and furniture requirements. Building regulations and byelaws of residences including National Building code rules.

UNIT-IV (20 Lectures)

Practice Drawing: (Copying exercises)

a) Conventional signs of materials, various equipment used in residences relevant I.S.Codes.

b) Plan, Section and Elevation of a small house comprising of one room and verandah (load bearing structure).

c) Plan, Section and Elevation of two or three bed room house.

d) Plan, Section, and Elevation of a two or three bed roomed house in hot and arid zone.

e) Plan, Section, and Elevation of a two or three bed roomed house in hot and humid zone.

f) Plan, Section, and Elevation of a two or three bed roomed house in cold zone.

g) Plan, Section and Elevation of a duplex house in hot and humid zone.

h) Plan of one apartment floor comprising of at least four dwelling units (not included for examination purpose)

UNIT-V (10 Lectures)

Drawing of plan section and elevation of houses with given functional requirements and climatic data (on drawing sheets and in AutoCAD). Emphasis shall be given to hot and humid zones.

TEXT BOOK:

N. Kumara Swamy and. A. Kameswara Rao, *"Building Planning and Drawing"*, 8th Edition, Charotar Publications, 2010.

REFERENCE:

Gurucharan Singh, *"Building Planning, Scheduling and Design"*, 2nd Edition, Khanna Publishers, 2010.

STRENGTH OF MATERIALS LAB

Course Code: 13CE1110

L	T	P	C
0	0	3	2

Course Educational Objectives:

✤ To impart experimental skills to carryout tests on structural material for bending and torsion.

✤ To impart the knowledge to gain the understanding of structural material for various purposes in the construction.

Course Outcomes:

✤ Students will have basic knowledge of stresses under various loading conditions.

✤ Students will demonstrate the ability to find material properties of wood, steel and bricks.

LIST OF EXPERIMENTS:

1. Tension test.
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simply supported beam.
4. Torsion test.
5. Hardness test.
6. Helical Spring test.
7. Compression test on wood.
8. Impact test.
9. Shear test.
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of Electrical Resistance Strain gauges.
12. Compression test on Bricks.

CONCRETE TECHNOLOGY LAB

Course Code: 13CE1111

L	T	P	C
0	0	3	2

Course Educational Objectives:

✤ To impart experimental skills to carryout tests on different ingredients of Concrete, Fresh Concrete and hardened Concrete.

Course Outcomes:

✤ Students will be able to realize the importance of testing of concrete.

✤ Students will be able to evaluate different properties of Cement, Fine aggregate and Course Aggregate.

LIST OF EXPERIMENTS:

Tests on Cement

1. Determination of Fineness of Cement.
2. Determination of Specific Gravity of Cement.
3. Determination of Normal Consistency of Cement.
4. Determination of Initial and Final Setting time of Cement.
5. Determination of Soundness of Cement.
6. Determination of Compressive Strength of Cement. Tests on Aggregate
7. Determination of Fineness Modulus and Zoning of Sand.
8. Determination of Fineness Modulus of Coarse Aggregate.
9. Determination of Bulk Density of Fine Aggregate.
10. Determination of Bulk density of Coarse Aggregate.
11. Test on Fresh concrete
12. Test on Hardened concrete

ENVIRONMENTAL STUDIES

(Common to all Branches)

Course Code: 13NM1102

L	T	P	C
2	0	0	0

Course Educational objectives:

This course introduces the students to the following

- Important & Scope of the Environment.
- Awareness about the resources and their limitations.
- Appreciate the variedness of nature and role of different species in nature.
- The importance of understanding the impact of any development of nature.
- Population control and its importance.

Course Outcomes:

After studying the course the student will have good understanding of

- Environment and its conservation.
- The impacts of human action on nature and remedial measures.
- Being proactive instead of reactive.

UNIT-I (8 Lectures)

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES AND NATURAL RESOURCES

Definition, Scope and Importance – Need for Public Awareness.

Renewable and non-renewable resources– Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems -Mineral resources: Use and

exploitation, environmental effects of extracting and using mineral resources, case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Case studies. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT-II (7 Lectures)

ECOSYSTEMS, BIODIVERSITY AND ITS CONSERVATION:

Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Definition: genetic, species and ecosystem diversity.- Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a mega diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. - Endangered and endemic species of India Conservation of biodiversity: In-situ and Exsitu conservation of biodiversity.

UNIT-III (7 Lectures)

ENVIRONMENTAL POLLUTION:

Definition, Cause, effects and control measures of a) Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards.

SOLID WASTE MANAGEMENT:

Causes, effects and control measures of urban and industrial wastes. – Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT-IV (6 Lectures)

SOCIAL ISSUES AND THE ENVIRONMENT:

From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, and watershed management -Resettlement and rehabilitation of people; its problems and concerns. Case Studies Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. -Wasteland reclamation. -Consumerism and waste products. –Environment.

Protection Act. -Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution)

Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

UNIT-V (8 Lectures)

HUMAN POPULATION AND THE ENVIRONMENT:

Population growth, variation among nations. Population explosion - Family Welfare Programme. -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. -Women and Child Welfare. -Role of information Technology in Environment and human health. – Case Studies.

FIELD WORK:

Visit to a local area to document environmental assets

River /forest grassland/hill/mountain -Visit to a local polluted site-

Urban/ Rural/industrial/ Agricultural Study of common plants, insects, birds. - Study of simple ecosystems-pond, river, hill slopes, etc.

TEXT BOOKS:

1. Bharucha. E., "*Textbook of Environmental Studies for Undergraduate Courses*", University Press, 2005.
2. Rajagopalan. R., "*Environmental Studies*", Oxford University Press, 2005.

REFERENCE:

AnjiReddy. M., "*Textbook of Environmental Sciences and Technology*", BS Publications, 2010.

NOTES

SYLLABI FOR
IV SEMESTER

MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTING

Course Code : 13HM1101

L	T	P	C
4	0	0	3

Course Educational Objectives :

To explain the basic principles of managerial economics, accounting practices and financial management techniques for effective business decision making and to promote entrepreneurial abilities among the budding engineers.

Course Outcomes :

To understand the economic environment and to give an idea on various accounting concepts and financial management techniques for effective utilization of economic resources.

UNIT-I (12 Lectures)

INTRODUCTION TO MANAGERIAL ECONOMICS & DEMAND:

Definition, Nature and Scope of Managerial Economics, Factors influencing managerial decision making process

Demand Analysis: Definition-types of demand - Demand Determinants, Law of Demand and its exceptions.

Elasticity of Demand: Definition, Types, Significance of Elasticity of Demand. Demand Forecasting: definition, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

UNIT-II (12 Lectures)

THEORY OF PRODUCTION AND COST ANALYSIS:

Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Types of Cost, Break-even Analysis (BEA)-Determination of Break-Even Point (Simple numerical problems) - Managerial Significance and limitations of BEA.

UNIT-III (10 Lectures)

BUSINESS & ENVIRONMENT:

Features of Business Organization, Features, Advantages & limitations of Sole Proprietorship, Partnership, and Joint Stock Company, Steps for formation and Registration of the company- Internal and External factors affecting business environment (PESTLE analysis)- Impact of environment on business

UNIT-IV (12 Lectures)

INTRODUCTION TO FINANCIAL ACCOUNTING:

Accounting Principles, Concepts & conventions, Double-Entry Book Keeping, Journal, Ledger, Trial Balance

UNIT-V (18 Lectures)

PREPARATION AND ANALYSIS OF FINANCIAL STATEMENTS:

Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments) - Financial statement Analysis (Comparative and Common Size Statements)- Ratio analysis (Liquidity Ratios, Activity ratios, Solvency and Profitability ratios)

TEXTBOOKS :

1 A R Aryasri, *"Managerial Economics and Financial Analysis"*, 2nd Edition, TMH, 2009

2 S A Siddiqui & A. S. Siddiqui, *"Managerial Economics & Financial Analysis"*, 1st Edition, New Age Publishers, 2005.

3 P Venkata Rao, J.V.Prabhakar Rao *"Managerial Economics and Financial Analysis"*, 1st Edition, Maruti Publications, 2012.

4 R.L.Varshney & K.L Maheswari, *"Managerial Economics"*, 5th Edition, S.Chand Publishers, 2005.

REFERENCES :

1 D N Dwivedi, *"Managerial Economics"*, 8th Edition, PHI, 2010.

2 S P Jain & KL Narang, *"Cost and Management Accounting"*, 3rd Edition Kalyani Publishers, 2004.

3 P.K.Sharma & Shashi K. Gupta, *"Management Accounting Principles and Practice"*, 1st Edition, Kalyani Publishers, 2004.

STRENGTH OF MATERIALS – II

Course Code: 13CE1112

L	T	P	C
4	1	0	3

Course Educational Objectives:

- ✤ The student shall understand the behavior of materials under any structural system
- ✤ Student should be able to deal with the effect of various types of loading include bending, torsion, etc.,
- ✤. Student should be able to understand the stresses induced in thick and thin cylinders.

Course Outcomes:

- ✤ Students will demonstrate the ability to analyse the principal stresses developed in a material.
- ✤ Students will be equipped with the importance of calculating deflections in various springs and their applications, theories of failures.

UNIT-I (16 Lectures)

PRINCIPAL STRESSES AND STRAINS:

Introduction – Stresses on an inclined section of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses – Principal stresses and strains – Analytical and graphical solutions.

THEORIES OF FAILURES:

Introduction –Various Theories of failures like Maximum Principal Stress theory – Maximum Principal strain theory – Maximum shear stress theory – Maximum strain energy theory – Maximum shear strain energy theory.

UNIT-II (10 Lectures)

DIRECT AND BENDING STRESSES:

Stresses under the combined action of direct loading and B.M, core of a section – determination of stresses in the case of chimneys – conditions for stability – stresses due to direct loading and B.M. about both axis.

UNIT-III (14 Lectures)

TORSION OF CIRCULAR SHAFTS:

Theory of pure torsion – Derivation of Torsional Rigidity equation – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending and torsion and end thrust – Design of shafts according to theories of failure.

SPRINGS:

Introduction – Types of springs – deflection of closed and open coiled helical springs under axial pull and axial couple – springs in series and parallel – Carriage or leaf springs.

UNIT-IV (10 Lectures)

COLUMNS AND STRUTS:

Introduction – Types of columns – Short, medium and long columns – Axially loaded compression members – Crushing load – Euler's theorem for long columns- assumptions- derivation of Euler's critical load formulae for various end conditions – Equivalent length of a column – slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – Long columns subjected to eccentric loading – Secant formula – Empirical formulae – Straight line formula – Prof. Perry's formula.

UNIT-V (14 Lectures)

THIN CYLINDERS:

Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and volumetric strains – changes in diameter, and volume of thin cylinders – Thin spherical shells.

THICK CYLINDERS:

Introduction Lame's theory for thick cylinders – Derivation of Lame's formulae – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders – Necessary difference of radii for shrinkage – Thick spherical shells.

TEXT BOOKS:

1. R.K.Bansal, *"A Text book of Strength of Materials"*, 4th Edition, Laxmi Publications (P) ltd., New Delhi, 2008.
2. Sadhu Singh, *"Strength of Materials"*, 2nd Edition, Khanna Publications, 2001.
3. S. Ramamrutham and R.Narayanan, *"Strength of Materials"*, 11th Edition, Dhanpat Rai Publications, 2009.
4. Ferdinand Beer and Johnston, *"Mechanics of Solids"*, 6th Edition, Tata Mc Graw Hill Publications, 2000.
5. Schaum's out line series, *"Strength of Materials"*, 10th Edition, Mc Graw Hill International Editions, 2007.

REFERENCES:

1. R.K.Rajput, *"Strength of materials"*, 4th Edition, S.Chand & Co, New Delhi, 2010.
2. A.R.Basu, *"Strength of Materials"*, 2nd Edition, Dhanpat Rai & Co, Nai Sarah, New Delhi, 2008.
3. L.S.Srinath et al., *"Strength of Materials"*, 1st Edition, Macmillan India Ltd., Delhi, 2001.
4. S.B. Junnarkar, *"Mechanics of Structures"*, 10th Edition, Charotar Publishing House, Anand, Gujarat, 2000.

HYDRAULICS AND HYDRAULIC MACHINERY

Course Code: 13CE1113

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To make the student /learn about the model and prototype relationship and able to predict the prototype behavior by model testing in the laboratory.
- To impart knowledge about the working and design aspects of hydraulic machines like turbines and pumps and their applications.
- To make the student confident in the fundamental concepts of open channel hydraulics.

Course Outcomes:

- Student will be able to develop empirical relationships amongst physical variables involved in any physical flow phenomenon.
- Student will be able to design various components of pumps and turbines and study their characteristics.

UNIT-I (14 Lectures)

DIMENSIONAL ANALYSIS & SIMILITUDE:

Dimensional analysis-Rayleigh's method and Buckingham pi theorem-study of Hydraulic models–Geometric, kinematic and dynamic similarities-dimensionless numbers – model and prototype relations.

BASICS OF TURBO MACHINERY:

Hydrodynamic force of jets on stationary and moving flat inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency-Angular momentum principle, Applications to radial flow turbines.

UNIT-II (10 Lectures)

HYDRAULIC TURBINES–I:

Layout of a typical Hydropower installation – Heads and efficiencies-classification of turbines-Pelton wheel-Francis turbine-Kaplan turbine-principle of working, working proportions, velocity diagrams, work done and efficiency, hydraulic design.

UNIT-III (14 Lectures)

HYDRAULIC TURBINES–II:

Draft tube – theory, functions and efficiency, modern developments in turbines, governing of turbines-Runaway speed of turbines–water hammer-surge tanks, Performance under unit head-unit quantities- specific speed - performance characteristics – Cavitation.

UNIT-IV (14 Lectures)

CENTRIFUGAL PUMPS:

Pump installation details-classification-work done- Manometric head-minimum starting speed-losses and efficiencies-specific speed - multistage pumps-pumps in series and parallel- performance of pumps-characteristic curves- NPSH-cavitation.

UNIT-V (12 Lectures))

OPEN CHANNEL FLOW:

Types of flows – Type of channels – Velocity distribution – Energy and momentum correction factors – Chezy's, Manning's and Bazin formulae for uniform flow – Most Economical sections. Specific energy-critical depth – computation of critical depth – critical, sub-critical and super critical flows.

Non uniform flow-Dynamic equation for G.V.F., Mild, Critical, Steep, horizontal and adverse slopes-surface profiles-direct step method- Rapidly varied flow, hydraulic jump, energy dissipation.

TEXT BOOKS:

1. A.K.Jain, *"Fluid Mechanics Including Hydraulic Machines"*, 8th Edition, Khanna Publishers, New Delhi, 2003.

2. P.N Modi and S.M. Seth, *"Hydraulics and Fluid Mechanics Including Hydraulic Machines"*, 14th Edition, Standard Book House, 2002.

3. K. Subramanya, *"Flow in Open Channels"*, 2nd Edition, Tata Mc Graw hill Publishing Company Ltd, New Delhi, 2003.

REFERENCES:

1. Ven Te Chow, *"Open Channel Flow"*, 2nd Edition, Mc Graw Hill Book Company, New Delhi, 1998.

2. Srivatsava, *"Open Channel Flow"*, 2nd Edition, Oxford publishers, New Delhi, 1998.

3. R.K. Bansal, *"A textbook of Fluid mechanics and hydraulic machines"*, 9th Edition, Laxmi Publications (P) Ltd., New Delhi, 2010.

4. J.F. Douglas, J.M. Gasirock and J.A. Swaffield, *"Fluid Mechanics"*, 4th Edition, Pearson Education Publishers,2001.

STRUCTURAL ANALYSIS – I

Course Code: 13CE1114

L	T	P	C
4	0	0	3

Course Educational Objectives:

- ✤ To impart knowledge of analysis of various types of beams, trusses under static loads and moving loads.
- ✤ To create awareness of the application of the energy theorem for beams.

Course Outcomes:

- ✤ Student will demonstrate the ability to analyse different types of beams, trusses under different loading conditions.
- ✤ Students will be capable of analysing the beams using ILDs

UNIT-I (15 Lectures)

PROPPED CANTILEVERS:

Analysis of propped cantilever – Shear force and Bending moment diagrams-Deflection of propped cantilever.

FIXED BEAMS:

Introduction, Analysis of fixed beams, subjected to single and multiple point loads, UDL, UVL, couple and combination of loads. Draw SFD, BMD and deflection diagrams – Effect of sinking and rotation of supports.

UNIT-II (12 Lectures)

CONTINUOUS BEAMS:

Introduction- Clapeyron's theorem of three moments- Analysis of continuous beams with constant moment of inertia, continuous beams with different M.I for different spans – Effects of sinking of supports – SF & BM diagrams.

UNIT-III (10 Lectures)

ENERGY THEOREMS:

Introduction – Strain energy in linear elastic system, expression of Strain Energy due to axial load, BM and SF Castigliano's first theorem, deflections of simple beams of simple portal frames.

UNIT-IV (12 Lectures)

INDETERMINATE STRUCTURAL ANALYSIS:

Determination of Static and Kinematic indeterminacies – trusses upto one degree of internal and external indeterminacies using Castigliano's theorem-II.

UNIT-V (16 Lectures)

INFLUENCE LINES:

Definition of Influence line for reactions, SF & BM, find SF & BM at a given position of loading, number of point loads, UDL.

MOVING LOADS:

Introduction, maximum S.F and B.M at a given section and absolute maximum S.F. and B.M due to single concentrated load, UDL longer than the span, UDL shorter than the span, two point loads with fixed distance between them and several point loads-Load position for maximum B.M at a given section, load position for max S.F. at a given section.

TEXT BOOKS:

1. V.N. Vazirani & M.M.Ratwani, *"Analysis of Structures"*, (Vol I&II), Khanna Publications, New Delhi.
2. T.S. Thandavamoorthy, *"Analysis of Structures"*, Oxford University Press, New Delhi
3. Dr. R. Vaidyanathan & Dr. P.Perumal, *"Comprehensive Structural Analysis (Vol I & II)"*, Laxmi publications Pvt. Ltd., New Delhi.
4. C.S. Reddy, *"Basic structural Analysis",* Tata Mc Graw hill, New Delhi.

REFERENCES:

1. S.B.Junnarkar, *"Mechanics of Structures"*, 10th Edition, Charotar Publishing House, Anand, Gujrat, 2000.
2. Pandit & Gupta, *"Theory of Structures"*, 3rd Edition, Tat McGraw – Hill Publishing Co. Ltd, New Delhi, 2006.
3. R.S. Khurmi, *"Theory of Structures"*, 2nd Edition, S. Chand Publishers, 2000.
4. B.C.Punmia, *"Strength of Materials and Mechanics of Structures"*, 2nd Edition, Khanna Publications, New Delhi, 2006.
5. B.D.Nautiyal, *"Introduction to Structural Analysis"*, 1st Edition, New age International Publishers, New Delhi, 2008.

REINFORCED CONCRETE STRUCTURES- I

Course Code: 13CE1115

L	T	P	C
4	1	0	3

Course Educational Objectives:

- To impart basic concepts of design of individual elements of reinforced concrete structures using limit state and working stress methods.
- To understand the principles of limit state design and design of singly and doubly reinforced beams.
- To enable the students to design columns and footings

Course Outcomes:

- Student will demonstrate an ability to design beams, columns and foundations for given loads.
- Student will be able to design one-way and two-way slabs

UNIT-I (10 Lectures)

INTRODUCTION TO WORKING STRESS METHOD:

Introduction – Design for bending –Analysis and design of singly reinforced and doubly reinforced beams.

UNIT-II (12 Lectures)

INTRODUCTION TO LIMIT STATE DESIGN :

Concepts of limit state design- Characteristic loads-Characteristic strength-Partial loads and Material Safety factors- Representative stress- Strain curves- Assumptions in limit state design – Stress block parameters – Limiting moment of resistance.

SINGLY AND DOUBLY REINFORCED BEAMS:

Limit state analysis and design of singly reinforced, doubly reinforced beams.

UNIT-III (12 Lectures)

FLANGED SECTIONS:

Design of T and L beam sections.

SHEAR, TORSION AND BOND:

Limit state analysis and design of sections for shear and torsion – Concept of bond, anchorage and development length, I.S Code provisions. Design examples in simply supported and continuous beams.

UNIT-IV (15 Lectures))

SLABS:

Design of one way slabs – Two way slabs –Continuous slabs using IS coefficients.

UNIT-V (12 Lectures)

COLUMNS:

Short and long columns – Uni axial loads – Uni - axial bending and bi-axial bending – I.S code provisions.

FOOTINGS:

Footings: Different types of footings–Design of isolated, square, rectangular and circular footings.

NOTE: All the designs to be taught in Limit State Method. Following plates should be prepared by the students.

1. Reinforcement particulars of T-beams and L-beams.
2. Reinforcement detailing of continuous beams.
3. Reinforcement particulars of columns and footings.
4. Detailing of One way, two way and Continuous slabs.

TEXT BOOKS:

1. Pillai & Devdas Menon, *"Reinforced concrete design"*, 3rd Edition, Tata McGraw Hill, New Delhi, 2009.
2. A.K.Jain, *"Reinforced Concrete dDesign"*, 5th edition, Charotor Publications, 2010.

REFERENCES:

1. N.C. Sinha and S.K Roy, *"Fundamentals of Reinforced Concrete"*, 4th Edition, S. Chand publishers, 2002
2. N. Krishna Raju and R.N. Pranesh, *"Reinforced Concrete Design"*, 8th Edition, New age International Publishers, New Delhi, 2004.

ENGINEERING GEOLOGY

Course Code: 13CE1116

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To impart basic concepts of engineering geology those are required for a Civil Engineer.
- To familiarize a student with rock types and their properties

Course Outcomes:

Student will develop an understanding of petrology, mineralogy, and structural geology, geology of dams, tunnels and reservoirs.

UNIT-I (10 Lectures)

PHYSICAL GEOLOGY:

Branches of Natural Science, Earth Science, Weathering – Types of weathering, Formation of Rivers, River piracy – Various stages of a river. Delta formation, Meandering of river, Formation of Oxbow lakes, Action of Wind, Formation of Sand dunes, Formation of Soils, Different types of soils and their classification.

UNIT-II (15 Lectures)

MINERALOGY & PETROLOGY :

Definition of mineral as colour, streak, luster, cleavage, fracture, hardness, specific gravity, structure, diaphinity, isomorphism, polymorphism, pseuodomorphism, special properties, diagnostic properties, chemical composition, uses. Rock

Forming minerals: Rock forming minerals, economic minerals – properties of: Calcite, Feldspar, Quartz, Olivine, Augite, Hornblende, Muscovite, Biotite, Barites, Bauxite, Garnet, Talc, Hamatite, Magnetite, Chlorite, Galena, & Graphite. Difference between Rock and Mineral. Geological classification of rocks. Igneous Rocks : their structures, textures, concordant bodies, discordant bodies, sills, lopoliths, phacoliths, Bismalith, Dyke, Batholith, Plutonic, Hypabyssal and Volcanic Igneous rocks properties of Granite, Pegmatite, Gabbaro, Dolerite, Basalt. Sedimentary rocks: Mode of deformation, texture and structures of sedimentary rocks; clastic, Rudaceous, Chemcial and Biological rocks. Structures of sedimentary rocks as Bedding, Ripple marks, Tracks and trails, Rain prints, Fossils, Calcareous, Argillaceous, Siliceous and Ferruginous rocks. Properties of Breccia, Conglomerate, Sand stone, Lime stone & Shale. Metamorphic rocks: Metamorphism, Dynamic Metamorphism, Thermal Metamorphism, Dynamo thermal metamorphism. Metasomatism. Structures and Textures of Metamorphic rocks as lineation, foliation, Cataclastic texture, Grannulose texture, Schistose texture, Gneissose textures. Properties of Slate, Marble, Schist, Gneiss, Quartzite.

UNIT-III (15 Lectures)

STRUCTURAL GEOLOGY:

Strike, Dip, folds – various types – Faults – Various types – Unconformities – Joints. GROUND WATER: Wells – Deep well, shallow well, Springs – Different types.

UNIT-IV (10 Lectures)

EARTHQUAKES:

Classification of seismic waves, Mercalli & Richter scales, causes and effects, Seismic belts, Seismic zones of India, precautions while constructing engineering structures. Land Slides: Causes, effects, methods of mitigating impact of landslides.

UNIT-V (12 Lectures)

DAMS AND TUNNELS:

Selection of site of dam construction, Gravity dams, Arch dams and Earthen dams – Geological considerations for dam construction. Reservoir formed – Geological consideration for no leakage, Long life and more usefulness. Tunnels: Necessity – Effects – Litho logical – Structural and Ground Water considerations.

TEXT BOOKS:

1. N.Chennkesavulu, *"Engineering Geology"*, Mc-Millan, India Ltd. 2005.
2. Parbin Singh, *"Engineering and General Geology"*, SK Kataria & Sons, 2009.

REFERENCES:

1. F.G. Bell, *"Fundamentals of Engineering Geology"*, Butterworths, Publications, New Delhi, 1992.
2. Krynine & Judd, *"Principles of Engineering Geology & Geo-technics"*, CBS Publishers & Distribution.
3. K.V.G.K. Gokhale, *"Principles of Engineering Geology"*, B.S Publications, 2009.

FLUID MECHANICS AND HYDRAULIC MACHINES LAB

Course Code: 13CE1117

L	T	P	C
0	0	3	2

Course Educational Objectives:

- To impart the experimental skills in flow measurement and real fluid flow problems
- To impart experimental skills to verify the performance characteristics of pumps and turbines

Course Outcomes:

- Student will be able to utilize the knowledge in the design of water supply pipe networks and measure the rate of flow in pipes and channels.
- Students will have confidence in the hydraulic design of turbines and should be able to identify suitable pumps and turbines for different working conditions.

LIST OF EXPERIMENTS:

1. Calibration of Venturimeter.
2. Calibration of Orifice meter.
3. Determination of Coefficient of discharge for a small orifice by a constant head method.
4. Determination of Coefficient of discharge for an external mouth piece by variable head method.
5. Calibration of contracted Rectangular Notch.
6. Calibration of contracted Triangular Notch.
7. Determination of friction factor for a given pipe line.
8. Determination of coefficient of loss of head due to pipe fittings.

9. Verification of Bernoulli's theorem.
10. Reynolds's Experiment- Demonstration of types of flows.
11. Impact of jet on vanes.
12. Performance test on Pelton Wheel Turbine.
13. Performance test on Francis Turbine.
14. Performance test on Single Stage Centrifugal Pump.
15. Performance test on Multi Stage Centrifugal Pump.
16. Performance Test on Reciprocating Pump
17. Performance Test on Kaplan Turbine

ENGINEERING GEOLOGY LAB

Course Code: 13CE1118

L	T	P	C
0	0	3	2

Course Educational Objectives:

- To provide knowledge in the identification of rock and mineral types
- To interpret the Geological Maps
- To solve the structural geology problems of strike and dip.

Course Outcomes:

After the completion of the course the student

- Will be able to identify rocks and minerals by simple tests.
- Will be able to solve geological problems (strike and dip)
- Will be able to interpret geological maps

LIST OF EXPERIMENTS:

1. Study of physical properties and identification of Rock forming minerals.
2. Study of physical properties and identification of Economic minerals.
3. Megascopic description and identification of Igneous rocks.
4. Megascopic description and identification of Sedimentary rocks.
5. Megascopic description and identification of Metamorphic rocks.
6. Structural geology problems- Calculation of Thickness of Beds
7. Structural Geology problems – Faults
8. Structural Geology problems – Simple Strike & Dip problems (Calculation of amount of True Dip and direction).
9. Structural Geology problems – Simple Strike & Dip problems (Calculation of amount of Dip).

10. Calculation of Borehole Problems.
11. Interpretation and drawing of sections for geological maps showing Normal beds.
12 Interpretation and drawing of sections for geological maps showing Tilted beds.
13. Interpretation and drawing of sections for geological maps showing Fault beds.
14. Interpretation and drawing of sections for geological maps showing Folded beds.

NOTES

SYLLABI FOR V SEMESTER

WATER RESOURCES ENGINEERING- I

Course Code: 13CE1119

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To provide necessary background for understanding the occurrence and movement of water in hydrosphere and able to estimate and analyze the rain fall data.
- To enable the student to understand the water requirement for different crops and design suitable channel for conveying water to the fields.

Course Outcomes:

- Student will demonstrate the ability to measure various hydrology components and develop unit hydrographs for different catchments to estimate the flood discharges.
- Student will have the confidence in using modern water application methods to the irrigation fields.

UNIT-I (10 Lectures)

HYDROLOGY:

Introduction to Engineering hydrology and its applications, Hydrologic cycle, types and forms of precipitation, rainfall measurement, types of rain gauges, computation of average rainfall over a basin, processing of rainfall data and estimation of missing precipitation data.

Abstraction from rainfall-evaporation, factors affecting evaporation, measurement of evaporation – evapotranspiration - Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT-II (12 Lectures)

DESCRIPTIVE HYDROLOGY AND HYDROGRAPH ANALYSIS:

Runoff-components of runoff, factors affecting runoff, computation of runoff- Infiltration method and rational method, Stream gauging: Necessity, selection of gauging sites, methods of measurement of depth, velocity and discharge. Hydrograph analysis - base flow separation, effective rain fall, Unit Hydrograph- definition, limitations and applications, derivation of Unit Hydrograph, S-hydrograph, IUH, Synthetic Unit Hydrograph (concept only).

UNIT-III (12 Lectures)

GROUND WATER:

Ground water - Occurrence, types of aquifers, aquifer parameters- porosity, specific yield, permeability, transmissivity and storage coefficient, types of wells, Darcy's law, radial flow to wells in confined and unconfined aquifers, Determination of hydraulic properties of aquifers, Yield of an open well- constant level pumping test, recuperation test.

UNIT-IV (14 Lectures)

IRRIGATION AND WATER REQUIREMENT OF CROPS:

Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods of application of Irrigation water, Indian agricultural soils, methods of improving soil fertility, preparation of land for Irrigation, standards of quality for Irrigation water.

Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, estimation of consumptive use, Crop seasons in India, Duty and delta, factors affecting duty, depth and frequency of Irrigation, irrigation efficiencies, determination of irrigation requirements of crops.

UNIT-V (12 Lectures)

DESIGN OF CHANNELS:

Classification of canals, design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, Lining of irrigation channels- necessity, advantages and disadvantages, Types of lining, design of lined canal.

TEXT BOOKS:

1. Jayaram Reddy, *"Engineering Hydrology"*, 2nd Edition, Laxmi publications Pvt. Ltd., New Delhi reprint 2008.
2. B.C.Punmia, B.B.L. Pande, Ashok K.R. Jain, Arun K.R. Jain, *"Irrigation & Water Power Engineering"*, 16th Edition, Laxmi Publications (P) Ltd., New Delhi, 2009.
3. R.K.Sharma & T.K. Sharma, *"Hydrology and Water Resource Engineering"*, 5th Edition, Dhanapati Rai Publications, 2000.
4. K Subramanya, *"Engineering Hydrology"*, Tata Mc Graw-Hill Publishing Company Ltd., New Delhi, 3rd Edition, 2008.

REFERENCES:

1. V.P.Singh, *"Elementary Hydrology"*, 2nd Edition, PHI Publications, Prentice Hall, 1992.
2. P.N.Modi, *"Irrigation, Water Resources & Water Power Engineering"*, 2nd Edition, Standard Book House, Rajsons Publications Pvt. Ltd., 2008.
3. D.K.Majumdar, *"Irrigation Water Management"*, 3rd Printing, Prentice Hall of India, 2004.
4. S.K Garg, *"Irrigation engineering and hydraulic structures"*, 24th Edition, Khanna publishers, 2012.

GEOTECHNICAL ENGINEERING-I

Course Code: 13CE1120

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To develop an understanding of formation of the soil and its properties.
- To impart knowledge about the Engineering behavior of the soil.

Course Outcomes:

- Student will demonstrate an ability to apply the theoretical knowledge to understand the behaviour of soil upon loading.
- The students will be equipped with the requisite knowledge to prepare a basic soil report.
- The students will attain an ability for a basic understanding of the subjects like Geotechnical Engineering-II and Ground Improvement Techniques.

UNIT-I (10 Lectures)

INTRODUCTION & INDEX PROPERTIES OF SOILS:

Soil formation – Soil structure and clay mineralogy – Adsorbed water – Mass- Volume relationships – Relative density. Grain size analysis – Sieve and Hydrometer methods – Consistency limits and indices – IS Classification of soils

UNIT-II (12 Lectures)

PERMEABILITY & SEEPAGE THROUGH SOILS:

Soil water – Capillary rise – Flow of water through soils – Darcy's law- Permeability – Factors affecting permeability, Capillary phenomenon soils – Laboratory determination of coefficient of permeability – Permeability of layered systems. Total, neutral and effective stresses – Quick sand condition – Seepage through soils – Flownets: Construction, Characteristics and Uses.

UNIT-III (12 Lectures)

STRESS DISTRIBUTION IN SOILS:

Boussinesq's and Westergaard's theories for point loads and areas of different shapes – Newmark's influence chart.

UNIT-IV (14 Lectures)

COMPACTION & CONSOLIDATION:

Mechanism of compaction – Factors affecting compaction– Effects of compaction on soil properties – Field compaction Equipment – compaction control. Stress history of clay; Compressibility of soils, Terzaghi's one dimensional consolidation theory, Consolidation test, pre-consolidation pressure, e - p and e-log p curves, total settlement.

UNIT-V (12 Lectures)

SHEAR STRENGTH OF SOILS:

Mohr – Coulomb Failure theories – Types of laboratory strength tests – Strength tests based on drainage conditions – Shear strength of sands – Critical Void Ratio – Liquefaction- shear strength of clays, pore pressure coefficients.

TEXT BOOKS:

1. Venkataramiah. C, *"Geotechnical Engineering"*, 3rd Edition, New Age International Pvt. Ltd, 2008.
2. K.R. Arora, *"Soil Mechanics and Foundation Engineering"* 5th Edition, Standard Publishers and Distributors, Delhi, 2001.

REFERENCES:

1. 1 Muni Budhu, *"Soil Mechanics and Foundations"*, 3rd Edition, John Wiley and Sons, 2011
2. Purushotham Raj, *"Geotechnical Engineering"*, 2nd Edition, Pearson Edition, 2009.
3. NPTEL Video lectures.
4. IS 2720 all parts, and other relevant IS codes, special publications and handbooks.
5. Das. B.M., *"Principles of Geotechnical Engineering"*, 7th Edition, Cengage Learning, 2010.

STRUCTURAL ANALYSIS – II

Course Code: 13CE1121

L	T	P	C
4	1	0	3

Course Educational Objectives:

- To impart knowledge of analyzing framed structures using approximate methods and analyse beams using slope deflection method and matrix methods.
- To create a strong understanding of behaviour of arch structures.

Course Outcomes:

- The student will be able to analyse the given building frames by approximate methods for gravity loads and lateral loads.
- Students will be acquainted with the matrix methods for beams and frames.

UNIT-I **(12 Lectures)**

THREE HINGED ARCHES:

Introduction – Eddy's theorem, determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature – moving loads on three hinged arches.

TWO HINGED ARCHES:

Determination of horizontal thrust, bending moment and radial shear – basic concepts of fixed and tied arches.

UNIT-II **(10 Lectures)**

SLOPE - DEFLECTION METHOD:

Introduction - Derivation of slope - deflection equation - application to continuous beams including settlement of supports, analysis of single bay-single storey portal frame including side sway.

UNIT-III **(12 Lectures)**

MOMENT DISTRIBUTION METHOD:

Introduction - stiffness and carry over factors – Distribution factors –

Analysis of continuous beams with and without sinking of supports – single bay-single storey portal frames – including sway.

UNIT-IV (15 Lectures)

APPROXIMATE METHODS:

Substitute frame analysis by two cycle method, approximate methods of analysis application to building frames by portal and cantilever method (up to two bays and two storeys only).

UNIT-V (15 Lectures)

FLEXIBILITY METHOD:

Introduction, calculations of S.I. - application to continuous beams including support settlements. Analysis portal frames upto 3 degree of freedom.

STIFFNESS METHOD:

Introduction, calculations of K.I - application to continuous beams including support settlements. Analysis portal frames up to 3 degree of indeterminacy.

TEXT BOOKS:

1. Bhavikatti S.S, *"Analysis of Structures"*, (Vol. I & II), 6th Edition, Vikas Publications, 2009.
2. Vazirani & Ratwani, *"Analysis of structures"*, 19th Edition, Khanna Publications, 2008.
3. B.C. Punmia, *"Strength of Materials and mechanics of solids"*, Vol-II, 10th Edition, Laxmi Publications, New Delhi, 2009.
4. B.C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, *"Theory of Structures"*, 12th Edition, Laxmi Publications, 2004.

REFERENCES:

1. Pandit and Gupta, *"Structural Analysis (Matrix Approach)"*, Tata Mc Graw Hill, New Delhi, 2008.
2. S.Ramamurtham, R. Narayan, *"Theory of Structures"*, 9th Edition, Dhanapat Rai Publishing Company, 2010.
3. C.S.Reddy, *"Structural Analysis"*, Tata Mc Graw Hill, New Delhi, 2008.

TRANSPORTATION ENGINEERING – I

Course Code: 13CE1122

L	T	P	C
4	0	0	3

Course Educational Objectives:

To develop

- ✤ Basic knowledge on various highway developmental engineering surveys and drawings and reports.
- ✤ Skill of conducting various tests on bitumen & aggregate.
- ✤ Knowledge on designing geometry of highways.
- ✤ Knowledge on conducting traffic surveys.
- ✤ Knowledge on traffic signs, markings and design of traffic signal.
- ✤ Basic knowledge on various intersections.

Course Outcomes:

The student will be able to

- ✤ Understand various engineering surveys
- ✤ Know what drawings & reports are to be produced
- ✤ Understand the procedure of conducting tests on bitumen and aggregate.
- ✤ Design geometries like sight distance, super elevation, extra-widening, transition curves and vertical curves.
- ✤ Understand the procedure of conducting various traffic surveys and traffic regulations by signboards, markings and signals.
- ✤ Understand various types of At-grade & grade separated intersections.

UNIT-I (12 Lectures)

HIGHWAY DEVELOPMENT AND PLANNING:

Highway development in India– Necessity for Highway Planning-Different Road Development Plans- Classification of Roads- Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports.

UNIT-II (12 Lectures)

HIGHWAY MATERIALS:

Highway Materials- Soil, Aggregate and Bitumen –Test on Aggregate – Aggregate properties and their importance. Tests on Bitumen – Bituminous Concrete – Requirements of design mix – Marshall Method of Bituminous mix design.

UNIT-III (14 Lectures)

HIGHWAY GEOMETRIC DESIGN-I :

Importance of Geometric Design- Design Controls and Criteria- Highway Cross Section Elements- Sight Distance Elements- Stopping Sight Distance, Overtaking Sight Distance and Intermediate Sight Distance.

HIGHWAY GEOMETRIC DESIGN-II:

Design of Horizontal Alignment- Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical alignment-Gradients- Vertical Curves.

UNIT-IV (12 Lectures)

TRAFFIC ENGINEERING:

Basic Parameters of Traffic-Volume, Speed and Density- Traffic Volume Studies-speed studies- Data Collection and Presentation- Parking Studies and Parking characteristics- Road Accidents-Causes and Preventive measures-Accident Data Recording – Condition Diagram and Collision Diagrams.

TRAFFIC REGULATION AND MANAGEMENT:

Road Traffic Signs – Types and Specifications – Road markings-Need for Road Markings-Types of Road Markings- Design of Traffic Signals –Webster Method –IRC Method.

UNIT-V (14 Lectures)

AT GRADE INTERSECTION DESIGN:

Types of Intersections – Conflicts at Intersections- Types of At-Grade Intersections- Channelisation: Objectives –Traffic Islands and Design Criteria – Rotary - Types.

GRADE SEPARATED INTERSECTION DESIGN:

Types of Grade Separated Intersections- Rotary Intersection – Flyovers, ROB, Cloverleaf (partial, full). Criteria for selection, Advantage, Disadvantages of grade separated intersection.

TEXT BOOKS:

1. S.K.Khanna & C.E.G.Justo, *"Highway Engineering"*, 7th Edition, Nemchand & Bros., 2000.
2. L.R.Kadiyali and Lal, *"Principles & Practices of Highway Engineering"*, 4th Edition, Khanna Publications, 2004.
3. V.N.Vazirani and S.P.Chandra, *"Transportation Engineering"*, Vol. I, 4th Edition, Khanna Publications, 1994.

REFERENCES:

1. S.P.Bindra, *"Highway Engineering"*, 4th Edition, Dhanpat Rai & Sons, 1981
2. Dr.L.R.Kadyali, *"Traffic Engineering & Transportation Planning"*, 6th Edition, Khanna publications, 1997.
3. NPTEL Videos
4. Indian Road Congress, Ministry of Road Transport and Highways, and Special Publications.

ESTIMATION AND QUANTITY SURVEYING

Course Code: 13CE1123

L	T	P	C
4	0	0	3

Course Educational Objectives:

- ✤ To produce civil engineering students who have strong foundation in estimation of quantities required for roads and buildings.
- ✤ To familiarize with the knowledge of preparing bar bending schedules and valuation of buildings.

Course Outcomes:

- ✤ Student will have the confidence to prepare detailed and abstract estimations for roads and building.
- ✤ Student will demonstrate the ability to prepare valuation of buildings.

UNIT-I (20 Lectures)

INTRODUCTION:

General items of work in Building – Standard Units –Principles of working out quantities for detailed and abstract estimates –Methods of Estimates of Buildings.

UNIT-II (12 Lectures)

Standard specifications for different items of building construction. Rate Analysis – Working out data for various items of work, over head and contingent charges.

UNIT-III (10 Lectures)

Reinforcement bar bending schedules.

UNIT-IV (12 Lectures)

Valuation of buildings – Purpose and Principles of valuation – Technical terms – Methods of valuation.

UNIT-V **(10 Lectures)**

Estimation of quantities for road work items.

TEXT BOOKS:

1. B.N. Dutta, *"Estimating and Costing"*, 10th Edition, UBS Publishers, 2000.
2. A.K. Upadhyay, *"Civil Estimating and Costing"*, 8th Edition, S.K. Kataria and Sons Publishers, 2010.

REFERENCES:

1. Standard Schedule of Rates and Standard Data Book by Public Works Department, 2010.
2. IS. 1200 (Parts I to XXV – 1974, *"Method of Measurement of Building and Civil Engineering works"*, B.I.S.)
3. National Building Code - 2010.
4. M. Chakraborthi; *"Estimation, Costing and Specifications"*, 7th Edition, Laxmi Publications, 2008.
5. G.S. Birdie, *"Estimating and Costing"*, 6th Edition, Dhanapati Rai Publishing Company, 2005.

DESIGN OF STEEL STRUCTURES

Course Code: 13CE1124 **L T P C**
4 1 0 3

Course Educational Objectives:

- To impart the basic concepts about design of Steel Structures like flexural compression and tension members
- To familiarize the understanding of the basic concepts for design of beams, column bases, connections, and roof trusses by limit state method as per IS 800-2007.

Course Outcomes:

- Student will be able to design the structural members under tension, compression, shear and bending.
- Student will be able to demonstrate the application of particular connection system in given situation.

UNIT-I (12 Lectures)

WELDED AND BOLTED CONNECTIONS:

Introduction, Advantages and disadvantages of welding- Strength of welds-Butt and Fillet welds: Permissible stresses – IS Code requirements. Design of Butt weld and fillet weld subjected to moment acting in the plane and at right angles to the plane of the joints.

UNIT-II (14 Lectures)

BEAMS:

Introduction to plastic analysis, Design requirements as per IS Code-Design of simple and compound beams-Curtailment of flange plates, check for deflection, shear, buckling and bearing, for laterally supported and unsupported beams.

UNIT-III (14 Lectures)

TENSION MEMBERS:

General design of members subjected to direct tension.

COMPRESSION MEMBERS:

Effective length of columns, Slenderness ratio – permissible stresses, Design of compression members, Struts etc.

COLUMNS & BUILT UP COLUMNS:

Design of Built up compression members – Design of lacings and battens. Design Principles of Eccentrically loaded columns and splicing of columns.

UNIT-IV (12 Lectures)

DESIGN OF COLUMN BASES:

Design of slab base and gusset base. Column bases subjected to moment.

UNIT-V (14 Lectures)

ROOF TRUSSES:

Different types of trusses – Design loads – Load combinations, IS Code 800-2007 recommendations, structural details – Design of simple roof trusses involving the design of purlins.

Note: The students should prepare the following plates.

Plate 1 Detailing of simple beams

Plate 2 Detailing of compound beams including curtailment of flange plates.

Plate 3 Detailing of Column including lacing and battens.

Plate 4 Detailing of Column bases – slab base and gusset base

Plate 5 Detailing of steel roof trusses including particulars at joints.

TEXT BOOKS:

1. Bhavikatti, *"Design of Steel Structures"*, 6th Edition, University Press. Hyderabad, 2010.
2. S.K. Duggal, *"Limit state design of steel structures"*, 1st Edition, TMH publication, 2011
3. N.Subramaniyan, *"Design of Steel structures"*, 1st Edition, Oxford university press, 2008.

REFERENCES:

1. B.C. Punmia, *"Comprehensive Design of Steel structures"*, 10th Edition, Ashok Kumar Jain and Arun Kumar Jain, Laxmi Publications, New Delhi, 2007.
2. P. Dayaratnam, *"Design of Steel Structures"*, 2nd Edition, S. Chand Publishers, 2009.
3. Prof. Dr. V.L. Shah, Prof. Veena Gore, "Limit State Design of Steel Structures", 1st Edition, Structures Publications, 2009.

IS Codes:

1. IS -800 – 2007, *"Codes of Practice for General Construction in Steel"*, BIS, 2007
2. IS – 875 – Part III, *"Codes of Practice for Design Loads"* (other than Earthquake, for Buildings and Structures), 1987.
3. Steel Tables.

These codes and steel tables are permitted in the examinations.

TRANSPORTATION ENGINEERING LAB

Course Code: 13CE1125

L	T	P	C
0	0	3	2

Course Educational Objectives: :

To introduce

- Bitumen and & its engineering behavior.
- Aggregate & its engineering behavior.
- Concept of traffic behavior.

Course Outcomes:

The student will be able to

- Identify engineering properties of aggregate.
- Indentify the grade & properties of bitumen.
- Find out peak hour traffic & peak time for a given location on the road.
- Calculate design speed, maximum speed & minimum speed limits of a location through spot speed.
- Draw parking accumulation curve and find out parking duration & turnover of parking lot/stretch.

LIST OF EXPERIMENTS:

ROAD AGGREGATES:

1. Aggregate Crushing value
2. Aggregate Impact Test.
3. Specific Gravity and Water Absorption.
4. Attrition Test
5. Abrasion Test.
6. Shape tests

BITUMINOUS MATERIALS:

7. Viscosity Test.
8. Ductility Test.
9. Softening Point Test.
10. Flash and fire point tests.
11. Marshall mix design
12. Benkelman beam (Optional)

TRAFFIC ENGINEERING

13. Traffic volume studies
14. Spot speed studies
15. Parking study

TECHNICAL COMMUNICATION AND SOFT SKILLS LAB

Course Code : 13HE1103

L	T	P	C
0	0	3	2

Introduction

The introduction of the Advanced English Communication skills Lab is considered essential at B.Tech. level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context. The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

- Gathering ideas and information: organizing ideas relevantly and coherently
- Engaging in debates
- Participating in group discussions
- Facing interviews
- Writing project proposals / technical reports
- Making oral presentations
- Writing formal letters and essays
- Transferring information from non-verbal to verbal texts and vice versa
- Taking part in social and professional communication

Course Educational Objectives:

The Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the students' accuracy and fluency in English through a well-developed vocabulary, and enable them to listen to English

spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.

- To enable students face competitive exams such as, GRE, TOEFL, IELTS, UPSC and other Bank examinations.
- To enable them communicate their ideas relevantly and coherently in writing.

Course Outcomes:

- Students will be able to use language accurately, fluently and appropriately.
- They will be able to show their skills of listening, understanding and interpreting.
- They will be able to write project reports, reviews and resumes.
- They will be able to express their ideas relevant to given topics.
- Students will also exhibit advanced skills of interview, debating and discussion.

LIST OF TASKS :

1. Listening comprehension – Achieving ability to comprehend material delivered at relatively fast speed; comprehending spoken material in Standard Indian English, British English, and American English; intelligent listening in situations such as interview in which one is a candidate.
2. Vocabulary building, Creativity, using Advertisements, Case Studies etc.
3. Personality Development: Decision-Making, Problem Solving, Goal Setting, Time Management & Positive Thinking
4. Cross-Cultural Communication : Role-Play/ Non-Verbal Communication.
5. Meetings- making meeting effective, chairing a meeting, decision-making, seeking opinions , interrupting and handling interruptions, clarifications, closure- Agenda, Minute writing

6. Group Discussion – dynamics of group discussion, Lateral thinking, Brainstorming and Negotiation skills
7. Resume writing – CV – structural differences, structure and presentation, planning, defining the career objective
8. Interview Skills – formal & informal interviews,concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing
9. Writing Skills - Business Communication, Essays for competitive examinations.
10. Technical Report Writing/ Project Proposals – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.- Feasibility, Progress and Project Reports.

REFERENCES:

1. Simon Sweeny, *"English for Business Communication"*, CUP, First South Asian Edition, 2010.
2. M. Ashraf Rizvi, *"Effective Technical Communication"*, Tata McGraw-Hill Publishing Company Ltd. 2005.
3. Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, *"English Language Communication: A Reader cum Lab Manual"*, Anuradha Publications, Chennai, 2006.
4. Dr. Shalini Verma, *"Body Language- Your Success Mantra"*, S. Chand, 2006.
5. Andrea J. Rutherford, *"Basic Communication Skills for Technology"*, 2nd Edition, Pearson Education, 2007.
6. Sunita Mishra & C. Muralikrishna, *"Communication Skills for Engineers"*, Pearson Education, 2007.
7. Jolene Gear & Robert Gear, *"Cambridge Preparation for the TOEFL Test"*, 2010.
8. Meenakshi Raman & Sangeeta Sharma, *"Technical Communication"*, Oxford University Press, 2011.

9. Nick Ceremilla & Elizabeth Lee- Cambridge *"English for the Media"* CUP, 2010.

10. R.C. Sharma, Krishna Mohan, *"Business Correspondence and Report writing"*, 4th Edition, Tata Mcgraw-Hill Publishing Co. Ltd., 2010.

11. DELTA's key to the Next Generation TOEFL Test: *"Advanced Skill Practice,"* New Age International (P) Ltd., Publishers, New Delhi. 2010.

12. Books on TOEFL/GRE/GMAT/CAT by Barron's/ CUP, 2011.

13. IELTS series with CDs by Cambridge University Press, 2010.

BASIC COMPUTATIONS LAB

Course Code: 13ES11BC

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to enable the student to learn the basics of MATLAB Toolbox and to solve general mathematical problems.

Course Outcomes :

- ✤ Student will able to solve mathematical problems numerically.
- ✤ The student able to solve ODE-IVP, ODE-BVP, Regression using MAT LAB.

LIST OF EXERCISES:

1. Basic commands like representing arrays, matrices, reading elements of a matrix, row and columns of matrices, random numbers.
2. Round, floor ceil, fix commands.
3. Eigen values and Eigen vectors of a matrix.
4. Plotting tools for 2-D and 3-D plots, putting legends, texts, using subplot tool for multiple plots, log-log and semilog plots.
5. Linear Regression and polynomial regression, Interpolation.
6. Non linear regression.
7. Solving non linear algebraic equations.
8. ODE IVP problems using Runge - Kutta method.
9. Using quadrature to evaluate integrals (1-D, 2-D and 3-D cases).
10. Control statements like switch, if else statement etc.
11. Determination of safe bearing capacity of a soil foundation system
12. Design of singly reinforced cement concrete beam
13. Analyse the propped cantilever beam
14. Design of one way and two way reinforced cement concrete slabs.

SYLLABI FOR VI SEMESTER

WATER RESOURCES ENGINEERING-II

Course Code: 13CE1126

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To produce civil engineering students who have strong foundation in concepts of irrigation structures.
- To familiarize student with the knowledge of working operations of reservoirs, dams and spillways.

Course Outcomes:

- Student will be able to demonstrate the behaviour of various irrigation structures and their design principles and construction features.
- Students will be broadly educated about the useful impact of hydro-power engineering.

UNIT-I (12 Lectures)

DIVERSION HEAD WORKS:

Types of Diversion head works-diversion and storage head works, weirs and barrages, layout of diversion head works, components. Causes and failure of hydraulic structures on permeable foundations, Bligh's creep theory, Khosla's theory, determination of uplift pressure and impervious floors using Bligh's and Khosla's theory, exit gradient, functions of upstream and downstream sheet piles.

UNIT-II (14 Lectures)

CANAL REGULATION AND DRAINAGE WORKS:

Types of falls and their location, design principles of Sarda type fall, straight glacis fall, Canal regulation works - principles of design of distributary head regulator, Canal outlets - types of canal modules, proportionality, sensitivity and flexibility, Cross drainage works - types, selection of site, design principles of aqueduct, syphon aqueduct.

UNIT-III (12 Lectures)

RESERVOIRS:

Types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve for constant demand only.

WATER POWER ENGINEERING :

Introduction to Hydropower- Advantages and disadvantages, estimation of hydro- power, Flow duration curve, Power duration curve, Load curve, Load factor, Capacity factor, Utilization Factor, Diversity factor, Load duration curve, Firm power, Secondary power, Types of hydel schemes.

UNIT-IV (12 Lectures)

GRAVITY DAMS:

Types of dams, merits and demerits, selection of type of dam, selection of site for dam, forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a low gravity dam, stability analysis, drainage galleries.

UNIT-V (14 Lectures)

EARTH DAMS:

Types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage.

SPILLWAYS:

Types of spillways, design principles of Ogee spillway, types of spillway gates, Methods of energy dissipation below spillway-Description only.

TEXT BOOKS:

1. S.K Garg, *"Irrigation engineering and hydraulic structures"*, 24th Edition, Khanna publishers, 2012.
2. K.R.Arora, *"Irrigation, Water Power and Water Resources Engineering"*, 3rd Edition, Standard Publishers Distributors, 2010.

3. R.K. Sharma and T.K. Sharma, *"Irrigation Engineering"*, S. Chand Publishers, 2007.

4. B.C.Punmia, B.B.L. Pande, Ashok K.R. Jain, Arun K.R. Jain, *"Irrigation & Water Power Engineering"*, 16th Edition, Laxmi Publications (P) Ltd., New Delhi, 2009.

REFERENCES:

1. G.L.Asawa, *"Irrigation and Water Resources Engineering"*, New Age International Publishers, 2005.

2. Varshney R.S., *"Concrete dams"*, 2nd Edition, Oxford and IBH Pub.Co.in, New Delhi, 1982.

3. Varshney R.S., S. C. Gupta & R.L. Gupta, *"Theory and Design of Hydraulic structures"*, 2nd Edition, Nemchand and Brothers, 1992.

4. Satyanarayana Murthy C, *"Water Resources Engineering"*, 1st Edition, New Age International Pvt. Ltd. Publishers, 1997.

5. Relevant IS codes.

ENVIRONMENTAL ENGINEERING-I

Course Code: 13CE1127

L	T	P	C
4	1	0	3

Course Educational Objectives:

- To create an awareness about the importance of supply of safe drinking water.
- To familiarize the students about safe disposal of sewage, collection of data, design and execution of water and waste water treatment plants.

Course Outcomes:

- The student will be equipped with the requisite knowledge about conventional and miscellaneous treatment units and execution of the projects.
- Student will be able to design of oxidation ponds, septic tanks, aerobic and anaerobic lagoons using low cost technologies.

UNIT-I (12 Lectures)

WATER DEMANDS- STANDARDS -SOURCES:

Aspects of Environmental Engineering – Protected water supply – Need – Water demands – factors affecting - fluctuations – design period – population forecast – water quality – drinking water standards-Quality and Quantity and other considerations – surface and sub- surface sources – yield calculations – intake works – storage reservoir capacity – systems of water supply – requirements – detection of leakages – selection of pump – economical diameter of pumping main water quality – D.W.S. – testing and significance.

UNIT-II (12 Lectures)

TREATMENT OF WATER AND DISTRIBUTION :

Water treatment, conventional treatment flow diagram – Sedimentation types – principles – design factors – coagulation – design of clariflocculator

– filtration – slow and rapid gravity filters – multimedia and pressure filters – design principles-Disinfection – chlorination – miscellaneous treatment methods – distribution systems – layouts – design- and analysis, Hardy Cross and equivalent pipe method - pipe joints – valves – other appurtenances.

UNIT-III (12 Lectures)

WASTE WATER MANAGEMENT:

Introduction: waste water treatment system – definitions of terms – waste water management systems – collection and conveyance of sewage – sewage flow rates – storm water – characteristics of sewage – cycles of decay – BOD- COD – ultimate disposal of sewage.

UNIT-IV (12 Lectures)

DESIGN OF SEWERS AND PRIMARY TREATMENT:

Layouts – design of sewers – sewers appurtenances – sewage pumping – conventional sewage treatment – primary treatment screens – grit chamber – sedimentation tanks – design principles. Septic tanks and Imhoff tanks rural latrines – House plumbing – appurtenances.

UNIT-V (12 Lectures)

SECONDARY BIOLOGICAL TREATMENT:

Secondary treatment – Biological treatment – trickling filters – Activated Sludge Process – low cost waste treatment methods – Design of oxidation ponds – Aerobic and anaerobic lagoons. Sludge Digestion – Design principles – Disposal.

TEXT BOOKS:

1. G.S. Birdi, *"Water supply and sanitary Engineering"*, Dhanpat Rai & Sons Publishers. 8th Edition, 2010.
2. B.C.Punmia, *"Water Supply Engineering", Vol. 1, "Waste water Engineering Vol. II"*, 2nd Edition, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi, 2008.
3. K.N. Duggal, *"Elements of Environmental Engineering"*, 7th Edition, S. Chand Publishers, 2010.

REFERENCES:

1. Hammer and Hammer *"Water and wastewater Technology"*, 4th edition, Prentice hall of India, 2003.
2. Fair, Geyer and Okun, *"Water and Waste Water Engineering"*, 3rd Edition, Wiley, 2010.
3. Metcalf and Eddy, *"Waste Water Engineering"*, 3rd edition, Tata Mc Graw Hill, 2008.
4. Howard S. Peavy, Donand P. Rowe, George Technobanoglous, *"Environmental Engineering"*, 1st Edition Mc Graw –Hill Publications, Civil Engineering Series, 1985.

TRANSPORTATION ENGINEERING – II

Course Code: 13CE1128

L	T	P	C
4	0	0	3

Course Educational Objectives:

To develop

- ✤ Basic knowledge on design of flexible pavements and rigid pavements.
- ✤ Procedural Skills on highway construction, maintenance.
- ✤ Analytical skills of solving economic analysis problems on highway projects.
- ✤ Basic Knowledge on various components of railway engineering.
- ✤ Basic Knowledge on various components of airport engineering like runway, taxiway, Apron, control tower etc.
- ✤ Basic knowledge on docks & harbors.

Course Outcome:

The student will be able to

- ✤ Solve problems on pavement design by IRC method, AASHTO method for flexible pavements and rigid pavements by IRC method.
- ✤ Understand the construction and maintenance procedure of highways.
- ✤ Understand various highway costs and highway user benefits for a project.
- ✤ Solve problems on economic analysis on highway projects.
- ✤ Know various components of railway engineering.
- ✤ Solve problems on turnout design.
- ✤ Solve problems on runway length correction & its orientation.
- ✤ Understand various components of docks and harbour.

UNIT-I (12 Lectures)

PAVEMENT DESIGN –I:

Pavement Design – CBR method of flexible pavement design – IRC method of flexible pavement design, AASHO method of flexible pavement design.

PAVEMENT DESIGN–II:

IRC method of rigid pavement design – Importance of joints in rigid pavements – Types of joints – Use of tie bars and dowel bars.

UNIT-II (12 Lectures)

HIGHWAY CONSTRUCTION, MAINTENANCE AND DRAINAGE:

Highway construction – Construction of earth roads – Gravel roads – WBM roads – Bituminous roads – Cement concrete roads – Reinforced concrete pavements – Construction of joints in cement concrete pavements. Highway Maintenance – Failures of flexible and rigid pavements and their maintenance- Strengthening of existing pavements. Highway drainage – importance of highway drainage – Surface, sub surface drainage.

UNIT-III (12 Lectures)

HIGHWAY ECONOMICS & FINANCE:

Highway user benefits – Highway cost – Economic analysis – Highway finance.

UNIT-IV (12 Lectures)

RAILWAY ENGINEERING-I :

Permanent way components – Cross Section of Permanent Way – Functions of various Components like Rails, Sleepers and Ballast –Rail Fastenings – Creep of Rails- Theories related to creep – Adzing of Sleepers- Sleeper density.

RAILWAY ENGINEERING- II:

Rail joints, welding of rails. Turnouts – Left hand turnout – Track – junctions – Points and crossings – Tracks drainage – Railway stations and yards – Signaling.

UNIT-V (14 Lectures)

AIRPORT ENGINEERING:

Factors affecting selection of site for Airport and Layout Design – Computation of Runway length – Correction for Runway Length –

Orientation of Runway – Wind Rose Diagram – Runway Lighting system – Taxiways, Apron, Control tower terminal building.

DOCKS & HARBOURS:

Types – layout and planning principles – Break waters – Docks – Wharves and Quays – Transit sheds – Ware houses – Navigational Aids.

TEXT BOOKS:

1. S.K.Khanna & C.E.G.Justo, *"Highway Engineering"*, 7th Edition, Nemchand & Bros., 2000.
2. S.P.chadula, *"Railway Engineering–A text book of Transportation Engineering"*, S.Chand & Co. Ltd. 2001.
3. L.R.Kadiyali and Lal, *"Principles & Practices of Highway Engineering"*, 4th Edition, Khanna Publications, 2004.
4. S.K.Khanna and M.G.Arora, *"Airport Planning and Design"*, 6th Edition, Nemchand & Bros., 1999.
5. Rangwala S.C & K.S. *"Railway Engineering"*, 14th Edition, Charotar Publications, 2005.
6. Saxena S.C and Arora S.P, *"Railway Engineering"*, 6th Edition, Dhanapat Rai Publications, 2004.
7. Seetharaman, *"Dock & Harbour Engineering"*, 1st Edition, Umesh Publications, 2008.

REFERENCES:

1. S.P.Bindra , *"Highway Engineering"*, Dhanpat Rai & Sons.
2. Dr.L.R.Kadyali, *"Traffic Engineering & Transportation Planning"*, 6th Edition, Khanna Publications, 1997.
3. Virendhra Kumar & Statish Chandhra, *"Air Transportation Planning & Design"*, Gal Gotia Publishers, 1999.
4. Robert M. Horonjeff, *"Planning and Design of Airports"*, Mc Graw Hill Publications, 2008.
5. J. S. Mundrey, *"Railway Track Engineering"*, 4th Edition, Mc Graw Hill Publications, 2010.
6. Indian Road Congress, Ministry of Road Transport and Highways, and Special Publications

GEOTECHNICAL ENGINEERING–II

Course Code: 13CE1129

L	T	P	C
4	1	0	3

Course Educational Objectives :

- ✤ Students will familiarize about the importance of carrying out soil exploration before the start of any infrastructure project.
- ✤ To create a strong background about the various foundation systems for various projects.
- ✤ To impart preliminary knowledge about the importance of well foundations and rock as a suitable foundation.

Course Outcomes:

- ✤ Student will be able to understand how to collect site soil information, analyse and interpret
- ✤ Student will demonstrate the ability to design suitable foundation systems depending upon loads and type of soil.
- ✤ Students will be broadly educated about the importance of earth slope stability and the applications of earth pressure theories.

UNIT-I (10 Lectures)

SOIL EXPLORATION:

Need – Methods of Soil exploration – Boring and Sampling Methods – Field tests – Penetration Tests – Plate Load Test – Pressure Meter Test – Planning of exploration program and Preparation of Soil investigation report.

UNIT-II (14 Lectures)

EARTH SLOPE STABILITY & EARTH PRESSURE THEORIES:

Infinite and finite earth slopes – Types of failures – Factor of safety of slopes – Stability analysis by method of slices, Bishop's Simplified method – Taylor's Stability Number- Stability of slopes of earth dams under different conditions. Rankine's theory of Earth pressure – Earth pressures in layered soils – Coulomb's Earth pressure theory, Stability of retaining wall under seismic condition.

UNIT-III **(12 Lectures)**

SHALLOW FOUNDATIONS:

Types – Choice of foundation –Depth of foundation – Safe Bearing Capacity – Terzaghi, Meyerhof, Skempton and IS Methods, Safe bearing pressure based on N- value –Plate Load Test – Settlement Analysis – Immediate and Consolidation Settlement, Empirical estimation of SBC and settlement.

UNIT-IV **(14 Lectures)**

DEEP FOUNDATIONS:

Types of piles – Load carrying capacity of piles based on static pile formulae – Dynamic pile formulae – Pile capacity based on empirical relations- Under-reamed piles-Uplift capacity of under - reamed piles- Pile load tests – Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

UNIT-V **(10 Lectures)**

ADVANCED TOPICS:

TYPES OF WELLS:

Components of well foundation; Shapes of wells; Construction and Sinking of wells; tilts and shifts

Basics of rock mechanics – Classification and index properties of rocks, Rock strength and Failure criteria, Initial stresses in rocks and their measurement.

TEXT BOOKS:

1. B.M. Das, *"Principles of Foundation Engineering"*, 7th Edition, Cengage Learning, 2011.
2. Swami Saran, *"Analysis and Design of Substructures"*, 5th Edition, Oxford and IBH Publishing company Pvt Ltd (1998).
3. Som,N.N., and Das, S.C., *"Theory and Practice of foundation design"*, 3rd Edition, PHI, 2006.

REFERENCES:

1. Varghese. P.C., *"Foundation Engineering"*, 1st Edition, Prentice Hall of India, 2005.
2. J.E. Bowles, *"Foundation Analysis and Design"*, 5th Edition, McGraw-Hill Publishing Company, 1995.
3. Kurien, N.P., *"Theory and Practice of Foundation Design"*, 3rd Edition, Narosa Publishers, 2012.
4. D.P. Coduto, *"Foundation Designs – Principles and Practices"*, 1st Edition, Prentice Hall of India, 2009.
5. Lakshmi Reddi, Hilary Inyang, *"Geo Environmental Engineering: Principles and Applications"*, 1st Edition, CRC Press, 2000.
6. Goodman, R.E., *"Introduction to Rock Mechanics"*, 2nd Edition, John Wiley and Sons, 1989
7. Relevant IS codes, Special Publications and handbooks.
8. NPTEL Video lectures.

EARTHQUAKE RESISTANT DESIGN OF STRUCTURES
(ELECTIVE-I)

Course Code: 13CE1130

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To create a strong understanding on application of single degree and multi-degree of freedom systems.
- To impart the knowledge on causes and effects of earthquakes.
- To familiarize with seismic codal and detailing provisions.

Course Outcomes:

- Students acquire the ability to analyze single and multi-degrees of freedom system of structures.
- The student will demonstrate the ability to design earthquake-resistant structures.

UNIT-I (10 Lectures)

INTRODUCTION TO STRUCTURAL DYNAMICS :

Theory of vibrations – Lumped mass and continuous mass systems – Single Degree of Freedom (SDOF) Systems – Formulation of equations of motion – Un damped and damped free vibration – Damped – Force vibrations – Response to harmonic excitation – Concept of response spectrum.

UNIT-II (12 Lectures)

MULTI-DEGREES OF FREEDOM (MDOF) SYSTEMS (LIMITED TO 2 DOF):

Formulation of equations of motion – Free vibration – Determination of natural frequencies of vibration and mode shapes – Orthogonal properties of normal modes – Mode superposition method of obtaining response.

UNIT-III (12 Lectures)

EARTHQUAKE ENGINEERING :

Engineering Seismology – Earthquake phenomenon – Causes and effects of earthquakes – Faults Structure of earth – Plate Tectonics – Elastic Rebound Theory – Earthquake Terminology – Source, Focus, Epicenter etc – Earthquake size – Magnitude and intensity of earthquakes – Classification of earthquakes – Seismic waves – Seismic zones – Seismic Zoning Map of India – Seismograms and Accelerograms.

UNIT-IV (14 Lectures)

CODAL DESIGN PROVISIONS :

Review of the latest Indian seismic code IS:1893 – 2002 (Part-I) provisions for buildings – Earthquake design philosophy –Assumptions – Analysis by seismic coefficient and response spectrum methods – Displacements and drift requirements – Provisions for torsion – Analysis of a multistoried building using Seismic Coefficient method.

CODAL DETAILING PROVISIONS:

Review of the latest Indian codes IS: 4326 and IS: 13920 Provisions for ductile detailing of R.C buildings – Beam, column and joints.

UNIT-V (14 Lectures)

ASEISMIC PLANNING :

Plan Configurations – Torsion Irregularities – Re-entrant corners – Non-parallel systems – Diaphragm Discontinuity – Vertical Discontinuities in load path – Irregularity in strength and stiffness – Mass Irregularities – Vertical Geometric Irregularity – Proximity of Adjacent Buildings.

SHEAR WALLS:

Types – Design of Shear walls as per IS: 13920 – Detailing of reinforcements.

TEXT BOOKS:

1. Mario Paz, *"Structural Dynamics - Theory and Computations"*, 6th Edition, Pearson Education, 2005.
2. Pankaj Agarwal & Manish Shrikhande, *"Earthquake Resistant Design of Structures"*, 5th Edition, Prentice Hall of India, New Delhi, 2009.

3. Jai Krishna A.R, Chandrasekharan A.R, Brijesh Chandra, *"Elements of Earthquake Engineering"*, 2nd Edition, South Asian Publishers, New Delhi, 2001.

REFERENCES:

1. Chopra A.K., *"Dynamics of Structures"*, 5th Edition, Pearson Education, Indian Branch, Delhi, 2007.
2. Clough & Penzien, *"Dynamics of Structures"*, 4th Edition, McGraw Hill, International Edition, 2008.
3. S.K.Duggal, *"Earth Quake Resistant Design of Structures"*, Oxford university Press, 1st Edition, 2012.
4. IS Codes: IS: 1893, IS: 4326 and IS:13920, Bureau of Indian Standards, New Delhi.

INDUSTRIAL WASTE AND WASTE WATER MANAGEMENT (ELECTIVE-I)

Course Code: 13CE1131

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To familiarize student with the knowledge of theory and design of Industrial waste water treatment.
- To produce civil engineering graduates who have strong fundamental knowledge about the treatment of effluents from food and chemical industries.

Course Outcomes:

- Student will be able to identify and analyse the waste from various sources.
- Student will be able to understand about Industrial processes –Origin of waste water – various treatment methods, code of practices – management.

UNIT-I (12) Lectures)

INTRODUCTION:

General Characteristics of Industrial effluents, effects on Environment – ISI tolerance limits for discharging industrial effluents into surface water, into public sewers and on to land for irrigation.

UNIT-II (14 Lectures)

TREATMENT OF INDUSTRIAL WASTE WATER :

Necessity of treatment –Segregation – Process changes – Salvaging – By Product Recovery –Ion Exchange, Electro dialysis, Solvent Extraction, Floatation – Removal of Nitrogen and Phosphorus – Boiler water treatment methods and cooling water treatment methods.

UNIT-III (10 Lectures)

FOOD INDUSTRIES:

Sources, characteristics and treatment of Sugar, Dairy, Distilleries.

UNIT-IV (12 Lectures)

MAJOR INDUSTRIAL EFFLUENTS:

Sources, characteristics and treatment of power plants, oil refineries, cement and steel.

UNIT-V (12 Lectures))

CHEMICAL INDUSTRIES:

sources and characteristics and treatment of Paper and pulp, tanneries, textiles, fertilizers and pharmaceuticals

TEXT BOOK:

Rao, M.N. & Dutta, A.K. "Waste Water Treatment", 3rd Edition, IBH Publishers, 1982.

REFERENCES:

1. Numersorn. N.L., *"Liquid Waste from industry – theories, Practice and Treatment"*.
2. Benefield L.D. and Randall C.D, "*Biological Process Designs for Wastewater Advanced Waste Treatment Methods "Removal suspended soils – Dissolved solid Treatment"*, Prentice Hall Pub. Co., 1980.
3. Metcalf and Eddy. *"Waste water Engineering – Collection, Treatment, Disposal and Reuse"*, Mc Graw Hill Pub. Co., 1995.
4. Bhide, A.D. & Sunderesan, B.B. *"Solid Waste Management"*, INSDOC, NEERI, Nagpur 1994.

TRAFFIC ENGINEERING
(ELECTIVE-I)

Course Code:13CE1132

L	T	P	C
4	0	0	3

Course Educational Objectives:

To develop

- Basic concept of collecting data on traffic count, speed and origin-destination.
- Basic knowledge on capacity, level of service and peak hour factor.
- Basic knowledge on types of parking surveys and design standards.
- Concept of traffic control measures like channelization, traffic signal.
- Knowledge on various pollutions related to traffic.
- Knowledge on traffic signs, road markings, accident studies and principles of road safety audit.

Course Outcomes:

The student will be able to

- Get the knowledge on various traffic data collection and its result presentation.
- Understand capacity, level of service, service volume and peak hour factor.
- Design parking space for given area.
- Solve the problem on signal design by Webster method.
- Understand the inter-relationship between environment and traffic.
- Understand the standards and specifications of traffic signs and road markings.

UNIT-I (12 Lectures)

TRAFFIC CHARACTERISTICS:

Basic characteristics of Traffic- Volume, Speed and Density- Relationship among Traffic parameters.

TRAFFIC MEASUREMENT:

Traffic Volume Studies-Objectives- Types of Volume Studies –Concept of PCU- Data Collection and Presentation – Speed Studies – Types of Speeds- Objectives of Speed Studies- Methods of Conducting speed studies- Data collection and Presentation- Statistical Methods for Analysis of Speed Data.

UNIT-II (12 Lectures)

HIGHWAY CAPACITY:

Definition of Capacity – Importance of capacity – Factors affecting Capacity- Concept of Level of Service- Different Levels of Service- Concept of Service Volume- Peak Hour Factor.

UNIT-III (10 Lectures)

PARKING STUDIES:

Types of parking facilities – On street and Off Street Parking Facilities- Parking Studies- Parking Inventory Study – Parking Survey by Patrolling Method- Analysis of Parking Data and parking characteristics-Multi Story Car Parking Facility-Design standards.

UNIT-IV (14 Lectures)

TRAFFIC CONTROL & REGULATION:

Traffic Problems in Urban areas- Importance of Traffic Control and regulation- Traffic Regulatory Measures- Channelisation- Traffic Signals- Saturation Flow – Signal Design by Webster Method – Signal Phasing and Timing Diagrams.

TRAFFIC & ENVIRONMENT :

Detrimental effect of traffic on environment – Air Pollution – Pollutants due to Traffic – Measures to reduce Air Pollution due to Traffic- Noise Pollution – Measures to reduce Noise Pollution.

UNIT-V **(14 Lectures)**

TRAFFIC SIGNS AND ROAD MARKINGS:

Types of Traffic Signs- Cautionary, Regulatory and Informative Signs-Specifications- Pavement markings- Types of Markings – Lane markings and Object markings- Standards and Specifications for Road Markings.

HIGHWAY SAFETY:

Problem of Highway Safety – Types of Road accidents- Causes – Engineering Measures to reduce Accidents- Enforcement Measures – Educational Measures- Road Safety Audit- Principles of Road Safety Audit.

TEXT BOOKS:

1. Kadiyali L.K, *“Traffic Engineering and Transportation Planning”*, 3rd Edition, Khanna Publishers”, 2004.
2. Mannering and Kilareski, *“Highway Engineering and Traffic Analysis”*, 3rd Edition, John Wiley Publications, 2007.

REFERENCES:

1. Khisty C. J., *“Transportation Engineering – An Introduction”*, 3rd Edition, Prentice Hall, 2010.
2. Partha Chakroborthy,Animesh Das, *“Principles of Transportation Engineering”*, 2nd Edition, Prentice Hall of India, 2005.
3. Papacostas C.S., *“Fundamentals of Transportation Engineering”*, 2nd Edition, Prentice Hall (India), 2005.

PORTS AND HARBOURS
(ELECTIVE- I)

Course code: 13CE1133

L	T	P	C
4	0	0	3

Course Educational Objectives:

- ✤ To impart basic knowledge in civil engineering aspects of Ports and Harbours.
- ✤ To familiarize the students in the areas of design and construction aspects of port structures.

Course Outcomes:

- ✤ Student will demonstrate the fundamentals and basic design of port and harbour structures.
- ✤ Students should be capable of planning and construction of port and harbour structures.

UNIT-I (12 Lectures)

INTRODUCTION:

Ports and harbours as the interface between the water and land infrastructure – an infrastructure layer between two transport media.

UNIT-II (12 Lectures)

THE FUNDAMENTALS:

Wave conditions inside harbour, water circulation; breakwaters, jetties & quay walls; mooring, berthing and ship motion inside the port; cargo handling – bulk material storage & handling.

UNIT-III (12 Lectures)

DESIGN ISSUES:

Sea port layout with regards to (1) Wave action (2) Siltation (3) Navigability berthing facilities.

UNIT-IV (12 Lectures)

Design of Port Infrastructures:

Design of port infrastructures with regards to (1) Cargo handling (2) Cargo storage (3) Integrated transport of goods, Planning multipurpose port terminals.

UNIT-V (14 Lectures)

CONSTRUCTION ASPECTS:

Planning and construction of expansion and renovation of existing Inland Port Infrastructure.

Inland Waterways and ports: Maintenance of waterways, Construction of environmentally engineered banks, Dredging, Processing and storing of polluted dredged materials, development of river information services.

TEXT BOOK:

Ozha & Ozha, *"Dock and Harbour Engineering"*, 1st Edition, Charotar Books, Anand., 1990.

REFERENCES:

1. S.Seetharaman, *"Construction Engineering and Management"*, 4th Edition, Umesh Publications, New Delhi, 1999
2. Richard L. Silister, *"Coastal Engineering" Volume I & II,* Elsevier Publishers, 2000.
3. Pera Brunn, *"Port Engineering"*, 1st Edition, Gulf Publishing Company, 2001.

AIR POLLUTION AND CONTROL
(ELECTIVE-II)

Course Code: 13CE1134

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To impart the knowledge on air pollution.
- To analyse causes and effects of air pollution.
- To familiarize with strategic planning for control of air pollution.

Course Outcomes:

- Student will be broadly educated the Sources of Air pollutants and its classification.
- Student will demonstrate the ability to design and operation of control units.

UNIT-I (12 Lectures)

AIR POLLUTION:

Air Pollution – Definition of Air pollution-sources and classification of air pollutants-effects of air pollution-global effects-air Quality Emission standards-Sampling of pollutants in ambient air-Stack sampling

UNIT-II (12 Lectures)

METEOROLOGY AND AIR POLLUTION:

Factors influencing air pollution-Wind rose-Mixing depths-Lapse rates and dispersion- atmospheric stability- Plume rise and dispersion-prediction of air quality-box model-Gaussian model-Dispersion coefficient-Application of tall chimney for pollutant dispersion.

UNIT-III (12 Lectures)

CONTROL OF PARTICULATE POLLUTANTS:

Properties of particulate pollution-particle size distribution-control mechanism-Dust removal equipment-Design and operation of settling chambers, cyclones, wet dust rubbers, fabric filters and ESP

UNIT-IV (12 Lectures)

CONTROL OF GASEOUS POLLUTANTS:

Process and equipment for the removal of gaseous pollutants by chemical methods – Design and operation of absorption and adsorption equipment-Combustion and condensation equipment.

UNIT-V (12 Lectures)

CONTROL OF AIR POLLUTION:

Zoning and site selection-Other management controls, AP legislation-Automobile pollution and control-Emission standards

TEXT BOOKS:

1. M.N.Rao and H.V.N.Rao, *"Air Pollution"*, Tata McGraw Hill Company.
2. Wark and Warner, *"Air pollution"*, Harper & Row, New York.
3. Prof. K.V.S.G. Muralikrishna, *"Air pollution"*, Kaushal Publications – Kakinada.

REFERENCE:

R.K. Trivedy and P.K. Goel, *"An introduction to Air Pollution"* B.S. Publications.

GROUND IMPROVEMENT TECHNIQUES
(ELECTIVE – II)

Course Code : 13CE1135

L	T	P	C
4	0	0	3

Course Educational Objectives:

✤ Basic knowledge on various ground improvement techniques and their suitability for various types of soil conditions.

✤ The skills of implementation of geotechnical knowledge in field situations.

✤ Knowledge of reinforcement to soils in the form of geo textiles and other synthetic materials.

Course Outcomes:

✤ Student will be able to understand soil dewatering techniques with respect to field conditions.

✤ Student will be able to understand grouting techniques with respect to field conditions.

✤ Student will be able to understand soil dewatering techniques with respect to field conditions.

✤ Student will be able to understand and design principles of reinforced soil walls.

✤ Student will be able to understand geo synthetics and their field applications.

UNIT-I (12 Lectures)

DEWATERING:

Methods of de-watering- Sumps and Interceptor Ditches- Single, Multi stage well points - Vacuum well points- Horizontal wells-Foundation drains-Blanket drains- Criteria for selection of fill material around drains –Electro-osmosis.

UNIT-II (10 Lectures)

GROUTING:

Objectives of grouting- Grouts and their properties- Grouting methods- Ascending, Descending and Stage Grouting- Hydraulic fracturing in soils and rocks- Post grout test.

UNIT-III (14 Lectures)

IN SITU DENSIFICATION METHODS IN GRANULAR SOILS & COHESIVE SOILS :

Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth, preloading or dewatering, Vertical drains – Sand Drains, Sand wick geo drains – Stone and Lime columns – Thermal methods.

UNIT-IV (10 Lectures)

REINFORCED SOIL:

Principles – Components of reinforced soil – Factors governing design of reinforced soil walls – Design principles of reinforced soil walls.

UNIT-V (12 Lectures)

GEO SYNTHETICS & METHODS OF STABILIZATION:

Geo textiles- Types, Functions and Applications – Geo grids and geo membranes – Functions and Applications. Cement Stabilization, Mechanism, Factors affecting and Properties, Use of Additives, Design of soil cement mixtures, Construction techniques. Lime and Bituminous Stabilization - Type of Admixtures, Mechanism, Factors affecting, design of mixtures, construction.

TEXT BOOKS:

1. Hausmann M.R., *“Engineering Principles of Ground Modification”*, 3rd Edition, McGraw-Hill International Edition, 2002.
2. Purushotham Raj, *“Ground Improvement Techniques”*, 4th Edition, Laxmi Publications, New Delhi, 2006.

REFERENCES:

1. Moseley M.P., *"Ground Improvement"*, 2nd Edition, Blackie Academic and Professional, Boca Taton, Florida, USA, 2007.
2. Xanthakos P.P, Abramson, L.W and Brucwe, D.A., *"Ground Control and Improvement"*, 5th Edition, John Wiley and Sons, New York, USA 2000.
3. Robert M. Koerner, *"Designing with Geo-synthetics"*, 2nd Edition, Prentice Hall New Jersey, USA, 2000.

ADVANCED STRUCTURAL ANALYSIS
(ELECTIVE - II)

Course Code : 13CE1136

L	T	P	C
4	0	0	3

Course Educational Objectives:

- ✤ To impart the knowledge of advanced and Matrix methods of structural analysis.
- ✤ To familiarize student with the knowledge of influence lines for arches and plastic analysis.

Course Outcomes:

- ✤ The students will demonstrate the ability to analyse arches and frames by matrix methods.
- ✤ Student will be able to analyse structures using plastic analysis concepts.

UNIT-I **(12 Lectures)**

SLOPE DEFLECTION METHOD:

Application to the analysis of portal frames with inclined legs, gable frames

UNIT-II **(12 Lectures)**

ARCHES:

Analysis of two hinged and Three hinged arches using influence line concept.

UNIT-III **(12 Lectures)**

FLEXIBILITY METHOD:

Introduction to the structural analysis by flexibility concept using Matrix approach and application to frames and trusses. (Maximum indeterminacy of 3)

UNIT-IV (12 Lectures)

STIFFNESS METHOD:

Introduction to the structural analysis by stiffness concept using Matrix approach and application to frames and trusses. (Maximum degrees of freedom of 3)

UNIT-V (16 Lectures)

PLASTIC ANALYSIS:

Introduction – Idealized stress – Strain diagram – shape factors for various sections – Moment curvature relationship – ultimate moment – Plastic hinge formation – lower and upper bound theorems – ultimate strength of fixed and continuous beams.

TEXT BOOKS:

1. Pandit and Gupta, *"Matrix Methods of Structural Analysis"*, 2nd Edition, Tata McGraw Hill, 2000.
2. Vazirani and Ratwani, *"Analysis of structures",* Vol. I & II, 4th Edition, Khanna publications, 2009.

REFERENCES:

1. Prakash Rao D.S., "Structural Analysis", 3rd edition, Sagar books, 2008.
2. Bhavi Katti S.S, *"Structural Analysis",* Vol. I & II, 4th Edition, Vikas Publications, 2010.

ADVANCED DESIGN OF STEEL STRUCTURES
(ELECTIVE- II)

Course code: 13CE1137

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To impart the basic concepts in design of Gantry girders and Plate girders.
- To familiarize student about design of Gable frames and Pre-engineered buildings.

Course Outcomes:

- The students will be able to demonstrate the design of Plate girder bridge.
- Student will demonstrate the ability to design gantry Girder and Pre-engineered building for an Industrial structure.

UNIT-I (12 Lectures)

DESIGN OF BEAM-COLUMNS:

Introduction – General behavior of beam-columns – codal provision for local capacity check and overall buckling check – Design of beam-columns.

UNIT–II (14 Lectures)

DESIGN OF PLATE GIRDER:

Introduction to plate girder – Elements of plate girder– IS 800-2007 codal provisions Preliminary design considerations - concept of Tension field action – design of end panels. Design of plate girder using IS 800-2007- Design of vertical stiffeners – design of longitudinal stiffeners – design of torsional stiffeners – Introduction to steel plate shear wall.

UNIT-III (12 Lectures)

DESIGN OF GANTRY GIRDER:

Introduction - loading consideration – maximum load effect – Selection of Gantry girder – Design of gantry girders for primary loads only.

UNIT-IV (12 Lectures)

DESIGN OF INDUSTRIAL STRUCTURES:

Introduction – analysis and design of knee braced truss members – Design of gable portal frame – analysis and design of Gantry girder columns.

UNIT-V (12 Lectures)

PRE-ENGINEERED BUILDINGS:

Introduction – connection details – design of typical portal frame from Industrial shed using IS: 800-2007

TEXT BOOKS :

1. N. Subramanyam, *"Design of Steel Structures"*, 1st Edition, Oxford University Press, 2008. Units: I to IV
2 M.R. Sheyekar *"Limit state design in Structural Steel"*, 1st Edition, PHI Publications, 2010. Unit-V.
3. SK Duggal "Limit state design of steel structures", 1st Edition, TMH publication2011

REFERENCE:

Edmin H. Gaylord, J. Charles. N. Gaylord & James E. Stallmeyer, *"Design of steel structures"*, 3rd Edition, Mc Graw – Hill International 1992.

COMPUTER APPLICATIONS IN CIVIL ENGINEERING LAB

Course Code : 13CE1138

L	T	P	C
0	0	3	2

Course Educational Objectives:

- ✤ To impart basic knowledge on Computer Applications in Civil Engineering.
- ✤ To familiarize student with design softwares.

Course Outcomes:

The student will demonstrate the ability to analyse multi-storied frames, earth work calculations, sewer pipe design and slope stabilities, using various civil engineering softwares.

LIST OF EXERCISES:

1. Analysis of beams.
2. Analysis of 2D frames for gravity loads.
3. Analysis of 2D frames for lateral loads.
4. Analysis of 3D frames for gravity loads.
5. Analysis of 3D frames for lateral loads
6. Analysis of 3D frames for combined gravity and lateral loads.
7. Analysis of trusses.
8. Determine the fundamental frequency and mode shapes for a given structure.
9. Calculation of area and volume for a given block level survey data and to plot the contours.
10. To design the pipe network for a sewer line.
11. Calculation of earth pressures on retaining wall and assessment of slope stability of a finite slope.
12. Determination of safe bearing capacity of soil using C Programming..

GEOTECHNICAL ENGINEERING LAB

Course Code: 13CE1139	L	T	P	C
	0	0	3	2

Course Educational Objectives:

- To familiarize students about properties of soil through testing.
- To impart skills so as to analyze and interpret test results.

Course Outcomes:

- Student will demonstrate the ability to identify and classify soils so as to decide the suitability of soils for various construction projects.

LIST OF EXPERIMENTS:

1. Atterberg's Limits.
2. Field density-core cutter and Sand Replacement Method
3. Specific Gravity Test
4. Sieve Analysis
5. Sedimentation Analysis
6. Permeability of soil, constant and variable head Test
7. Compaction Test
8. CBR Test
9. Consolidation Test
10. Unconfined compression Test
11. Direct Shear Test.
12. Vane Shear Test

REFERENCE:

IS 2720 all parts, and other relevant IS codes, special publications and handbooks

INTELLECTUAL PROPERTY RIGHTS AND PATENTS

(Common to all Branches)

Course Code: 13NM1103

L	T	P	C
2	0	0	0

Course Educational Objectives:

- To acquaint the learners with the basic concepts of Intellectual Property Rights.
- To develop expertise in the learners in IPR related issues and sensitize the learners with the emerging issues in IPR and the rationale for the protection of IPR.

Course Outcomes:

At the end of this course, the student will be able to

- Gain knowledge on Intellectual Property assets and generate economic wealth
- Assist individuals and organizations in capacity building and work as a platform for development, promotion, protection, compliance, and enforcement of Intellectual Property & knowledge.

UNIT-I (7 Lectures)

Introduction to intellectual property Act and Law-the evolutionary past-the IPR tool kit- legal tasks in intellectual property law-ethical obligations in Para legal tasks in intellectual property law

UNIT-II (8 Lectures)

Introduction to trade mark – Trade mark registration process-Post registration procedures-Trade mark maintenance – transfer of rights- inter party's proceeding – Infringement-Dilution ownership of trade mark-likelihood of confusion – trademark claims- trademark litigations

UNIT-III (6 Lectures)

Introduction to copy rights- principles of copyright – subjects matter of copy right- rights afforded by copyright law- copyright ownership- transfer and duration – right to prepare derivative works- right of distribution- right to perform the work publicity- copyright formalities and registrations

UNIT-IV (7 Lectures)

Introduction to patent law- Rights and limitations- Rights under patent law- patent requirements- ownership – transfer- patent application process- patent infringement- patent litigation

UNIT-V (6 Lectures)

Introduction to transactional law- creating wealth and managing risk – employment relationship in the Internet and technologic cal sector- contact for internet and technological sector

TEXT BOOKS:

1 Kompal Bansal and Praishit Bansal, "Fundamentals of IPR for Engineers", 1st Edition, BS Publications, 2012.

2 Prabhuddha Ganguli, *"Intellectual Property Rights"*, 1st Edition, TMH, 2012.

REFERENCES:

1 R Radha Krishnan & S Balasubramanian, *"Intellectual Property Rights"*, 1st Edition, Excel Books, 2012.

2 M Ashok Kumar & mohd Iqbal Ali, *"Intellectual Property Rights"*, 2nd Edition, Serial publications, 2011.

NOTES

SYLLABI FOR
VII SEMESTER

ENVIRONMENTAL ENGINEERING-II

Course Code: 13CE1140

L	T	P	C
4	1	0	3

Course Educational Objectives:

- To create a strong engineering background about the influence of pollution on the environment.
- To emphasise about the importance of solid and hazardous waste management.

Course Outcomes:

- Students will be able to solve Air and Noise Pollution control, and industrial Waste-Water Engineering.
- Students will be broadly educated about the management of solid and Hazardous Waste Treatments and the awareness about legal aspects of pollution control.

UNIT-I (12 Lectures)

AIR POLLUTION & NOISE POLLUTION:

Sources of Air pollution – Air pollutants – classification – effects on man-vegetation – materials – global effects - Control of air pollution – Gaussian model – Removal of particulate pollutants – Removal gaseous pollutants. Noise pollution – Impacts – measurement and control.

UNIT-II (12 Lectures)

SPECIAL WATER TREATMENT METHODS:

a) Special treatment methods – Reverse Osmosis – Ion Exchange – Ultra filtration – De-fluoridation – Gas transfer – Thermal Phenomena.

b) Theories of Industrial Waste Treatment – Volume Reduction – Strength Reduction – Neutralization – Equalization – Proportioning – Nitrification and Denitrification – Removal of Phosphates.

UNIT-III (12 Lectures)

SOLID WASTE MANAGEMENT:

Municipal solid wastes – Solid wastes characteristics – generation – collection – segregation and transportation – treatment and disposal.

UNIT-IV (12 Lectures)

HAZARDOUS WASTE TREATMENT METHODS:

Sources and effects – classification - characterization – treatment - secured land fill and safe disposal, Nuclear Wastes - Bio-Medical Wastes, and Chemical Wastes.

UNIT-V (12 Lectures)

LEGAL ASPECTS OF POLLUTION CONTROL :

Legal aspects of Environmental Management – Effluent standards – Air Emission Standards – Water Act – Air Act – Environmental Protection Act – Legal Provisions.

TEXT BOOKS:

1. Henry. G. J. and Heinke G.W., *"Environmental Science and Engineering"*, 2nd Edition, Pearson Education, 1996.
2. Dhameja. K. Suresh, *"Environmental Engineering and Management"*, 2nd edition, S.K. Kataria & Sons, 2005.
3. Howard S. Peavy, Donald R. Rowe, George Tchobanoglous, 1st Edition, McGraw-Hill, 1985.

REFERENCES:

1. Walter J. Weber, *"Physico, Chemical process for waste quality control"*, 9th Edition, Wiley- Interscience, 1972.
2. Rao M.N & Rao H.N., *"Air Pollution and Control"*, 1st Edition, Tata McGraw-Hill, 2006.

PRESTRESSED CONCRETE

Course Code : 13CE1141

L	T	P	C
4	0	0	3

Course Educational Objectives: :

- ✤ To impart the knowledge on pre-stressing techniques and material required for pre-stressing.
- ✤ To familiarize the student with the losses of pre-stress and design of beams for flexure and shear.

Course Outcome:

The students will be able to analyse and design pre-stressed concrete members including end blocks

UNIT-I (14 Lectures)

INTRODUCTION:

Historic development – General principles of Pre-stressing - Pre-tensioning and Post tensioning – Advantages and Limitations of Pre-stressed concrete – Materials – High Strength Concrete and High Tensile Steel and their characteristics.

PRESTRESSING METHODS :

IS Code provisions, Methods and Systems of Pre-stressing; Pre-tensioning and Post tensioning methods – Analysis of Post tensioning – Different systems of Pre-stressing like Hoyer system, Magnel Blaton system, Freyssinet's system and Gifford Udall System.

UNIT-II (14 Lectures)

LOSSES OF PRESTRESS:

Loss of Pre-stress in Pre-tensioned and Post-tensioned members due to various causes like Elastic shortage of concrete, Shrinkage of concrete, Creep of concrete, Relaxation of steel, Slip in anchorage bending of member and frictional losses.

ANALYSIS OF SECTIONS FOR FLEXURE:

Analysis of sections for flexure; Elastic analysis of concrete beams pre-stressed with straight, Concentric, Eccentric, Bent and Parabolic Tendons.

UNIT-III (12 Lectures)

DESIGN OF SECTIONS FOR FLEXURE AND SHEAR :

Allowable stress, Design criteria as per IS Code – Elastic design of simple rectangular and I-section for flexure, shear, and Principal Stresses – Design for shear in beams – Kern – Lines, Cable profile.

UNIT-IV (10 Lectures)

ANALYSIS OF END BLOCKS:

Analysis of end Blocks by Guyon's method and Mugnel method, Anchorage zone stress – Approximate method of design – Anchorage zone reinforcement – Transfer of pre- stress pre-tensioned members.

UNIT-V (10 Lectures)

DEFLECTIONS OF PRESTRESSED CONCRETE BEAMS:

Importance of control of deflections – Factors influencing deflections – Short term deflections of uncracked members prediction of long term deflections.

TEXT BOOKS:

1. Krishna Raju N, *"Prestressed Concrete"*, 4th Edition, Tata McGraw Hill Publications, 2007.
2. Rajagopalan. N, *"Prestressed Concrete"*, 2nd Edition, Narosa publications, 2006.

REFERENCES:

1. Ramamrutham S., *"Prestressed Concrete"*, 4th Edition, Dhanpatrai Publications, 2006.
2. Lin T.Y. & Ned H. Burns, *"Design of Prestressed concrete structures"*, 3rd Edition, John Wiley & Sons, 2004.

CONSTRUCTION MANAGEMENT

Course Code : 13CE1142

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To impart knowledge about construction process and management.
- To familiarize students with the knowledge of planning, scheduling and resource management for civil engineering projects

Course Outcome:

- Students should be capable of preparing CPM and PERT networks for construction projects.
- Student will demonstrate basic knowledge about resolving construction disputes and their settlement.

UNIT-I (12 Lectures)

CONTRACT MANAGEMENT :

Introduction and types of contract – Contract documents – possible contractual obligations – meaning of specification – tender notice – types – tender documents – earnest money deposit (EMD) and security deposits (SD) – scrutiny and acceptance of a tender – contract agreement – contractual changes and termination of contract – subcontract – rights and duties of sub contractor.

UNIT-II (16 Lectures)

PLANNING, SCHEDULING AND RESOURCE MANAGEMENT FOR CIVIL ENGINEERING PROJECT:

Objectives of planning – its advantage to client and engineer – limitations –stages of planning by owner & contractor. Scheduling – definition – its preparation – uses and advantages – classification – methods of scheduling – bar chart – job layout – Gantt chart – work breakdown chart (WBC)

Resource Management : Definition – need for resource management – optimum utilization of resources- finance, materials, machinery, human resources – resources planning – resource levelling and its objectives" – time – cost trade off – crashing – need for crashing an activity – methods & tips for crashing – time vs. cost optimization curve – cost slope – its significance in crashing.

UNIT-III (10 Lectures)

PROJECT MANAGEMENT THROUGH NETWORKS:

Activity – Event – Dummies – basic assumptions in creating a network – rules for drawing networks – Fulkerson's rule for numbering the events, PERT – time estimates – earliest expected time – latest allowable occurrence time – slack, standard deviation, variance.

QUALITY MANAGEMENT AND SAFETY:

Importance of quality – elements of quality – quality assurance techniques (inspection, testing, and sampling) importance of safety – causes of accidents – role of various parties (designer / employer / worker) in safety management – benefits – approaches to move safety in construction.

UNIT-IV (8 Lectures)

PRECEDENCE NETWORKS:

Creating network logic, Relationship Types – Finish to Start, Start to start, finish to finish, start to finish, critical path method – ES, EF, LS, LF, Floats – significance of critical path.

UNIT-V (12 Lectures)

CONSTRUCTION DISPUTES AND THEIR SETTLEMENT:

Introduction – development in disputes – categories of disputes – modes of settlements –arbitration

CONSTRUCTION LABOUR AND LEGISLATION:

Need for legislation – Payment of wages Act – Factories Act – Contract labour (Regulation and abolition Act – Employees Provident Fund (EPF) Act.

TEXTBOOKS:

1. Sengupta.B, & H.Guha, *"Construction Management and Planning"*, Tata Mc Graw Hill Publishing Company Ltd., New Delhi, 2004.
2. Seetharaman. S, *"Construction Engineering & Management"*, Umesh Publications, NaiSarak, New Delhi, 2006.
3. Sanga Reddy. S, *"Construction Management"*, Kumaran Publications, Coimbatore, 2004.

REFERENCES:

1. Rangwala.S.C, *"Construction of Structures and Management of Works"*, 3rd Edition, Charotar Publishing House, 2000.
2. Mincks and Johnston, *"Construction Jobsite Management"*, 4th Edition, Narosa Publications, Delmar, 1998.
3. Dorsey, Robert, *"Case Studies in Building Design and Construction"*, 3rd Edition, Prentice-Hall, 1999.

REINFORCED CONCRETE STRUCTURES-II

Course Code: 13CE1143

L	T	P	C
4	1	0	3

Course Educational Objectives: :

- ✤ To impart concepts of design of reinforced concrete structures such as staircase, retaining walls and water tanks.
- ✤ To familiarize the students with the knowledge of detailing of reinforcement.
- ✤ To equip the student with the design of combined footing and pile foundation.

Course Outcomes:

- ✤ The students will be able to design structures such as staircase, foundations, retaining walls and water tanks.
- ✤ The student should be capable of understanding of structural drawings for practical execution of structures.

UNIT-I (10 Lectures)

STAIRCASES: Introduction, types - design of Dog-legged staircase- design of open well staircase with quarter span landing- design of stairs with central stringer beam.

UNIT-II (14 Lectures)

COMBINED FOOTINGS:

Introduction – Design of combined rectangular footings –combined trapezoidal footings – MAT foundation – Reinforcement detailing and bar bending schedule.

STRUCTURAL DESIGN OF PILE FOUNDATIONS :

Types of piles – Load carrying capacity of piles – Group action in piles – Structural design of RC piles – Design of pile cap for 2 or 3 piles - Reinforcement detailing and bar bending schedule.

UNIT-III (14 Lectures)

CANTILEVER RETAINING WALLS :

Introduction – Types of retaining walls –Active and passive earth pressure- Design principles of cantilever retaining walls with horizontal back fill – With horizontal back fill and traffic load – With sloping back fill.

COUNTERFORT RETAINING WALLS:

Design principles of Counterfort retaining walls with horizontal back fill –With horizontal back fill and traffic load – With sloping back fill- Reinforcement detailing and bar bending schedule.

UNIT-IV (12 Lectures)

RECTANGULAR WATER TANKS-I:

Introduction – General design requirements according to Indian standard code of practice – Design of on ground and underground water tanks- Reinforcement detailing and bar bending schedule.

RECTANGULAR WATER TANKS-II:

Introduction – General design requirements according to Indian standard code of practice –Design of over head water tanks- Reinforcement detailing and bar bending schedule.

UNIT-V (10 Lectures)

CIRCULAR WATER TANKS :

Introduction – General design requirements according to Indian standard code of practice – Joints in water tanks – Circular tank with flexible joint between floor and wall – Circular tank with rigid joint between floor and wall – Design of Over head tanks - IS code method for design of circular tanks- Reinforcement detailing and bar bending schedule need to be prepared.

TEXT BOOKS

1. Punmia B.C., Ashok kumar Jain & Aurn Kumar Jain, *"Reinforced concrete structures"*, volume – I, 5th Edition, Laxmi publications Pvt. Ltd., New Delhi, 2008.
2. Varghese P.C., *"Limit State Design of Reinforced Concrete Structures"*, 3rd Edition, Prentice hall of India, New Delhi, 2005.

REFERENCES

1. Varghese P.C., *"Advanced Reinforced Concrete Structures"*, 4^{th} edition, Prentice hall of India, 2005.
2. Pillai S.V. and Menon D, *"Reinforced Concrete Design"*, 2^{nd} edition, Tata Mc Graw Hill, 2006.
3. Krishna Raju N, *"Advanced Reinforced Concrete Design"*, 4^{th} edition, University Press, 2007.
4. Codes: Relevant IS codes.

REMOTE SENSING AND GIS

Course Code: 13CE1144

L	T	P	C
4	0	0	3

Course Educational Objective:

- To impart the knowledge of Remote Sensing & GIS along with simple applications in Civil Engineering.
- To familiarize the student with satellites and sensors.

Course Outcome :

- Student will demonstrate the ability to understand the latest developments in Remote Sensing Satellites, GIS and its applications in different fields of Civil Engineering.

UNIT-I (12 Lectures)

PHOTOGRAMMETRY & REMOTE SENSING :

Introduction – Principle and Types of Aerial Photographs, Stereoscopy, Scale of a Vertical Aerial Photograph, Map Vs Aerial Photographs, Mosaic, Ground Control, Parallax Measurements for height. Basic concepts and foundation of Remote Sensing – Elements involved in Remote Sensing , Electromagnetic Spectrum, Physics of Remote Sensing, Energy Interactions with Earth Surface Features of Vegetation, Water and Soil, Energy Interactions with Atmosphere.

UNIT-II (10 Lectures)

SATELLITES & SENSORS:

Satellite and Sensor characteristics of LANDSAT series, SPOT, IRS, IKONOS & QUICKBIRD. Visual Interpretation Keys - Converging Evidence.

UNIT-III (14 Lectures)

GEOGRAPHIC INFORMATION SYSTEM:

Geographic Information System: Introduction, GIS categories, Components of GIS, Fundamental operations of GIS, A theoretical framework for

GIS. Types of data representation- Data collection data input and output. Mannual Digitizing and Scanning.GIS Data File Management; Layer based GIS, Feature based GIS mapping. Data storage – Raster, Vector and Attribute data storage, Overview of the Data Manipulation and Analysis. Integrated Analysis of the Spatial and Attribute Data. Integration of RS, GIS & GPS.

UNIT-IV (12 Lectures)

WATER RESOURCES APPLICATIONS- I:

Land use/Land cover, Rainfall – Runoff relations and runoff potential indices of watersheds, Flood and Drought impact assessment and monitoring. Watershed management for sustainable development and Watershed characteristics – Reservoir sedimentation, Identification of suitable sites for Ground water & identification of sites for artificial recharge structures, Drainage morphometry, water depth estimation and bathymetry.

UNIT-V (12 Lectures)

ENVIRONMENTAL AND TRANSPORTATION ENGINEERING APPLICATIONS:

Air pollution – Detection & Identification of pollution sources of Water – Water quality Mapping & Monitoring, Environmental Impact Assessment – Highway alignment-urban Planning and Infrastructure Development.

TEXT BOOKS

1. Lillesand and Kiefer, *"Remote Sensing and Image Interpretation"*, 5th Edition, published by John Wiley and Sons, 2008.
2. M.Anji Reddy, *"Remote Sensing and Geographical Information systems"*, 3rd Edition, B.S.Publications, 2006.
3. A.M. Chandra, S.K. Ghosh, *"Remote Sensing and Geographical Information System"*, Narosa Publishing house, 1st Edition, 2007.

REFERENCES

1. Micheal N Demers, *"Fundamental of GIS"*, 3rd Edition, John Wiley & Sons, 2008.

2. C.P.Lo Albert, K.W. Yonng, *"Concepts & Techniques of GIS"*, 2nd Edition, Prentice Hall (India) Publications, 2008.
3. David P Paine, *"Aerial Photography and Image Interpretation"*, 2nd Edition, published by Wiley, Higher Education, 2006.
4. Kang – Tsung chang, *"Introduction to GIS"*, 4th Edition, TMH Publications & Co., 2007.
5. Ian Heywood, Sarah Cornelius, Steve Carver, *"An Introduction to Geographical Information Systems"*, 1st Edition, Pearson Education Asia, 2000.
6. Bernhardsen, *"Geographic Information Systems- An Introduction"*, 3rd Edition, Published by John Wiley Sons, 2006.
7. LRA Narayana, *"Basics of Remote Sensing and its applications"*, Universities press, 1st Edition, 2001
8. Peter A Burrough and Rachael A, MC Donnell, *"Principles of Geographical Information Systems"*, 1st Edition, Oxford Publishers, 1998.

INTRODUCTION TO FINITE ELEMENT METHOD
(ELECTIVE – III)

Course code: 13CE1145

L	T	P	C
4	0	0	3

Course Educational Objectives:

- ✤ To impart the knowledge of shape functions and stiffness matrices for various elements
- ✤ To familiarize the student to analyze beams and truss using FEM

Course Outcome:

- ✤ Students will be capable of analyzing beams and trusses using FEM.

UNIT-I (10 Lectures)

INTRODUCTION TO FEM:

Introduction – Limitations of methods of structural analysis – Mathematical modeling of physical problem - Concept of FEM through perimeter of circle – History, merit and demerits and applications of FEM – FEM based softwares – Steps involved in FEM as applicable to Structural mechanics problems.

UNIT-II (12 Lectures)

CHOICE OF DISPLACEMENT MODELS:

Introduction – Discretization – Choice of Element shapes - Choice of displacement models – Requirements of Ideal displacement model - Factors affecting nature and degree of polynomial for displacement models.

FORMULATION OF SHAPE FUNCTION AND STRAIN DISPLACEMENT MATRIX:

Introduction – Properties of Shape Functions - Methods of Determination – Shape functions for 1D bar, beam element and 2D CST element.

UNIT-III (14 Lectures)

ELEMENT STIFFNESS MATRIX :

Introduction - Element Stiffness Matrix based on minimization of total potential Energy and Virtual Work - Stiffness Matrix for 2 noded truss element, 3 noded truss element, 2 noded Beam element, 3 noded CST –Assemblage of Element Stiffness Matrices – consistent load vector for elements - Assembling load matrix- Static Condensation.

UNIT-IV (14 Lectures)

1D AND 2D TRUSS ANALYSIS USING FEM:

Introduction - Analysis of stepped bars and tapered bars- Analysis of 2D Truss - 2D Truss with initial Strain/Rise in Temperature.

UNIT-V (10 Lectures)

BEAM ANALYLSIS USING FEM:

Introduction - Analysis of simply supported beam – Analysis of propped cantilevers, Fixed beams, and Continuous beams for various loadings.

TEXT BOOKS:

1. Chandrupatla,T.R., Belegunde, A.D, "*Introduction to Finite Elements in Engineering*", 3rd Edition, PHI, 2010
2. Desai,Y.M., Eldho.TI, Shah,A.H, *"Finite Element Methods with Application in Engineering"*, 1st Edition, Pearson, 2011
3. S.S. Bhavikatti, *"Finite Element Analysis"*, 2nd Edition, New age international, 2010

REFERENCES:

1. Klaus-Jurgen Bathe, *"Finite Element Methods"*, 2nd Edition, Prentice Hall, 2010
2. Reddy, J.N., *"Introduction to Finite Element Method"*, 3rd Edition, Mc Graw Hill, 2002

NOTES

SYLLABI FOR VIII SEMESTER

TRANSPORTATION PLANNING AND DESIGN
(ELECTIVE - III)

Course Code : 13CE1146

L	T	P	C
4	0	0	3

Course Educational Objectives:

To develop

- Knowledge on four-step process of transportation planning.
- Knowledge on various transportation surveys like Home-Interview survey, road side interview survey etc.
- Knowledge on trip generation models and trip distribution models.
- Concept of various methods of traffic assignment and mode split.
- Knowledge on various pollutions related to traffic.
- Knowledge on highway costs & Highway user benefits in a project.
- Knowledge on various methods of economic analysis.

Course Outcome:

The student will be able to

- Understand four-step process of transportation planning.
- Understand various traffic data collection procedures.
- Draw design line diagrams.
- Understand factors governing trip generation and attraction.
- Solve regression models for trip generation.
- Understand various methods of trip distribution.
- Solve various growth factor models & Gravity model.
- Understand methods of traffic assignment & Mode split.
- Understand the inter-relationship between environment and traffic.
- Understand various methods of economic evaluation.

✤ Solve problems on economic analysis of highway problems

UNIT-I (12 Lectures)

CONCEPT OF TRAVEL DEMAND :

Travel characteristics – Origin. Destination, Route mode, Purpose – Travel demand as a function of independent variables – Assumptions in demand estimation, relation between land use and travel – Four step process of Transportation planning.

TRANSPORTATION PLANNING PROCESS:

General concept of Trip – Trip Generation – Trip Distribution – Traffic assignment and mode split , Aggregate and disaggregate Models – Direct Demand Models, Sequential and Sequential Recursive models.

UNIT-II (12 Lectures)

DATA COLLECTION AND INVENTORIES :

Definition of study area – Zoning principles ; Types and sources of Data, Home Interview surveys ; Road side interview surveys; Goods Taxi, IPT surveys; Sampling techniques ; Expansion factors and Accuracy check : Desire line diagram and use.

UNIT-III (12 Lectures)

TRIP GENERATION MODELS:

Factors governing Trip Generation and Attraction :

Multiple linear Regression Models – Category analysis.

TRIP DISTRIBUTION MODELS METHODS OF TRIP DISTRIBUTION :

Growth Factor Models – Uniform Growth Factor Method ; Average Growth Factor Method ; Fratar Method ; Furness Method ; limitation of Growth Factor Models ; Concept of Gravity Model.

UNIT-IV (12 Lectures)

TRAFFIC ASSIGNMENT AND MODE SPLIT : PURPOSE OF ASSIGNMENT AND GENERAL PRINCIPLES:

Assignment Techniques – All-or-nothing assignment : Multiple route assignment :

Capacity resistant method, Minimum path trees ; Diversion curves. Factors affecting mode split – Probit logit and Descriminant Analysis.

UNIT-V **(12 Lectures)**

TRANSPORTATION AND ENVIRONMENT:

Detrimental effect of Traffic on Environment: Noise Pollution :Air pollution : Vibrations : Visual Intrusion – Effects and remedial measures.

ECONOMIC EVALUATION OF TRANSPORTATION PLANS :

Costs and benefits of transportation projects ; vehicle operating cost ; time saving, accident costs ; methods of economic evaluation – benefit Cost ratio method – Net Present Value method ; Internal Rate of Return method.

TEXT BOOKS:

1. Kadiyali L.R., *"Traffic Engineering and Transportation Planning"*, 8th Edition, Khanna Publishers, Delhi, 2005.
2. Papa Costas C.S., *"Fundamentals of Transportation Engineering"*, 2nd Edition, Prentice Hall, 2006.

REFERENCES:

1. Bruton M.J., *"Introduction to Transportation Planning"*, Hutchinson of London, 4th Edition, 2009
2. Khisty C.J., *"Transportation Engineering- An Introduction"*, 3rd Edition, Prentice Hall, 2008.

SOIL DYNAMICS AND MACHINE FOUNDATIONS
(ELECTIVE – III)

Course Code : 13CE1147

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To familiarize students with the dynamic properties of soil.
- To create an understanding about the importance of designing machine foundation for reciprocating and impact machines.

Course Outcome:

- Student will demonstrate the ability to design machine foundations.

UNIT-I (12 Lectures)

THEORY OF VIBRATIONS:

Basic definitions- Free and Forced vibrations with and without damping for Single degree freedom system- Resonance and its effect – Magnification – Logarithmic decrement – Transmissibility, Natural frequency of foundation soil system -Barkan's and IS methods – Pressure bulb concept – Pauw's Analogy.

UNIT-II (12 Lectures)

WAVE PROPAGATION AND DYNAMIC SOIL PROPERTIES:

Elastic waves in Rods – Waves in elastic Half space, Field and Laboratory methods of determination – Uphole, Down hole and Cross hole methods – Cyclic plate load test – Block vibration test – Determination of Damping factor.

UNIT-III (12 Lectures)

MACHINE FOUNDATIONS:

Types, Design criteria, Permissible amplitudes and Bearing pressure, Degrees of freedom - Analysis under different modes of vibration of block foundation

UNIT-IV (12 Lectures)

DESIGN OF FOUNDATIONS FOR RECIPROCATING AND IMPACT MACHINES:

Analysis of Two Degree freedom systems under free and forced vibrations -Principles of Design of Foundations for reciprocating and impact machines as per IS code.

UNIT-V (10 Lectures)

VIBRATION ISOLATION:

Types and methods – Isolating materials and their properties

TEXT BOOKS:

1. Barkan, *"Dynamics of Bases and Foundations"*, 2nd Edition McGraw Hill Publishing, 1970.
2. Shamsher Prakash, *"Soil Dynamics"*, 3rd Edition, John Wiley, 2000.

REFERENCES:

1. Richart, Hall and Woods, *"Vibration of Soils and Foundations"*, Prentice Hall, 1981.
2. Prasad.B.B., *"Advance Soil Dynamics and Earthquake Engineering"*, 1st Edition, Prentice Hall, 2011.
3. P.Srinivasulu and G.V.Vaidyanathan, *"Handbook of Machine Foundations"*, 2nd Edition, Tata McGraw Hill, 1999.

DESIGN OF PUBLIC BUILDINGS
(ELECTIVE – III)

Course Code : 13CE1148

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To familiarize the student with the climate and functional requirement of public buildings.
- To give an insight into planning of simple public buildings.

Course Outcomes :

- Student will be capable of planning public buildings under the climatic, spatial and functional requirements.

UNIT-I **(12 Lectures)**

EDUCATIONAL BUILDINGS:

Requirements, primary school, secondary school, degree colleges. Design with reference to climate and functional requirements.

UNIT-II **(12 Lectures)**

Design of Library buildings: College libraries, public libraries.

UNIT-III **(12 Lectures)**

Functional design of a primary health centre.

UNIT-IV **(12 Lectures)**

Functional design of a bank, post office

UNIT-V **(12 Lectures)**

Principles of design of auditorium and cinema halls including acoustics.

In all the above FIVE UNITS emphasis shall be on plan and section of the buildings. They shall include the sanitary, ventilation and climate requirements and also NBO & NBC regulations.

TEXT BOOKS :

1. N. Kumara Swamy and. A. Kameswara Rao, *"Building Planning and Drawing"*, 8th Edition, Charotar Publications, 2010.

2. Y.S. Sane, *"Building planning and design"*.

REFERENCE:

Shah, Kale, Patk, *"Building Drawing with an Integrated Approach to Built Environment"*, Tata Mc Graw Hill.

ENVIRONMENTAL ENGINEERING LAB

Course Code: 13CE1149

L	T	P	C
0	0	3	2

Course Educational Objectives:

To impart experimental skills on water quality testing in accordance to IS standards.

Course Outcomes:

The student will be capable of determinging water quality and will be able to assess pollution levels in a given water sample.

LIST OF EXPERIMENTS:

1. Determination of pH and turbidity
2. Determination and Estimation of total solids, organic solids, dissolved solids, inorganic solids, determination of electrical conductivity.
3. Determination of Alkalinity/Acidity.
4. Determination of Optimum coagulant dose
5. Determination of Chlorides.
6. Determination of Chlorine demand.
7. Determination of Dissolved Oxygen.
8. Determination of B.O.D
9. Determination of C.O.D
10. Determination of total Hardness.
11. Determination of Nitrogen.
12. Determination of Total Phosphates.

TEXT BOOK:

Standard Methods for Analysis of Water and Waste Water – APHA.

REFERENCES:

1. Relevant *"IS Codes and Water & Waste Water Analysis Manual of ICMR or NEERI"*.
2. Sawyer and Mc Carty, *"Chemistry for Environmental Engineering"*.

GEOMATICS LAB

Course Code: 13CE1150 | **L T P C** | **0 0 3 2**

Course Educational Objectives:

- To familiarize student with remote sensing and GIS software.
- To impart experimental skills in total station.

Course Outcomes:

The student will demonstrate the ability to prepare various thematic maps and its applications in various fields like water resources and transportation Engineering.

LIST OF EXERCISES

1. Opening and Importing of an Image.
2. Rectification of Images.
3. Subset by Inquire Box method.
4. Subset by AOI method.
5. Mosaic of Images.
6. Supervised Classification of a given image
7. Unsupervised classification of a given image
8. Digitization of Map/Toposheet / Creation of thematic maps.
9. Developing Digital Elevation model and Draping of an image.

GIS SOFTWARE :

Arc GIS /ERDAS /Map info /ILWIS/SURFER

TOTAL STATION:

10. Determination of area
11. Contouring by SURFER
12. Stake out
13. GPS

REINFORCED CONCRETE BRIDGES

Course Code: 13CE1151

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To impart overall knowledge of about the analysis and design of RC bridges.
- To familiarize student with the knowledge of bridge sub structure and bearings.

Course Outcomes:

- Students should be able to design slab bridges, box culverts and T-beam bridges.

UNIT-I (14 Lectures)

GENERAL CONSIDERATIONS FOR ROAD BRIDGES:

Introduction – Site selection – Soil exploration for site – Selection of bridge type – Economical span – Number of spans – Determination of HFL – General arrangement drawing.

STANDARD SPECIFICATIONS FOR ROAD BRIDGES :

Width of carriageway- Clearances- Loads to be considered- Dead load – I.R.C. standard live loads- Impact effect- Review of I.R.C. loadings- Application of live loads on deck slabs – Wind load – Longitudinal forces- Centrifugal forces- Horizontal forces due to water currents – Buoyancy effect- Earth pressure.

UNIT-II (12 Lectures)

CULVERTS:

Introduction, analysis and design of box culverts- slab culverts – pipe culverts- Reinforcement detailing and bar bending schedule need to be prepared.

UNIT-III (12 Lectures)

REINFORCED CONCRETE T-BEAM BRIDGES :

Introduction – Analysis and design of T – Beam girder bridges-Reinforcement detailing and bar bending schedule need to be prepared.

UNIT-IV (12 Lectures)

DESIGN OF SUBSTRUCTURE:

Analysis and Design of Abutments and pier- Reinforcement detailing and bar bending schedule need to be prepared.

BRIDGE BEARINGS: Bearings, forces on bearings, design of elastomeric bearings, basics for selection of bearings, expansion joints, closed joints.

UNIT-V (12 Lectures)

BRIDGE FOUNDATIONS:

Types of foundations, well foundation – open well foundation, components of well foundation – pile foundations – designs not included- Reinforcement detailing .

TEXT BOOKS:

1. Johnson victor D, *"Essentials of Bridge Engineering"*, 7th Edition, Oxford, IBH publishing Co., Ltd., 2006.
2. Ponnu Swamy, *"Bridge Engineering"*, 4th Edition, Mc Graw-Hill Publication, 2008.
3. Krishna Raju N., *"Design of Bridges"*, 4th Edition, Oxford and IBH Publishing Co., Ltd., 2008.

REFERENCES:

1. Vazirani, Ratvani & Aswani, *"Design of Concrete Bridges"*, 5th Edition, Khanna Publishers, 2006.
2. Jagadish T.R. & M.A. Jayaram, *"Design of Bridge Structures"*, 2nd Edition, 2009.
3. Swami Saran, *"Analysis and Design of sub-structures"*, 2nd Edition, Oxford IBH Publishing co ltd., 2006.

ENVIRONMENTAL IMPACT ASSESSMENT
(ELECTIVE – IV)

Course Code : 13CE1152

L	T	P	C
4	0	0	3

Course Educational Objectives:

- ✤ To familiarize student with the knowledge of preparing E.I.A for various projects.
- ✤ To impart the awareness of environmental issues in water resource and industrial development.
- ✤ To create an understanding of applying various methodologies for carrying out environmental impact assessment.

Course Outcomes:

- ✤ Student will demonstrate the ability to prepare environmental impact statement for a project.
- ✤ Student will be capable of interpreting and analysing data and report environmental impact assessment.

UNIT-I **(12 Lectures)**

INTRODUCTION :

Environment and its interaction with human activities-Environment Imbalances- Attributes, impacts, Indicators, and measurements-Concept of Environmental Impact assessment (EIA) Environmental Impact Statement, Objectives of EIA, Advantages and limitations of EIA.

UNIT-II **(12 Lectures)**

ENVIRONMENTAL INDICATORS:

Indicators for climate-Indicators for terrestrial subsystems-Indicators for aquatic subsystems-Selection of indicators-Socio-economic indicators-Basic information-Indicators for economy-Social indicators-indicators for health and nutrition-Cultural indicators-Selection of indicators

UNIT-III (12 Lectures)

ENVIRONMENTAL ISSUES IN WATER RESOURCE DEVELOPMENT :

Land use-soil erosion and their short and long term effects- Disturbance and long term impacts-Changes in quantity and quality of flow-sedimentation Environmental impact assessment of water resource development structures-Case studies -water quality Impact assessment – attributes, water quality impact assessment of water resources projects-data requirements of water quality impact assessment for dams impacts of dams on environment-case studies

UNIT-IV (12 Lectures)

ENVIRONMENTAL ISSUES INDUSTRIAL DEVELOPMENT:

On site and off site impacts during various stages of industrial development , long term climatic changes, green house effect, industrial effluents and their impact cycle, environment impact of high ways, mining and energy development.

UNIT-V (12 Lectures)

METHODOLOGIES FOR CARRYING ENVIRONMENTAL IMPACT ASSESSMENT:

Overview of methodologies, Adhoc, Checklist, Matrix, Network, Overlays, Benefit cost analysis choosing a methodology, review criteria.

TEXT BOOKS:

1. CANTER L.W, *"Environmental Impact Assessment"*, Mcgraw Hill Pub.Co. New York, 1996.
2. Join, R.K. Urban L.V.Stracy, G.S. *"Environmental Impact Analysis"*, 2nd Edition, Vau Nostrand Reinhold Co, 2004.
3. Anjaneyulu, Vall Manickam, *"Environmental Impact Assessment Methodologies"*, 2nd Edition , B.S.Publications, 2007.

REFERENCES:

1. Ran, J.G. & Wooten, D.C., *"Environmental Impact Assessment"*, 2nd Edition, Mc Graw Hill Pub. Co. Ltd, 2008.
2. UNESCO, *"Methodologies, Guidelines for the Integrated Environmental Evaluation of Water Resources Development"*, UNESCO/UNEP, Paris, 1987.

ADVANCED FOUNDATION ENGINEERING
(ELECTIVE- IV)

Course Code : 13CE1153

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To produce Civil Engineering students who have ability to design foundation systems for structures such as Tall towers, Bridges etc.
- To familiarize the student with design of Sheet piles and Coffer dams.

Course Outcomes:

- Student will demonstrate the ability to identify a suitable foundation system for a structure.
- Student will be capable of analyzing and designing foundations for structures such as tall towers, bridges.

UNIT-I (12 Lectures)

SHALLOW FOUNDATIONS:

Depth, Spacing of footings, Erosion problems, Water table effects, foundations on sands, Silts, Clays, landfills (qualitative treatment only). Introduction to design of Spread footings, Rectangular footings, and Eccentrically loaded spread footings, Basics of beams on elastic foundation and Ring foundations.

UNIT-II (10 Lectures)

MAT FOUNDATIONS:

Types, Bearing capacity, Settlements, Sub grade reaction, Design guidelines.

UNIT-III (14 Lectures)

DEEP FOUNDATIONS:

Stresses during pile driving, Tension piles, Negative skin friction, and under-reamed piles. Guidelines for design of pile caps, Batter piles, Laterally loaded piles- Ultimate capacity of laterally loaded piles. Drilled piers – Uses, load carrying capacity, Settlements.

UNIT-IV **(12 Lectures)**

SHEET PILE WALLS:

Cantilever sheet piles and Anchored bulkheads, Earth pressure diagram Determination of Depth of embedment in sands and clays – Timbering of trenches- Earth pressure diagrams – Forces in struts.

UNIT-V **(10 Lectures)**

COFFER DAMS:

Stability, Bearing capacity, Settlements (Qualitative treatment only).

TEXT BOOKS:

1. Das, B.M., *"Principles of Foundation Engineering"*, 4th Edition, Cengage Learning, Singapore, 1999.
2. Bowles, J.E., *"Foundation Analysis and Design"*, 4th Edition, McGraw- Hill International, 1988.

REFERENCES:

1. Venkataramaiah C., *"Geotechnical Engineering"*, 5th Edition, NewAge International Pvt.Ltd, Publishers, 2009.
2. Swami Saran, *"Analysis and Design of Substructures"*, 3rd Edition, Oxford & IBH Publishing Company Pvt.Ltd, 2009.
3. Gopal Ranjan &ASR Rao, *"Basics and Applied Soil Mechanics"*, 4th Edition, New Age International Pvt.Ltd, Publishers, 2002.

ADVANCED STRUCTURAL DESIGN
(ELECTIVE-IV)

Course Code: 13CE1154

L	T	P	C
4	0	0	3

Course Educational Objectives: :

- To impart knowledge about the RC design of flat slabs, grid floors, and chimneys.
- To familiarize the student with knowledge of Bunkers, Silos and Voided slabs.

Course Outcomes:

- Students will demonstrate the ability to design reinforce concrete flat slabs, grid floors, and chimneys.
- Students will demonstrate the ability to design reinforce concrete Bunkers, Silos and Voided slabs.

UNIT-I **(12 Lectures)**

FLAT SLABS:

Introduction – Components of flat slab construction- Indian code Recommendations (IS : 456 -2000)- Direct design method – Equivalent frame method – Shear in flat slabs – Detailing of flat slabs- Reinforcement detailing and bar bending schedule need to be prepared.

UNIT-II **(14 Lectures)**

GRID FLOORS:

Introduction – Analysis and design of grid floors – analysis of rectangular grid floors by Timoshenkos plate theory- Reinforcement detailing and bar bending schedule need to be prepared.

UNIT-III (10 Lectures)

BUNKERS AND SILOS:

Introduction – difference between bunker & silo – concepts of loading and design.

UNIT-IV (12 Lectures)

CHIMNEYS:

Introduction to chimneys – Parts of chimney – Stress in RC shafts due to self weight and wind loads – Stress due to temperature difference – Design of RC chimneys.

UNIT-V (14 Lectures)

PLATE GIRDER BRIDGES:

Analysis and design of Plate girder bridges- Detailed drawings must be prepared.

TEXT BOOKS:

1. Varghese P.C., *"Advanced Reinforced Concrete Structures"*, 6th Edition, Prentice Hall of India Pvt. Ltd., 2005.
2. Punmia B.C., Ashok Kumar Jain and Arun Kumar Jain, *"Reinforced concrete structures"*, Vol- 2, 5th Edition, Laxmi publications Pvt. Ltd., New Delhi, 2007.
3. Duggal S.K., *"Design of Steel Structures"*, 3rd Edition, Mc Graw Hill Publishers, New Delhi, 2009.

REFERENCES:

1. Pillai S.U, and Menon D., *"Reinforced Concrete Design"*, 2nd Edition, Tata Mc Graw hill Publishing Company, 2008.
2. Bhavikatti S.S., *"Advanced RCC Design"*, 4th Edition, New Age International Pvt. Ltd., 2008.
3. Relevant IS: codes.

SEMESTER - I

Code	COURSE TITLE	L	T	P	C
13HE1101	English	4	0	0	3
13BM1101	Mathematics-I	4	1	0	3
13BC1101	Chemistry	4	0	0	3
13CT1101	Introduction to Computer Science and Information Technology	4	0	0	3
13EE1142	Basic Electrical Engineering	4	1	0	3
13HE1102	English Language Lab	0	0	3	2
13BC1103	Chemistry Lab	0	0	3	2
13MT1101	Engineering Workshop	0	0	3	2
13NM1101	Professional Ethics	2	0	0	0
	TOTAL	**22**	**2**	**9**	**21**

SEMESTER - II

Code	COURSE TITLE	L	T	P	C
13BM1102	Mathematics-II	4	1	0	3
13BP1101	Physics	4	0	0	3
13CT1102	Computer Programming Through C	4	0	0	3
13ME1102	Engineering Mechanics	4	0	0	3
13EC1142	Electronics Devices and Circuits	4	1	0	3
13BP1102	Physics Lab	0	0	3	2
13CT1103	Computer Programming Lab	0	0	3	2
13EE1143	Basic Electrical Engineering Lab	0	0	3	2
13ME1103	Engineering Drawing	1	0	3	3
	TOTAL	**21**	**2**	**12**	**24**

SEMESTER - III

Code	COURSE TITLE	L	T	P	C
13BM1106	Discrete Mathematical Structures	4	1	0	3
13HM1101	Managerial Economics and Financial Accounting	4	0	0	3
13CT1104	Operating Systems	4	1	0	3
13EC1105	Switching Theory and Logic Design	4	0	0	3
13CT1105	Computer Organization	4	0	0	3
13CT1106	Data Structures	4	0	0	3
13CT1107	Data Structures Lab	0	0	3	2
13EC1143	Analog and Digital Circuits Lab	0	0	3	2
	TOTAL	**24**	**2**	**6**	**22**

SEMESTER - IV

Code	COURSE TITLE	L	T	P	C
13BM1103	Probability Statistics and Numerical methods	4	1	0	3
13CT1108	Design and Analysis of Algorithms	4	1	0	3
13CT1109	Unix and Shell Programming	4	0	0	3
13CT1110	Database Management Systems	4	0	0	3
13CT1111	Object Oriented Programming Through JAVA	4	0	0	3
13CT1112	Computer Graphics	4	0	0	3
13NM1102	Environmental Studies	2	0	0	0
13CT1113	Object Oriented Programming Lab	0	0	3	2
13CT1114	Database Management Systems Lab	0	0	3	2
	TOTAL	**26**	**2**	**6**	**22**

SEMESTER - V

Code	COURSE TITLE	L	T	P	C
13CT1115	Formal Languages and Automata Theory	4	1	0	3
13CT1116	Web Programming	4	0	0	3
13CT1117	Embedded Systems-1	4	0	0	3
13CT1118	Object Oriented Analysis and Design	4	0	0	3
13CT1119	Software Engineering	4	0	0	3
13CT1127	Artificial Intelligence	4	1	0	3
13CT1120	Embedded Systems -1 Lab	0	0	3	2
13CT1121	Web Programming Lab	0	0	3	2
13NM1103	Intellectual Property rights and Patents	2	0	0	0
	TOTAL	**26**	**2**	**6**	**22**

SEMESTER - VI

Code	COURSE TITLE	L	T	P	C
13HM1102	Management Science	4	0	0	3
13CT1122	Data Warehousing and Data Mining	4	0	0	3
13CT1123	Compiler Design	4	1	0	3
13CT1124	Computer Networks	4	1	0	3
	ELECTIVE - I	4	0	0	3
13CT1126	Information Storage Systems				
13CS1101	Image Processing				
13CS1102	Human Computer Interaction				
	ELECTIVE - II	4	0	0	3
13CS1103	Machine Learning				
13CT1131	Middle ware Technologies				
13CS1104	Advanced Computer Architecture				
13HE1103	Technical Communication and soft skills Lab	0	0	3	2
13ES11BC	Basic computations lab	0	0	3	2
13CS1105	Data mining and Data Warehousing lab	0	0	3	2
	TOTAL	**24**	**2**	**9**	**24**

SEMESTER-VII

Code	COURSE TITLE	L	T	P	C
13CT1129	Embedded Systems -2	4	0	0	3
13CT1125	Software Testing	4	0	0	3
13CS1106	Principles of Programming languages	4	1	0	3
13CS1107	Cryptography and Network Security	4	0	0	3
13CT1128	Mobile Communications	4	1	0	3
	ELECTIVE - III	4	0	0	3
13CS1108	Natural Language Processing				
13CT1130	Unix Network Programming				
13CT1134	Information Storage Security and Management.				
13CT1135	Cloud Computing				
13CS1109	Network Security and Case Tools Lab	0	0	3	2
13CS1110	Embedded Systems -2 Lab	0	0	3	2
13CS11MP	Industry oriented Mini-project	0	0	0	2
	TOTAL	**24**	**2**	**6**	**24**

SEMESTER - VIII

Code	COURSE TITLE	L	T	P	C
13CS1111	Network Management Systems	4	0	0	3
	ELECTIVE - IV	4	0	0	3
13CT1133	Bio-informatics				
13CT1136	Big Data and Hadoop				
13CT1137	Multi-Core Programming				
13CS1112	Pattern Recognition				
	OPEN ELECTIVE	4	0	0	3
13CS11SM	SEMINAR	0	0	3	2
13CS11CV	COMPREHENSIVE VIVA	0	0	0	2
13CS11PW	PROJECT WORK	0	0	16	8
	TOTAL	**12**	**0**	**19**	**21**

LIST OF OPEN ELECTIVES

CODE	COURSE TITLE	OFFERING DEPARTMENT
13CH1128	Design and Analysis of Experiments*	Chemical Engineering
13CE1155	Green Buildings and Infrastructure	Civil Engineering
13CE1156	Disaster Management	Civil Engineering
13CS1113	E-Commerce	Computer Science and Engineering
13CT1132	Software Project Management*	Computer Science and Engineering
13EC1140	Bio-Medical Instrumentation	Electronics and Communications Engineering
13EE1138	Electrical Safety Management	Electrical and Electronics Engineering
13EE1139	Reliability Evaluation of Engineering Systems	Electrical and Electronics Engineering
13EE1140	Design Concepts for Engineers	Electrical and Electronics Engineering
13EE1141	Special Electrical Machines for Industrial Applications	Electrical and Electronics Engineering
13IT1113	Neural Networks	InformationTechnology
13IT1114	Biometrics	InformationTechnology
13ME1143	Renewable Sources Of Energy*	Mechanical Engineering
13ME1153	Project Management*	Mechanical Engineering
13BP1103	Nano Technology	Physics
13HM 1104	Entrepreneurship and Small Business Management	Management Studies
13HM 1105	Financial Management	Management Studies
13HM 1106	Indian and International Business Environment	Management Studies

*These courses can be taken by the students of respective departments if they are not offered /opted earlier in the structure.

NOTES

SYLLABI FOR I SEMESTER

ENGLISH
(Common to all Branches)

Course Code: 13HE1101

L	T	P	C
4	0	0	3

Course Educational Objectives:

Enabling the students to

- ✤ Understand class room lectures in different subjects
- ✤ Read technical and general materials including literary, scientific, political, economic and cultural topics of interest
- ✤ Develop effective written communication in academic, technical and professional contexts
- ✤ Develop creative and critical thinking skills necessary to become employable

Course Outcomes:

The learners will be able to show:

- ✤ Skills in reading including skimming, scanning, intensive and extensive and comprehension
- ✤ Enriched vocabulary and become better communicators
- ✤ Skills of communicating in descriptive, analytical and narrative modes with felicity
- ✤ Creative and critical thinking skills for employability

Course Work:

To achieve the above objectives, instruction will be imparted through relevant ESP materials, articles and editorials from newspapers, technical journals, magazines in classes and laboratory. Students will be given individual and integrated practice in LSRW skills.

Contents:

Reading Comprehension - Reading in various degrees of speed (slow, fast, very fast); reading different kinds of texts for different purposes (for example, for relaxation, for information, for understanding, for discussion at a later stage etc.); reading between the lines, skimming and scanning and so on.

Vocabulary –synonyms, antonyms, prefixes, suffixes, confusables, one-word substitutes, Idioms and phrases

WRITING:

- Grammar: Common errors, articles, prepositions, tenses, concord, phrasal verbs, modal verbs, conditionals, transformation of sentences, punctuation and spelling
- Selecting materials for expository, descriptive, and argumentative pieces summarizing and abstracting
- Paragraph writing with coherence, cohesiveness and clarity,
- Essay writing- variety in sentences and paragraphs, précis writing
- Business letter writing
- Reference skills; use of dictionary, library and internet sources

SYLLABUS

UNIT-I **(13 Lectures)**

1. Story of Insects (English Today)
2. Bringing up Boys & Girls (Academic Encounters)
3. The Lunatic, the Lover and the Poet (The Siren's Song)
4. Vocabulary Building: Prefixes, Suffixes, One-Word Substitutes etc.

UNIT-II **(14 Lectures)**

1. Unity of Minds by Dr. A.P.J. Kalam (English Today)
2. On His Blindness (The Siren's Song)
3. Cultural Variation & Change (Academic Encounters)
4. Grammar: Tenses & Concord

UNIT-III **(11 Lectures)**

1. Three Years She Grew in Sun and Shower (The Siren's Song)
2. Advertising in the Media (Academic Encounters)
3. Grammar: Articles & Prepositions
4. Paragraph Writing; Technical Description-Process, Object

UNIT-IV **(12 Lectures)**

1. A Special Kind of Blessing (English Today)
2. Techniques of Solving Crimes (Academic Encounters)
3. La Belle Dame Sans Merci (The Siren's Song)
4. Précis writing &Letter Writing

UNIT-V **(10 Lectures)**

1. I Have A Dream (English Today)
2. Because I Could not Stop for Death (The Siren's Song)
3. Writing: Note Taking & Note Making ,Essay writing
4. Grammar: Simple, Compound & Complex Sentences

TEXT BOOKS:

1. Kristine Brown & Susan Hood, *"Academic Encounters: Life in Society Reading, Study Skills, Writing, London"*, Cambridge University Press/ Foundation Books, 2006.
2. K Durga Bhavani, G. K. Subbarayuydu, C. Vijayasree, D. Prema Kumari & Y. L. Srinivas, *"English Today: A Course in Reading and Writing"*, Foundation Books, 2005.
3. David Murdoch, The Siren's Song, "*An Anthology of British and American Verse"*, Madras, Orient Longman, 1993.

REFERENCS:

1. Alec Fisher, *"Critical Thinking An Introduction"*, New Delhi: CUP, First South Asian Edition, 2011.
2. Bikram K. Das, Kalyani Samantray, Rath Nayak, Susmita Pani & Saveeta Mohanty, "*An Introduction to Professional English and Soft Skills"*, New Delhi, Foundation Books, 2009.

3. *"Regional Institute of English, English for Engineers"*, New Delhi, Foundation Books, 2006.
4. Sharon J.Gerson, Steven M.Gerson, *"Technical Writing"*, New Delhi, Pearson education, 2007.

SUGGESTED READING:

Stories of humour, adventure, mystery and autobiographies of eminent scientists.

MATHEMATICS-I

(Common to all branches)

Course Code: 13BM1101

L	T	P	C
4	1	0	3

Pre requisites:

- ✤ Basic formulae of differentiation, product rule, and quotient rule.
- ✤. Basic Integration formulae, integration by parts, definite integrals and properties.
- ✤ Basic concept of partial differentiation.

Course Educational Objectives:

- ✤ The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- ✤ The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- ✤ Solve ordinary differential equations of first, second and higher order.
- ✤ Learn the technique of Laplace transform and apply it to solve differential equations.
- ✤ Understand the concept of Double and Triple integrals and their applications to calculation of areas, volumes .
- ✤ Extend the concept of integration to vector functions, understand the significance of the operators, gradient, divergence and curl.
- ✤ Find surface areas and volumes of certain solids using Green, Stokes and Gauss divergence theorems.

UNIT-I (12 Lectures)

ORDINARY DIFFERENTIAL EQUATIONS:

Linear equations of first order, Bernoulli differential equation, Linear differential equations of higher order with constant coefficients, Method of Variation of parameters, Linear differential equations with variable coefficients (Cauchy's homogeneous linear equation, Legendre's linear equation).

APPLICATIONS OF LINEAR DIFFERENTIAL EQUATIONS:

Orthogonal trajectories, Models on R-L-C circuits, Newton's law of cooling.
(11.9, 11.10, 13.1—13.7, 13.8(1), 13.9, 12.3, 12.5, 12.6)

UNIT-II (12 Lectures)

LAPLACE TRANSFORMS:

Laplace transform of elementary functions, properties, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, division by t, evolution of integrals by Laplace transforms.

INVERSE TRANSFORM:

Introduction, Finding inverse transforms by the method of partial fractions, other methods of finding Inverse Transform, Convolution theorem, Unit step function, and Unit impulse function.

APPLICATION OF LAPLACE TRANSFORMS:

Initial and Boundary Value Problems.
(21.1-21.5, 21.7-21.15, 21.17, 21.18

UNIT-III (12 Lectures)

PARTIAL DIFFERENTIATION:

Total derivative, change of variables, Jacobians, Tangent Plane and Normal to the Surface, Taylor's theorem for functions of two variables.

APPLICATIONS OF PARTIAL DIFFERENTIATION:

Maxima and Minima of functions of two variables, Lagrange method of undetermined multipliers.
(5.5 – 5.9, 5.11, 5.12)

UNIT-IV (12 Lectures)

MULTIPLE INTEGRALS:

Introduction to Non-Cartesian Coordinates, Double integrals, Change of order of integration, Double integral in polar co-ordinates, Triple integrals, Change of variables in double integrals, Change of variables in triple integrals. Simple Applications of Multiple Integrals**:** Area enclosed by plane curves, Volumes of solids.
(8.19, 8.21, 7.1, 7.7,)

UNIT-V (12 Lectures)

VECTOR DIFFERENTIATION:

Differentiation of vectors, curves in space, velocity, acceleration, Scalar and Vector point functions. Gradient of a scalar field and directional derivatives- Divergence and curl of a Vector field and it's physical interpretation.

VECTOR INTEGRATION:

Line integral, Circulation, work done, surface and volume integrals.

Vector integral theorems: Green's, Stoke's and Gauss Divergence theorems (without proofs) and related problems.
(8.1- 8.16)

TEXT BOOK:

Dr.B.S.Grewal *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. Kreyszig E, "*Advanced Engineering Mathematics*", 8th Edition, John Wiley, Singapore, 2001.
2. Greenberg M D, "*Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, "*Advanced Engineering Mathematics*", 7th Edition, Cengage Learning, 2011.

CHEMISTRY

(Common to all Branches)

Course Code: 13BC1101

L	T	P	C
4	0	0	3

Course Eductational Objectives:

The course attempts impart a sound knowledge on the principles of chemistry involving different application oriented topics to requied for all engineering branches.

Course Outcomes :

The student should able to apply

- ✤ The principles involved in corrosion and its control
- ✤ Treatment of water for industrial purpose and concepts of energy storage devices.
- ✤ Utillisation of polymer engineering materials towards different applications.

UNIT-I (10 Lectures)

ELECTROCHEMICAL CELLS:

Electrode potential, Nernst equation, EMF of electrochemical cell, Reference electrodes-Standard hydrogen electrode, calomel electrode. Electrochemical series, Concentration cell, Construction of glass electrode, determination of P^H of given solution using glass electrode

Batteries-Primary cell-Dry or Lachanche cell, alkaline battery; secondary cells (storage batteries or accumulators) – Lead-acid Accumulator, Nickel-cadmium battery, Lithium ion battery (LIB) and redox flow battery.

Fuel cells - hydrogen - oxygen fuel cell, phosphoric acid fuel cell, solid oxide fuel cells

UNIT-II (12 Lectures)

CORROSION AND ITS CONTROL:

Introduction - Direct chemical corrosion and electrochemical corrosion and its mechanisms, Types of electrochemical corrosion-Differential aeration corrosion, galvanic corrosion, concentration cell corrosion, corrosion and pitting, stress corrosion, Galvanic series, passivity, factors influencing corrosion.

Corrosion control-proper designing, cathodic protection-sacrificial anodic protection and impressed current cathodic protection, modifying the environment and use of inhibitors.

Protective coatings- Anodic and cathodic coatings, Hot dipping-Galvanizing and Tinning, Metal cladding, Electroplating, Electroless plating, cementation or diffusion coatings.

UNIT-III (10 Lectures)

POLYMER TECHNOLOGY:

Polymerization, classification, degree of polymerization, functionality and tacticity of polymer, Types of polymerization-addition and condensation polymerization, Mechanism of addition polymerization, Condensation polymerization, Preparation, properties and uses of polythene, PVC, Teflon, nylons-6,6, Polyester, Bakelite and Silicones.

Plastics- Thermo plastics and thermosetting plastics, compounding of plastic.

Elastomers-Natural and synthetic rubbers, Manufacture, properties and applications of natural rubber-vulcanization, compounding of rubber, Synthetic rubbers-Preparation, properties and applications of Buna-S and Buna-N.

UNIT-IV (12 Lectures)

WATER TECHNOLOGY:

Introduction-characteristics imparted by impurities, hardness of water – Temporary and permanent hardness- units, Determination of hardness by EDTA method, Disadvantages of hard water, Chemical aspects of scale and sludge formation in boilers, caustic embrittlement,boiler corrosion, priming and foaming, Municipal water treatment-sedimentation, coagulation,

and filtration, Desalination of brackish water, Water softening methods-lime -soda method, zeolite method and ion exchange process.

UNIT-V: (16 Lectures)

ENGINEERING MATERIALS:

Fuels- classification, characteristics of fuel, calorific value –determination of calorific value by bomb calorimeter and Junkers gas calorimeter, theoretical calculation of calorific value, Types and Analysis of coal - Proximate and ultimate analysis of coal, Manufacture of coke- Petroleum-classification based on sources of petroleum, Refining of petroleum, Knocking, octane value, cetane value, Cracking -thermal cracking and catalytic cracking-fixed bed & moving bed catalytic cracking, reforming.

Cement: Classification of cement, chemical composition, functions of ingredients in Portland cement, Manufacture of Portland cement- raw materials, setting and hardening of Portland cement.

Refractories- Classification and properties of refractories, Failures of refractory materials.

Lubricants-friction, lubrication, functions of lubricants, mechanism of lubrication-thick film, thin film and extreme pressure lubrication, types of lubricants- solid, semisolid and liquid lubricants and their properties .

TEXT BOOKS:

1. Jain& Jain, *"A text book of Engineering Chemistry"*, 15th Edition, Dhanapat Roy publishing company, 2010.
2. Sasichawla, *"Engineering Chemistry"*, 3rd Edition, Dhanapat Roy publishing company, 2004.

REFERENCES:

1, S.S. Dara, *"A Text book of Engineering Chemistry"*, 11th Edition, S.Chand & Co, 2006.
2. C. Parameswara Murthy, C.V. Agarwal and Andhra Naidu, *"A Text Book of Engineering Chemistry"*, 1st Edition, B.S. Publications, 2006.

INTRODUCTION TO COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

(Common to CSE& IT)

Course Code : 13CT1101	**L**	**T**	**P**	**C**
	4	**0**	**0**	**3**

Course Educational Objectives:

To introduce the student to various computer fundamentals. The course will cover all the issues of computer hardware and software with illustrations.

- ✤ To make the student knowledgeable in computer fundamentals.
- ✤ To make the student capable of understanding and analyzing the hardware and software components of a computer.
- ✤ Explains the fundamentals of operating systems.
- ✤ Explains the storage media and data representation.
- ✤ Explains the importance of protecting the system from various attacks and protection.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Gain the knowledge in computer fundamentals
- ✤ Analyze the hardware and software components of a computer
- ✤ Gains the knowledge about the fundamentals of operating systems
- ✤ Gain the knowledge about various storage media and data representation.
- ✤ Gain the knowledge about various components of computers, virus attacks, and their cures.

UNIT-I (12 Lectures)

INTRODUCTION TO COMPUTER CONCEPTS:

What is a computer, definition of computer, importance of computers,

computers history and development, classification of computers, benefits and limitations of computers, components of a pc system – the hardware, a closer look at the hardware, software, popularity of personal computers, uses of computers, summary.

COMPUTER ARCHITECTURE:

Input and output unit, Central Processing Unit, Memory Unit, ALU Organization, Control Unit Organization, Memory System.

UNIT-II (12 Lectures)

DATA REPRESENTATION:

Logic Gates/Circuits, Bits and Bytes, Number system for data representation, Error Detection and correction Codes.

INPUT / OUTPUT DEVICES:

Mother Board, Input Device, Output Device, Storage Devices, Cards, Ports and cords, Power supply.

UNIT-III (10 Lectures)

STORAGE MEDIA:

Floppy Disk and hard Disk, Compact Disc.

SOFTWARE CONCEPTS:

Classification of software, operating systems, concept of programming computer, types of computer languages, language translators, Software tools, windows – A graphical user interfaces(GUI), general purpose application software, special purpose application software.

UNIT-IV (14 Lectures)

OPERATING SYSTEM:

Introduction, introduction to operating system, services of an operating system, components of the operating system software, terminology used in operating system, types of operating systems, classification of operating systems, single user systems, multi-user systems, multi-user systems and networks.

NETWORKING:

Communication, networking, advantages of networking, types of networks, components of a network, standard topologies, access methods, network operating system, LAN expansion, wide area network transmission, sending data across a WAN.

UNIT-V **(12 Lectures)**

COMPUTER VIRUSES: ATTACK, PREVENTION AND CURE:

Definition of a virus, virus characteristics, what is sinister about viruses, virus history, how viruses are spread, different kinds of virus, damage done by viruses, virus prevention, networks and viruses, network protection, things that are not viruses, the future of viruses, anti-virus in the future, summary.

TEXT BOOK:

S. K Bansal, *Fundamentals of Information Technology*, 1st Edition, APH Publishing Corporation, 2012.

REFERENCE:

Anita Goel, *Computer Fundamentals*, 1st Edition, Pearson Education, 2010.

BASIC ELECTRICAL ENGINEERING

Course Code :13EE1142

L	T	P	C
4	1	0	3

Pre requisites: Basic Electrical Laws

Course Educational Objectives:

- Basic Electrical Engineering is a basic fundamental course for the disciplines of CSE,IT and MECHANICAL.
- Hence it is introduced in I-Year so that the students will have to understand the topics related to Electrical Applications in the later studies.

Course Outcomes:

- Students acquire knowledge on the basics of electrical engineering and get ability to solve simple electrical network problems.
- And also will be knowledgeable enough to conduct experiments in electrical machines and miserable instruments.

UNIT-I (12 Lectures)

INTRODUCTION TO ELECTRICAL DC CIRCUITS AND THEOREMS:

Introduction, SI units, charge & current, voltage, power & energy, circuit elements. Ohm's law, Nodes, Branches & Loops, Kirchoff's laws, series resistors and voltage division, parallel resistors and current division(simple problems).

Wye–Delta transformation, source transformation, super position, Thevenin's, Norton's, Maximum power transfer theorems (simple problems).

UNIT-II (12 Lectures)

MAGNETIC CIRCUITS AND AC CIRCUITS

Magnetic field due to Electric current, force on current carrying conductor, Electro Magnetic Induction, Direction of Induced EMF's, EMF induced in a coil, comparison of electric, magnetic circuits, self and mutual inductance.

Introduction, Capacitors, series and parallel capacitors, Inductors, series, parallel inductors, sinusoids, Phasors, phasor relationships for circuit elements, impedance, admittance, instantaneous and average power, RMS values, apparent power, power factor, complex power.

UNIT-III (12 Lectures)

TRANSFORMERS AND DC MACHINES:

TRANSFORMERS:

Working Principle, construction, types, rating, induced EMF, ideal transformer, magnetizing and core loss current, voltage regulation, efficiency (simple problems), Auto transformer (elementary treatment only).

DC MACHINES :

Constructional features, emf and torque, DC machine excitation, characteristics of DC motors and speed control, losses, efficiency (simple problems), (elementary treatment only).

UNIT-IV (12 Lectures)

AC MACHINES

SYNCHRONOUS MACHINE :

Constructional details, EMF equation, determination of synchronous reactance, voltage regulation (simple problems), Principle of operation of a synchronous motor.

INDUCTION MOTOR:Constructional details, principle of operation, slip, rotor frequency, torque equation (simple problems) (Elementary treatment only).

UNIT-V (12 Lectures)

BASIC INSTRUMENTS:

Introduction, classification of Instruments, operating Principles, Basic requirements for measurement, Moving Coil Permanent Magnet (PMMC) instruments, Moving Iron of Ammeters and Voltmeters (elementary treatment only).

TEXT BOOKS :

1. Charles k Alexander, Mathew N.O. Sadiku, *"Fundamentals of Electric circuits"*, 4th edition McGraw-Hill Companies, 2009. (Units 1, 2)
2. D.P. Kothari & I.J. Nagrath , *"Theory and Problems of basic Electrical Engineering"*, 1st edition, PHI publications, 2010. (Units 3, 4, 5)

REFERENCE:

Hughes by I Mckenzie Smith, *"Electrical & Electronic Technology"*, 10th Edition, Pearson Education,2010.

ENGLISH LANGUAGE LAB
(Common to all Branches)

Course Code : 13HE1102

L	T	P	C
0	0	3	2

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

Course Educational Objectives:

- To make students recognise the sounds of English and Phonemic transcription through Audio-Visual aids and Computer Software.
- To help them overcome their inhibitions and self- consciousness while communicating in English and to build their confidence.
- To enable them to speak English intelligibly with focus on Stress and Intonation.

Course Outcomes :

- Students will be able to recognise the sounds of English and Phonemic transcription, practice Stress & Intonation in speech.
- They will learn to communicate in Oral and Written English forms confidently.
- They will also be able to demonstrate skills like Publik Speaking & Oral Presentations. Students will also exhibit debating and discussion skills.

SYLLABUS:

The following course content is prescribed for the English Language Laboratory sessions:

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.

2. Introduction to Stress and Intonation.
3. Listening for Comprehension
4. Situational Dialogues.
5. Oral Presentations- Prepared & Extempore
6. 'Just A Minute' Sessions (JAM)
7. Telephonic communication
8. Group Discussions
9. Debate
10. Team Presentations (PPTs).
11. Reference Skills

REFERENCES:

1. E. Suresh Kumar , P. Sreehari, *"A Handbook for English Language Laboratories"*, Foundation Books, revised edition 2009.
2. Simon Sweeny, *"English for Business Communication"*, CUP, First South Asian Edition, 2010.
3. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
4. Daniel Jones, English Pronouncing Dictionary with CD.
5. T. Balasubramanian, *"A Text book of English Phonetics for Indian Students"*, Macmillan, 1981.
6. Jeremy Comfort, Pamela Rogerson, Trish Stott & Derek Utley, *"Speaking Effectively : Developing Speaking Skills for Business English"*, Cambridge University Press, First South Asian Edition,2002.Reprint 2011.
7. T Samson, *"Innovate With English"*, New Delhi: Foundation Books, 2010.
8. Meenakshi Raman & Sangeeta Sharma, *"Technical Communication Principles & Practice"*, New Delhi: OUP, 2010.

CHEMISTRY LAB

(Common to all Branches)

Course Code: 13BC1103

L	T	P	C
0	0	3	2

Course Educational Objectives:

- The course is to develop the basic experimental skills and analytical thinking.
- The course attempt to provide information regarding various chemical techniques used in quantitative chemical analysis.

Course Outcomes:

- The student will be able to determine the substance quantitatively and analyse the data obtained to resolve the prolem in their respective areas.

LIST OF EXPERIMENTS :

1. Determination of ferrous iron.
2. Determination of ferric iron.
3. Determination of total hardness of water.
4. Determination of carbonate and bicarbonate of water.
5. Determination of dissolved oxygen.
6. Determination of available chlorine in bleaching powder.
7. Determination of zinc by potassium ferrocyanide.
8. Determination of copper by EDTA method
9. Determination of calcium by permanganate.
10. Determination of iron-II by potentiometric method.
11. Determination of viscosity of lubricant by viscometer.
12. Determination of flash and fire points of lubricant.

13. Determination of percentage residue of carbon in oils.
14. Determination of calorific value of solid fuels.
15. Determination of fluoride by spectrophotometric method.
16. Determination of iron in cement by spectrophotometric method.

REFERENCE:

A.I.Vogel, *"A Text book of quantitive chemical analysis"*, 6th Edition, Pearson Education, Pvt. Ltd., 2002.

ENGINEERING WORKSHOP

(Common to all Branches)

Course Code :13MT1101

L	T	P	C
0	0	3	2

Course Educational Objectives:

To provide hands on experience on basic Engineering and IT related skills.

- ✤ To train the student in the basics of computer components, maintenance software(s) installation
- ✤ To train the students in office tools.
- ✤ To give the student exposure to DOS commands and LINUX commands.
- ✤ To demonstrate and train the students in basic professional trades.
- ✤ To train the students to know about different system tools in personal computer.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Identify the peripherals of a computer, components in a CPU and its function
- ✤ Work with MS-OFFICE
- ✤ Work with DOS commands
- ✤ Work with LINUX commands
- ✤ Understands different system tools in personal computer.

COMPULSORY EXERCISES:

1. Identification of the peripherals of a computer, components in a CPU and its function – Block diagram of the CPU along with the configuration of each peripheral. Disassembly and assembly of a personal computer.

2. Installation of MS windows on the personal computer.

3. One lamp controlled by a one-way switch and (b) Two-way switching for stair-case lamp.

ANY NINE EXPERIMENTS FROM THE FOLLOWING:

Carpentry: Making a Cross-half lap joint using wooden pieces.

Carpentry: Making a Mortise and Tenon joint using wooden pieces.

Fitting: Preparation of a V-fit between mild steel flat pieces.

Fitting: Preparation of a Square-fit between mild steel flat pieces.

Foundry: Preparation of a sand mould using a single piece pattern

Foundry: Preparation of a sand mould using a split piece pattern.

Tin-Smithy: Preparation of a sheet metal pipe-joint using tin-smithy tools.

Tin-Smithy: Preparation of a sheet metal funnel using tin-smithy tools.

Welding: Making a Lap joint through arc welding.

Lathe Machine: Demonstration of turning related activities on Lathe machine.

Black smithy: Demonstration of Plumbing trade.

Plumbing: Demonstration of plumbing trade

Operating System: Changing Boot Device Priority, Installation of Linux, putting passwords, Enabling and disabling external devices, Connectivity Boot Camp.

Hands on Exposure on Linux shell commands: Using man, info commands for finding information about commands. Using file processing commands (ls, cp, mv, ln, mkdir, rmdir, chmod etc..), Using text processing commands (grep, egrep, sed etc…), Using disk utility commands, mount commands (du, df, mount etc..), Vi-Editor.

MS-Word: Using Ms-Word, creating project abstract, creating newsletter, creating feedback form

MS- Excel: Excel orientation, creating scheduler, calculating CGPA, Performance Analysis

MS-PowerPoint: PPT Orientation, Slide Layouts, Custom Animation, Hyperlinks, inserting Images, Clip Art, Audio, Video, Objects, Tables, Charts.

System tools, Hardware Troubleshooting, Software Troubleshooting and Installations of Anti Virus.

Multimedia Flash (Adobe)

a. Introduction to Flash interface

b. Introducing the tools

c. Putting text into Flash

d. Smoothen/straighten drawings

e. Animation Part 1: Using layers, key frames and motion tweening

f. Animation Part 2: Shape tweening, motion guide and frame by frame animation

PROFESSIONAL ETHICS

(Common to all Branches)

Course Code: 13NM1101

L	T	P	C
2	0	0	0

Course Educational Objectives:

- To educate and make the young generation students aware of their Social responsibilities make an Endeavour to tell them first we are humans and then we are scientists, engineers, technocrats and professionals.
- To make students accountable to whatever job they do whether it is less paid or heavily paid.
- To inculcate a spirit of togetherness, unity and team work in an organization.
- To make him reasonably a 'good' professional conscious of his duties to the society that graced this wonderful life.
- To induce the spiritual aspect of life in one's own practical and real life.
- To give an overview of a decent, dignified, humane, dedicated professional with a sense of social responsibility and security.

Course Outcomes:

By the end of this course, it is expected that the student will be able to

- Deal with complex situations while dealing with the people in the society (parents, friends, and co-professionals) in making the work environment congenial, encouraging and loving.
- Discriminate when he is forced through certain undesirable and ambiguous situations either in his day today life as a student and as a professional in his career further.
- Understand the basics regarding the leadership and to become a conscious professional.

- Be aware of codes of professional bodies.
- Implement these concepts in one's career for achieving excellent job satisfaction.

UNIT-I (6 Lectures)

BASIC HUMAN VALUES:

'Be a Human First and then one can become a good Professional'; so the basic Human Values-Truth, Right Conduct (Righteousness), Love, Non-violence and Peace, Humility and character. What is ethics? Core areas of ethics: Social ethics, personal ethics Integrity and Trustworthiness, Honesty, Loyalty, Courage, Prudence, Confidence, Confidentiality.

Character: definition, 'A bundle of Virtues and weaknesses of Head and Heart- the resulting individuality of a person from the balance sheet of 'good' and 'bad qualities' is his/her character.

TRAITS OF GOOD CHARACTER:

Honesty and integrity, sense of duties and obligations to one's own profession, Adherence to truth and principles, excellent team work with a good rapport with the subordinates and colleagues, self-discipline, Responsibilities and accountability, self-lessness. Unity in thought, word and deed (Case studies relating to these aspects can be drawn from history & epics or from one's own experience)

Human values as practiced in the Indian societal context-past and present. (Examples drawn from any standard scriptures and many other sources available may be illustrated, debated and discussed).

Spirit of Nationalism and Patriotism with examples from 'struggle for Freedom' (Case studies in the lives of Mahatma Gandhi & His team who strived for Freedom from the British, Scientists and Engineers like Bhaha, Sarabhai, Dhavan, Abdul J Kalam, and Benjamin Franklin, Martin Luther King, or any renowned personalities)

UNIT-II (6 Lectures)

What is a profession? Who is a Professional? Special criteria to meet the definition of professional, criteria to be a 'professional engineer (Pages 24-36) of Mike W Martin and Roland Schinzinger)

The 5 Ds (Discipline, Devotion, Dedication, Discrimination and

Determination) against 3 Ps (Pay-Prospects and Promotion)

Personal ethics-Social ethics and professional ethics – are they different-How would you distinguish? –A debate

General and Applied ethics, Relationship between these two in day-to-day functioning of an Engineering Professional- (Pages 10-12 of Mike W Martin and Roland Schinzinger)

PROFESSIONAL AND ENGINEERING ETHICS:

Why Engineering ethics? Moral issues encountered by professional engineers during their day-to-day operations both at home and office/workplace-Moral problems that frequently arise in ones Profession, (case studies from Chapter 1 pages 2-9, analysis of the case studies on pages 13 &14)

MORAL AUTONOMY:

Moral integrity and social and professional behavior. Different theories proposed under moral autonomy-Kohlberg's and Gilligan's Theory. Heinz's Dilemma- Motive behind aggression (16-23 Pages)

LEADERSHIP IN PROFESSIONALISM:

Characteristics of a Leader? Case studies and examples (Leadership by Dr M L Chibber)

UNIT-III (6 Lectures)

Religion and Ethics and Morals-Debate and discussion- Spirituality, social consciousness and ethics

THEORY ABOUT MORALITY:

Virtue ethics, Utilitarianism, Duty ethics, Right ethics based on the concepts of Virtues and vices, most good for most people, Duties to respect for persons, Human rights respectively (pages 53-61, Study Questions for analysis and discussion on pages 60 &61)

Engineering Profession as a social responsibility, His responsibility and accountability while dealing with public issues such as safety, risk, hazards, Risk Analysis and assessment-a brief discussion (risk assessment problem on Page (Chapter 4, specified topics and Case studies)

(Present the case studies on Challenger space shuttle(97), Chernobyl (173), Bhopal tragedy (299), Titanic disaster (p 83), SLV-3, the Indian Space Shuttle (Wings of Fire) recent nuclear holocaust in Japan recent

floods and other man-made and natural calamities or accidents we come across frequently in our society)

Environmental ethics (304-308) & Computer ethics 319-323328-330) (All Pages from Mike W Martin and Roland Schinzinger)

UNIT-IV **(6 Lectures)**

RESPONSIBILITIES AND RIGHTS OF ENGINEERS:

Collegiality (Ones attitude) towards other engineers working in the same Organization or outside) and Loyalty (to the Employer), obligation of Loyalty and misguided loyalty, Respect for authority and its limitations, Bootlegging, Collective bargaining, Commitments and Convictions (APJ Abdul Kalam's "Wings of Fire") Confidentiality while changing jobs, Conflicts of interests, Gifts, bribes, kickbacks -case studies related, Occupational Crime and industrial espionage

Whistle blowing and moral guide line (case studies), Discrimination, preferential treatment and harassment Rights of Engineers (page 284-286)

Selected topics from Ch 5 and 6 and case studies on pages 200-201,

UNIT-V **(6 Lectures)**

Engineers as Managers and leaders promoting ethical climate (350-358)

–Ethics in Engineering by Mike W Martin and Roland Schinzinger)

Why a code of Ethics for professional Engineers? ('A code of ethics is not something you post on the Bulletin board; it is something you live every day in your life and career)

Code of ethics for Engineers, Organizational Culture, and Guidelines for use with the Fundamental canons of ethics; (pages 142-162 Indian Culture and Professional Ethics by P S R Murty and 399-414 0f Mike W Martin and Roland Schinzinger)

PROFESSIONAL BODIES:

IEEE, IETE, IE, ASME, ASCE, ABET, NSPE, ISTE Etc…

{** Any topic can be discussed and debated with known live examples and illustrations we find in our day-to-day -living circumstances.}

TEXT BOOKS :

1. Mike W Martin and Ronald Schinzinger : *"Ethics Engineering"*, 3rd Edition, Tata McGraw Hill Education Pvt. Ltd., 2003.
2. P S R Murthy : *"Indian Culture Values and Professional Ethics"*, 2nd Edition, B S Publications, Hyderabad. 2013.

REFERENCES:

1. M. Govindarajan, S Natarajan and V.S. Senthil Kumar : *"Engineering Ethics and Human Values"*, 1st Edition, PHI Publications , 2013.
2. A. Alavudden, R. Kalil Rahaman & M . Jayakumaran : *"Professional Ethics & Human Values"*, 1st Edition, University Science Press (An Imprint of Laxmi Publications Pvt Ltd., Chennai, Bangalore. 2008.
3. Lieunt Gen Dr. M. L. Chibber : *"Leadership-Education in Human Values"*, Sri Sathya Sai Books and Publications Trust, Prasantinilayam, 1st Edition, 2009.
4. Kalam A P J : *"Wings of Fire"*, Universities Press Publications, 2013.
5. Charles B. Fleddermann : *"Engineering Ethics"*, 4th Edition, PHI, 2012.

SYLLABI FOR II SEMESTER

MATHEMATICS-II

(Common to all Branches)

Course Code:13BM1102

L	T	P	C
4	1	0	3

Pre requisites:

- ✤ Basic formulae of differentiation and integrations.
- ✤ Basic terminology and elementary operations on Matrices.
- ✤ Basic concept of partial differentiation.

Course Educational Objectives:

- ✤ The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- ✤ The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.
- ✤ Understand the most basic numerical methods to solve simultaneous linear equations.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- ✤ Solve simultaneous linear equations using matrix methods.
- ✤ Calculate eigenvalues and eigen vectors of matrices that are essential for vibration/design analysis.
- ✤ Understand Fourier series, integral ,transforms and they are provided with practice in their application and interpretation in a range of situations.
- ✤ Identify/classify and solve the different types of partial differential equations.

UNIT-I (12 Lectures)

MATRICES:

Rank, Normal form, Echelon form, Consistency and Solution of system of simultaneous linear homogeneous and non-homogeneous equations. Finding eigenvalues and eigen vectors, properties, Cayley-Hamilton theorem, computing inverse and powers of a matrix by applying Cayley-Hamilton theorem, Diagonalisation of matrix.
(2.7, 2.10, 2.13 -2.16)

UNIT-II (12 Lectures)

NUMERICAL METHODS IN LINEAR ALGEBRA:

Solution of linear simultaneous equations: LU decomposition, Jacobi iteration and Gauss-Seidel methods. Determination of eigenvalues and eigen vectors by iteration (Rayleigh's Power Method) .

(28.5, 28.6(3), 28.7(1)(2), 28.9)

UNIT-III (12 Lectures)

DIFFERENCE EQUATIONS AND APPLICATIONS:

Difference operators (forward, backward and shift operators), Introduction to difference equation, formation of difference equation, Linear difference equations and it's complete solution. Rules for finding the complementary function and complete integral, Deflection of a loaded string.
(29.1, 29.4, 31.1 - 31.6, 31.8)

UNIT-IV (12 Lectures)

FOURIER SERIES:

Euler's formulae, Dirichlet's Conditions for a Fourier expansion, functions having points of discontinuities, Change of interval, even and odd functions, half range series, wave forms.

FOURIER TRANSFORMS :

Fourier integral theorem, Fourier transform and inverse Fourier transform, Fourier sine and cosine integrals. – Fourier sine and cosine transforms – properties of Fourier Transforms – Finite Fourier transforms.
(10.1 – 10.9, 22.1 – 22.5)

UNIT-V **(12 Lectures)**

PARTIAL DIFFERENTIAL EQUATIONS:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – solutions of first order linear (Lagrange) equation and nonlinear first order (standard type) equations.

APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS:

Method of separation of variables, Classification of second order linear Partial Differential Equations. Solutions of one dimensional heat equation, wave equation and two-dimensional Laplace's equation under initial and boundary conditions. (17.1 – 17.3, 17.5, 17.6, 18.1-18.7)

TEXT BOOK:

Dr.B.S.Grewal *"Higher Engineering Mathematics"*, 42^{nd} Edition, Khanna Publishers, 2012.

REFERENCES:

1. Kreyszig E, "*Advanced Engineering Mathematics*", 8^{th} Edition, John Wiley, Singapore, 2001.
2. Greenberg M D, "*Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, "*Advanced Engineering Mathematics*", 7^{th} Edition, Cengage Learning, 2011.

PHYSICS

(Common to all Branches)

Subject Code: 13BP1101	L	T	P	C
	4	0	0	3

Course Educational Objectives:

The aim and objective of the course curriculum is to impart learners the basic knowledge that enables effective understanding of various core subjects of engineering branches through principles of physics such as architectural acoustics, wave mechanics, dielectrics, fiber optics, Electromagnetism and so on.

Course Outcomes:

- Students will acquire knowledge of basic physical principles and they can correlate the same to natural environment and social concern.
- Students will be able to apply the knowledge in the selection of materials for various engineering applications.
- Enables students to learn the characteristics and applications of laser devices and enhances information levels on fiber optic communications.
- Enables the students gain a research orientation and innovative spirit.

UNIT-I (10 Lectures)

ELASTIC PROPERTIES OF MATERIALS & ARCHITECTURAL ACOUSTICS:

Introduction – classification of stress, strain and Hooke's law – Elastic behavior of materials – Poisson's ratio and relationship between modulus of elasticity – Twisting couple on a solid shaft – bending of beams – bending moment - Y by cantilever – Uniform bending - Reverberation and reverberation time – absorption coefficient – Sabine's law (quantitative treatment) – Factors affecting the acoustics of buildings and their remedies – Acoustical design of a hall.

UNIT-II (15 Lectures)

ELECTROSTATICS AND DIELECTRICS:

Vectors - unit vectors - Gradient of a scalar field – divergence & curl of a vector field – Coulombs law - Electric flux - Gauss law in electrostatics – differential form of Gauss law – derivation of Coulombs law from Gauss Law – Applications of Gauss Law (Electric Field due to a solid charged sphere and thin sheet of charge) - Gauss law in dielectric medium - Dipole - Electric displacement vector - Dielectric permittivity and susceptibility- Dielectric constant and dielectric polarization in materials - Types of polarizabilities - Electronic polarizability derivation - Internal fields in solids and Claussius - Mosotti equation - frequency dependence of dielectric constant - Dielectric loss - Dielectric Strength and dielectric breakdown - important dielectric materials in electrical engineering.

UNIT-III (10 Lectures)

ELECTROMAGNETICS:

Biot-Savart Law - Magnetic flux – Magnetic scalar potential - Magnetic Vector Potential - Ampere's law – Force and torque on a magnetic dipole due to external magnetic field, Magnetization - Bound volume and surface current densities - auxiliary field H (Ampere's law in magnetized materials) - Magnetic susceptibility and permeability - Force on charged particle under electric and magnetic fields - Faraday's law of electromagnetic induction - Self and mutual Inductances - Displacement current density - Maxwell's equations – Physical Significance of Maxwell's equations.

UNIT-IV (10 Lectures)

WAVE MECHANICS & BAND THEORY OF SOLIDS :

Introduction to wave mechanics – wave particle duality – de-Broglie matter waves – Wave function characteristics and significance – Schrodinger's time independent wave equation – particle in one dimensional rigid box - Fermi-Dirac distribution function – Fermi level - Effect of temperature on Fermi function - Bloch theorem (Qualitative), Kronig - Penny model (Qualitative treatment) – Concept of effective mass, Origin of energy band formation in solids – Classification of materials in to

conductors, semi-conductors and insulators based on number of effective electrons.

UNIT-V **(15 Lectures)**

OPTICS & LASERS

Introduction to optics – Interference phenomenon - interference through thin films in reflected light – Newton's rings – determination of wave length of a source – Diffraction due to single slit – intensity pattern discussion – Diffraction grating – Resolving Power of grating (qualitative) - Polarization – Law of Malus - Brewster's law – double refraction – Nicol prism - Basic principle of a LASER – Induced absorption, spontaneous and stimulated emissions – Einstein's coefficients – Population inversion – Ruby laser, CO_2 laser and Semiconductor laser – Laser Applications – Introduction to optical fibers – Classification of fibers on the basis of refractive index profile – Acceptance angle and numerical aperture definitions and expression for Numerical aperture – Applications relating to communication and sensors (force and temperature).

TEXT BOOKS:

1. D.J. Griffiths, *"Introduction to Electrodynamics"*, 3rd Edition, PHI (EEE series), 2009.
2. M.N. Avadhanulu, P.G. Kshirasagar, *"A Text book of Engineering Physics"*, 10th Edition, S. Chand & Company Limited, 2013.
3. V. Rajendran, *"Engineering Physics"*. 2011 Edition, TMH Publishing company, 2011.

REFERENCES:

1. A.J. Dekker, *"Electrical Engineering Materials"*, 1st Edition, Macmillan Publishers, 2007.
2. C. Kittel, *"Introduction to Solid State Physics"*, John Wiley Publishers, 2007.
3. M.N.Sadiku, *"Elements of Electromagnetics"*, 4th Edition, Oxford University Press, 2007.

4. V. Raghavan, *"Materials Science"*, 5th Edition, PHI Publishers, 2007.

5. R.K. Gaur, S.L. Gupta, *"Engineering Physics"*, 8th Edition, Dhanapat Rai Publishers, 2003.

6. P.K. Palanisamy, *"Applied Physics"*, 2nd Edition, Scitech Publishers, 2010.

7. M. R. Srinivasan, *"Engineering Physics"*, New Age Publishers, 2012.

COMPUTER PROGRAMMING THROUGH C

(Common to all Branches)

Course Code : 13CT1102

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course helps the student in understanding Computer Programming concepts. An individual will have ability to:

- ✤ Design Algorithmic solution for various problems and convert algorithms to C programs
- ✤ Design programs with Interactive Input and Output
- ✤ Design programs utilizing arithmetic expressions
- ✤ Design programs utilizing repetition and decision making
- ✤ Design programs utilizing arrays and structures
- ✤ Design programs using file Input and Output
- ✤ Test and verifying programs

Course Outcomes:

At the end of the course the student will be able to

- ✤ Know how to write algorithms and draw flowcharts and develop programs
- ✤ Write programs using sequential, condition, iterative control statements
- ✤ Write programs using derived data types like arrays, functions, pointers, strings, structures, unions
- ✤ Define user defined data types like type- def, enum
- ✤ Learn about files, their creation, and various operations that can be performed on files

UNIT-I (12 Lectures)

Introduction to Computers , Algorithm/ Pseudo code, Flow chart, Program Development steps, Basic structure of C Program, Input and Output statements (printf() & scanf()), A Simple C Program, Identifiers, Basic data types and sizes, Constants, Variables, Operators, Type Conversion, Expression Evaluation, Precedence & Associativity of operators.

CONTROL STATEMENTS:

If, switch, for, while and do- while statements, break, continue and goto statements.Sample programs covering all the above topics.

UNIT-II (12 Lectures)

FUNCTIONS:

Definition, Advantages, types of functions- user defined and standard library functions, categories of functions , scope rules, recursion, storage classes. Sample programs covering all the above topics.

UNIT-III (12 Lectures)

ARRAYS:

Introduction to arrays, 1 D Arrays: Definition, Declaration, Initialization, Accessing & storing the elements, 2 D Arrays: Definition, Declaration, Initialization, Accessing & storing the elements C Pre processors.

STRINGS:

String- Declaration, Initialization, pointers and strings, standard library string functions, array of pointers to strings. Sample programs covering all the above topics.

UNIT-IV (12 Lectures)

POINTERS:

Definition, Declaration of Pointer variables, the & and * operators, Pointer Expressions, Char, int, and float pointers, Pointer arithmetic, Passing addresses to functions, Functions returning pointers, Pointers & Arrays: Passing array elements to functions, pointer to pointer, array of pointers, Dynamic memory allocation functions, Sample programs covering all the above topics

UNIT-V (12 Lectures)

STRUCTURES & UNIONS:

Structures: Definition, Initialization, Accessing structures, nested structures, array of structures, additional features of structures, self referential structures, unions, type-def, bit fields, enum data type.

FILES:

Concept of a file, Text and Binary files, file I/O operations, Command line arguments. (Let Us C, Yashavant Kanetkar)

Sample programs covering all the above topics.

TEXT BOOKS:

1. B.A Forouzan and R.F. Gilberg, *"Computer science, A structured programming approach using C"*, 3rd Edition, Cengage Learning.
2. Yashavant Kanetkar, *"Let Us C"*, 12th Edition, BPB Publications, 2012.
3. Yashavant Kanetkar, *"Understanding pointers in C"*, 4th Edition, BPB Publications, 2009.

REFERENCES:

1. N. B. Venkateswarlu, E.V. Prasad, *"C & Data Structures"*, 1st Edition, S. Chand Publications, 2010.
2. K.R.Venugopal, S.R.Prasad, *"Mastering C"*, 1st Edition, TMH, 2007.

ENGINEERING MECHANICS

(Common to all Branches)

Course Code: 13ME1102	L	T	P	C
	4	0	0	3

Course Educational Objectives:

To develop

- ✤ The skill of converting a physical problem into a suitable mathematical model
- ✤ Analytical skills of solving the mathematical model
- ✤ The skill of interpreting the results in terms of the given physical situation
- ✤ The skills of optimization

Course Outcomes:

The student will be able to

- ✤ Identify and list , for a given physical problem, all known's, intermediate unknowns, and final results
- ✤ Formulate suitable mathematical equations and the constraints.
- ✤ Resolve a given force into rectangular components, find the moment of a force about a given point and find the resultant of a set of forces
- ✤ Solve problems involving static and dynamic friction
- ✤ Locate the centroid and calculate the moments of inertia of a given plane area
- ✤ Find the resulting acceleration of a body subjected to a set of forces and moments
- ✤ Calculate the work done, energy, power and efficiency

UNIT-I (13 Lectures)

RESULTANTS OF FORCE SYSTEM:

Parallelogram law, forces and components, resultant of coplanar concurrent forces, components of forces in space, moment of force, principle of moments, coplanar applications, couples, resultant of any force system (coplanar concurrent cases only).

Equilibrium of force systems: Free body diagram, equations of equilibrium, equilibrium of planar systems, further discussion of planar equilibrium.

UNIT-II (09 Lectures)

FRICTION:

Theory of friction, angle of friction, laws of friction, static friction, kinetic friction, friction in bodies moving up or down on an inclined plane, wedge friction, screw friction and screw jack.

UNIT-III (14 Lectures)

CENTROIDS AND CENTERS OF GRAVITY:

Center of gravity of flat plate, centroids of areas and lines, importance of centroids of areas and lines, importance of centroids and moments of area, centroids determined by integration, centroids of composite figures, theorem of Pappus, center of gravity of bodies.

MOMENT OF INERTIA:

Definition of moment of inertia, polar moment of inertia, radius of gyration, parallel axis theorem, moments of inertia by integration, moments of inertia for composite areas.

UNIT-IV (12 Lectures)

MASS MOMENT OF INERTIA:

Introduction, radius of gyration, parallel axis theorem, mass moments of inertia by integration, moments of inertia of composite bodies.

KINEMATICS AND KINETICS OF A PARTICLE:

Motion of a particle, rectilinear motion, rectangular components of curvilinear motion, normal and tangential components of acceleration, radial and transverse components, cylindrical coordinates translation-analysis as a particle, further discussion of particle kinematics.

UNIT-V (10 Lectures)

KINEMATICS AND KINETICS OF A BODY UNDERGOING FIXED AXIS ROTATION:

Types of rigid-body motion, angular motion-fixed axis rotation, application of kinematic equations, kinetics of fixed axis rotation.

WORK-ENERGY METHOD:

Work-energy equation for translation, interpretation and computation of work, work-energy applied to particle motion, power, efficiency, applied to fixed-axis rotation, work-energy applied to connected systems, work-energy method.

TEXT BOOK:

Vijaya Kumar Reddy K and Suresh Kumar J(Adapters), "*Singer`s Engineering Mechanics : Statics and Dynamics*", Third edition (SI Units), BS Publications, Hyderabad, 2011

REFERENCES :

1. Timoshenko sp and Young DH, Rao and Pytel, "*Engineering Mechanics*", fourth edition, McGraw Hill international editions, 2013.
2. Hibbeler RC, " *Engineering Mechanics : Statics* ", low price edition, Pearson Education,2000.
3. Hibbeler RC, " *Engineering Mechanics : Dynamics* ", low price edition, Pearson Education,2000.
4. Tayal AK "*Engineering Mechanics: Statics and Dynamics*", Thirteenth edition, Umesh Publications, Delhi, 2005

ELECTRONIC DEVICES AND CIRCUITS

(Common to EEE, CSE, IT)

Course Code: 13EC1142	**L**	**T**	**P**	**C**
	4	**1**	**0**	**3**

Pre requisites:

Basic Electrical Engineering, Network Analysis, Engineering Physics,and Basics of Mathematics

Course Educational Objectives:

- To study the principles of electronics Engineering
- To study the operation and characteristics of different semiconductor devices.
- To study the basic design concepts of low frequency amplifiers & oscillators circuits using various transmissions for different applications.

Course Outcomes:

Upon completion of the course, students will:

- State the operating principles of major electronic devices, circuit models and connection to the physical operation of device
- Be able to apply this knowledge to the analysis and design of basic circuits

UNIT-I (14 Lectures)

DIODE CHARACTERISTICS:

Introduction to semiconductor materials, V-I Characteristics of Diode, Zener Diode Characteristics, Zener Diode as Voltage Regulator, Tunnel diode, LED.

RECTIFIERS AND FILTERS:

Half wave rectifier, Full wave rectifier, Advantages of full wave rectifier over Half Wave rectifier, C- Filter, Inductor filter, LC- Filter, ð- - filter.

UNIT-II (12 LECTURES)

TRANSISTOR CHARACTERISTICS:

Bipolar junction transistors (BJT) - input & output Characteristics of transistor in CB, CE, CC configurations, Relations between á,â,ã. Characteristics of JFET, MOSFET (Enhancement and depletion), Characteristics of UJT .

UNIT-III (10 Lectures)

BIASING AND STABILITY:

Need for biasing, criteria for fixing the operating point, thermal run away, thermal stability, stabilization techniques.

UNIT-IV (10 Lectures)

SMALL SIGNAL AMPLIFIERS:

h-parameter representation of a Transistor, Analysis of single stage transistor amplifier using h-parameters, comparison of transistor configurations in terms of A_V , A_I , R_i ,R_o.

UNIT-V (14 Lectures)

FEEDBACK AMPLIFIERS:

Concept of feedback, classification of feedback amplifiers, general characteristics of negative feedback amplifiers, effect of negative feedback on input and output Resistances.

OSCILLATORS:

Condition for oscillations, RC Phase shift oscillator with Transistor, Wein bridge oscillator, Hartley and Colpitts oscillator.

Text BOOKS:

1. Millman Jacob Halkias C Christos, *"Electronic Devices and Circuits"*, 2nd Edition, Tata Mcgrawhill Publications, 2007.
2. Boylestad.Robert, *"Electronic Devices and Circuits Theory"*, PHI Publications, 10th Edition, 2008.

REFERENCES:

1. B.Visweswara Rao, K.Bhaskarram Murthy, K.Raja Rajeswari, P.Chalam Raju Pantulu. *"Electronic Devices and Circuits"*, Pearson Publications, 2nd Edition, 2009.
2. Raju GSN *"Electronic Devices Electronic Devices And Circuits"*, IK International Publishing House, 1st Edition, 2006.
3. Lal Kishore *"Electronic Devices & Circuits"*, BSP Publications, 2nd Edition, 2005.

PHYSICS LAB

(Common to all Branches)

CourseCode: 13BP1102

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to involve the students to learn the subject and gain knowledge in handling the apparatus which will help them in designing devices and to trouble shoot the problems in their future professional work. The experiments are designed to cater to the needs of the students of all branches.

Course Outcomes:

The course will help the student in handling different apparatus for conducting various experiments in different fields which enables the student to trouble shoot the problems in their future professional work.

ANY TEN OF THE FOLLOWING 15 EXPERIMENTS

ERROR ANALYSIS AND GRAPH DRAWING (LECTURE - DEMO).

1. Bending of beams – Elliptical and Hyperbolic fringes - Determination of 'Y'.
2. Torsional pendulum - comparison of rigidity modulii of various wires.
3. Melde's experiment – determination of frequency of electrically maintained tuning fork.
4. Determination of wavelength of laser light using diffraction through a graded scale.
5. Particle size determination using He-Ne laser (Lycopodium powder).
6. Diffraction grating – determination of wavelengths of spectral lines of Mercury spectrum by minimum deviation method.
7. Spectrometer – determination of dispersive power of the material of a prism.

8. Polarization of light – verification of Malu's law and to determine the Brewster's Angle for glass.
9. Determination of Planck's constant.
10. Solar cell characteristics – I-V characteristics, measurement of efficiency and Fill factor.
11. Stewart – Gee apparatus – study of variation of magnetic field along the axis of circular current carrying loop.
12. LCR series and parallel resonance circuit study the frequency response.
13. Familiarity of CRO – Lissajjou's figures - determination of time period, voltage, frequency and phase of a wave.
14. Newton's Rings- determination of wavelength of the source/radius of curvature of given convex lens.
15. Optical fibres- determination of Numerical aperture, acceptance angle and bending losses.

COMPUTER PROGRAMMING LAB

(Common to All Branches)

Course Code : 13CT1103	L	T	P	C
	0	0	3	2

Course Educational Objectives:

The main objectives of the course are to give the basic knowledge of C Language with practical orientation of various features present in this language.

- ✤ To give exposure about RAPTOR tool to design flow charts.
- ✤ To give hands on exposure to the students in developing the programs.
- ✤ Develop programs by using simple and optimized logic.
- ✤ Maximizing the usage of various C programming features.
- ✤ To give hands on exposure to the students to work with files.

Course Outcomes:

Upon completion of the course the student will be able to

- ✤ Gets exposure on RAPTOR tool.
- ✤ Learn how to program basic mathematical operation using various loops like for, while, do while, and switch statement.
- ✤ Program various string handling functions.
- ✤ Program various file operations.
- ✤ Gets an idea on maximizing the usage of various C programming features.

LIST OF PROGRAMS:

1. Demonstration of RAPTOR Tool to generate flowcharts by considering simple algorithms. Generation of flow charts to solve problems such as Temperature Conversion, Swapping of Two numbers etc. using RAPTOR Tool.

2. Write C Programs to solve problems such as Student Grading, Income Tax Calculation, and Largest of three Numbers etc., which expose students to various categories of IF Statements. Generate flowcharts using RAPTOR Tool.

3. a) Write a C program to find the roots of a quadratic equation.

   b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

4. a) The total distance travelled by vehicle in 't' seconds is given by distance = $ut+1/2at^2$

   where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write a C

   program to find the distance travelled at regular intervals of time given the values of

   'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

   b) Write a C program to determine whether a given number is an Armstrong or not.

   (If the sum of the cubes of the number is equal to the original number, then the number

   Is called Armstrong number. Eg: 371 is Armstrong number ($3^3+7^3+1^3= 371$))

5. a) Write a C program to find the sum of individual digits of a positive integer.

   b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

6. a) Write a C program to calculate the following sum:

   Sum=$1-x^2/2! +x^4/4!-x^6/6! +x^8/8! -x^{10}/10!$

b) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

7. a) Write a C program to generate Pascal's Triangle.

b) Write a C program to construct a Pyramid of Numbers.

8. Write C programs that use both recursive and non-recursive functions for the following

a) To find the factorial of a given integer.

b) To find the GCD (greatest common divisor) of two given integers.

9. a) Write a C function to read in two numbers, x and n, and then compute the sum of this geometric progression:

$1+x+x^2+x^3+\ldots\ldots\ldots\ldots + x^n$. Also perform error checking by considering negative values for n and also check for illegal values of x.

b) Write a C function to read in two numbers, x and n (no. of terms), and then compute sin(x) and cos(x).

10. a) Write a C program to find the largest and smallest number in a list of integers.

b) Write a C program to perform Matrix Addition & Matrix Multiplication.

c) Write a C program to compute Transpose of a Matrix.

11. a) Write a C program to exchange value of two integers using call by value and call by reference.

b) Write C programs to demonstrate the use of Pointers.

12. Write user defined string handling functions to implement the following standard library functions: strlen(), strcpy(), strcat(), strrev(), strcmp().

13. a) Write a C program that displays the position/ index in the string S where the string T begins, or –1 if S doesn't contain T.

c) Write a C program to determine whether a given string is Palindrome or not.

14. Write a C program that uses functions to perform the following operations:

    a) To insert a sub-string in to given main string from a given position.

    b) To delete n Characters from a given position in a given string.

    c) To replace a character of string either from beginning or ending or at a specified location.

15. a) Write a C program to find the two's complement of a binary number.

    b) Write a C program to convert a Roman numeral to its Decimal Equivalent.

16. Write a C program that uses functions to perform the following operations using Structures:

    a) Reading a complex number.

    b) Writing a complex number.

    c) Addition of two complex numbers.

    d) Multiplication of two complex numbers.

17. a) Write a C program which copies one file to another.

    b) Write a C program to count the number of characters, lines, words, tabs and spaces in a given file.

BASIC ELECTRICAL ENGINEERING LAB

Course Code :13EE1143

L	T	P	C
0	0	3	2

Course Educational Objectives:

To impart experimental skills and also to verify the theoretical principles learned in the subject of BEE.

Course Outcomes:

After this lab course, the student will be able to design a circuit for any kind of experiment in the syllabus and will get the confidence to understand the practical circuits in an industry.

THE FOLLOWING EXPERIMENTS ARE REQUIRED TO BE CONDUCTED AS COMPULSORY EXPERIMENTS:

1. Verification of KCL and KVL.
2. Verification of Superposition theorem.
3. Verification of Thevenin's theorem.
4. Verification of Maximum power transformer theorem.
5. Speed control of DC shunt motor.
6. OC and SC Test on a single phase transformer.
7. Brake Test on 3- Phase Induction motor.
8. Regulation of Alternator by Synchronous Impedance Method.

   In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted:

9. Verification of Norton's theorem.
10. Measurement of Impedance, p.f, and power in a 1-ph RLC series circuit.
11. Calibration of Ammeter and Voltmeter.

12. Experimental illustration of Faraday's laws (Demonstration Experiment).
13. OCC of a DC Separately excited generator.
14. Calibration of a Wattmeter in DC circuits.

ENGINEERING DRAWING

(Common to all Branches)

Course Code:13ME1103

L	T	P	C
1	0	3	3

Course Educational Objectives:

To make the student

- ✤ Familiar with the drawing practices and conventions.
- ✤ Familiar with projections of points, lines, planes and solids
- ✤ Familiar with isometric views

Course Outcomes:

Student will be able to

- ✤ Draw various types of engineering curves
- ✤ Draw orthographic projections of points, lines, planes and solids inclined to one plane or both the planes
- ✤ Draw isometric views of simple solids

LIST OF EXERCISES:

1. Introduction to engineering drawing & basics of geometrical construction
2. Construction of parabola, ellipse, hyperbola- general method
3. Cycloid, epicycloids, hypocycloid, involutes of circle and square
4. Projections of points
5. Projections of lines inclined to one plane
6. Projections of lines inclined to both the planes
7. Projections of planes inclined to one plane
8. Projections of planes inclined to both the planes
9. Projections of solids in simple positions

10. Projections of solids inclined to both the planes

11. Isometric views

TEXT BOOK:

N.D. Bhatt and V.M. Panchal, *"Engineering Drawing"*, Charotar Publication House, 49th Edition, 2008.

SYLLABI FOR III SEMESTER

DISCRETE MATHEMATICAL STRUCTURES

(Common to CSE & IT)

Course Code: 13BM1106

L	T	P	C
4	1	0	3

Pre requisites:

- ✤ Fundamentals of Set theory.
- ✤ Elementary algebra and Calculus.

Course Educational Objectives:

To impart the necessary fundamental principles that are essential to study courses in computer science and related fields.To develop logical thinking and prerequisite knowledge necessary for skilled software engineer.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- ✤ Explain and apply the basic methods of discrete mathematics in Computer Science.
- ✤ Use these methods in subsequent courses in the design and analysis of algorithms, Computability theory, software engineering, and computer systems.

UNIT-I (12 Lectures)

MATHEMATICAL LOGIC:

Statements and notations, connectives, well formed formulas, tautologies, equivalence of formulas, Duality law, Tautological Implications, other connectives, Normal forms, Rules of inference, consistency of premises and indirect method of proof, Predicates, the statement function, variables and quantifiers, predicate formula, free and bound variables, universe of discourse, inference theory of the predicate calculus. (1-1, 1-2.1 to 1-2.4, 1-2.6 to 1-2.11, 1-2.14, 1-3.1 to 1-3.4, 1-4.2, 1-4.3, 1-5.1 to 1-5.5, 1-6.1 to 1-6.4 of Text book[1])

UNIT-II (12 Lectures)

RELATIONS:

Definition, properties of binary relations in a set, Relation matrix and Graph of a relation, Partition and covering of set, equivalence relations, partial ordering, partially ordered set.

ALGEBRAIC SYSTEMS:

Definition and examples, Semi groups and monoids: Definitions and examples, Some simple algebraic systems and general properties. Groups: Definitions and examples.

(2-3.1 to 2-3.5, 2-3.8, 2-3.9, 3-1.1, 3-1.2, 3-5.1 of Text book [1])

UNIT-III (12 Lectures)

COMBINATORICS :

Basics of counting, Combinations and permutations, Enumerating Combinations and permutations with repetitions, Multinomial theorems, Generating Functions of sequences, Calculating coefficients of generating functions, Recurrence relations, Solving Recurrence relations by substitution and generating functions, the method of characteristic roots.

(2.1, 2.2, 2.4, 2.7(Multinomial theorem only), 3.1 to3.5 of Text book [2])

UNIT-IV (12 Lectures)

GRAPH THEORY :

Basic concepts: Graph, Directed Graph, Multi Graph, Degree of vertex and their properties, Adjacency Matrix, Cycle Graph, Biparatite graphs, Isomorphism and Subgraphs, Trees and their properties,

SPANNING TREES:

DFS, BFS, Kruskal's Algorithm for finding minimal Spanning tree. (5.1-5.4 of Text book [2])

UNIT-V (12 Lectures)

Representation and Manipulation of Imprecision

Fuzzy sets, Possibility theory, Applications of Fuzzy sets to Expert Systems.

(8.1 to 8.3 of Text book [2])

TEXT BOOKS:

1. J.P Tremblay, R.Manohar, *"Discrete Mathematical Structures with Applications to Computer Science"*, Tata McGraw-Hill Publishing Company Limited, 1997.
2. J.L. Mott, A. Kandel, T.P. Baker, *"Discrete Maths for Computer Scientists & Mathematicians"*, 2nd Edition, Prentice Hall of India Pvt Limited, New Delhi, 2009.

REFERENCE:

Kenneth Bogart, Clifford Stein, Robert L.Drysdale, *"Discrete Mathematics for Computer Science"*, Springer International Edition, 2006.

MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTING

Course Code : 13HM1101

L	T	P	C
4	0	0	3

Course Educational Objectives :

To explain the basic principles of managerial economics, accounting practices and financial management techniques for effective business decision making and to promote entrepreneurial abilities among the budding engineers.

Course Outcomes :

To understand the economic environment and to give an idea on various accounting concepts and financial management techniques for effective utilization of economic resources.

UNIT-I (12 Lectures)

INTRODUCTION TO MANAGERIAL ECONOMICS & DEMAND:

Definition, Nature and Scope of Managerial Economics, Factors influencing managerial decision making process

Demand Analysis: Definition-types of demand - Demand Determinants, Law of Demand and its exceptions.

Elasticity of Demand: Definition, Types, Significance of Elasticity of Demand. Demand Forecasting: definition, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

UNIT-II (12 Lectures)

THEORY OF PRODUCTION AND COST ANALYSIS:

Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Types of Cost, Break-even Analysis (BEA)-Determination of Break-Even Point (Simple numerical problems) - Managerial Significance and limitations of BEA.

UNIT-III (10 Lectures)

BUSINESS & ENVIRONMENT:

Features of Business Organization, Features, Advantages & limitations of Sole Proprietorship, Partnership, and Joint Stock Company, Steps for formation and Registration of the company- Internal and External factors affecting business environment (PESTLE analysis)- Impact of environment on business

UNIT-IV (12 Lectures)

INTRODUCTION TO FINANCIAL ACCOUNTING:

Accounting Principles, Concepts & conventions, Double-Entry Book Keeping, Journal, Ledger, Trial Balance

UNIT-V (18 Lectures)

PREPARATION AND ANALYSIS OF FINANCIAL STATEMENTS:

Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments) - Financial statement Analysis (Comparative and Common Size Statements)- Ratio analysis (Liquidity Ratios, Activity ratios, Solvency and Profitability ratios)

TEXTBOOKS :

1 A R Aryasri, *"Managerial Economics and Financial Analysis"*, 2nd Edition, TMH, 2009

2 S A Siddiqui & A. S. Siddiqui, *"Managerial Economics & Financial Analysis"*, 1st Edition, New Age Publishers, 2005.

3 P Venkata Rao, J.V.Prabhakar Rao *"Managerial Economics and Financial Analysis"*, 1st Edition, Maruti Publications, 2012.

4 R.L.Varshney & K.L Maheswari, *"Managerial Economics"*, 5th Edition, S.Chand Publishers, 2005.

REFERENCES :

1 D N Dwivedi, *"Managerial Economics"*, 8th Edition, PHI, 2010.

2 S P Jain & KL Narang, *"Cost and Management Accounting"*, 3rd Edition Kalyani Publishers, 2004.

3 P.K.Sharma & Shashi K. Gupta, *"Management Accounting Principles and Practice"*, 1st Edition, Kalyani Publishers, 2004.

OPERATING SYSTEMS
(Common to CSE&IT)

Course Code : 13CT1104

L	T	P	C
4	1	0	3

Course Educational Objectives:

The main objective of the course is to expose the students to different CPU scheduling, Memory Management and File Management Techniques. Upon completion of this course, the student should be able to:

- ✤ Select and apply best scheduling algorithm to schedule the CPU for given set of processes.
- ✤ Solve synchronization problems among the processes
- ✤ Understand the Page Table Structure stored in Memory and its implementation
- ✤ Solve the Deadlock situations.
- ✤ Understand the Secondary storage structure and File Management.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Acquire the knowledge of Managing the Memory in an efficient manner,
- ✤ Solving Deadlock situations.
- ✤ Files and File System Structure, Disks and its Internal Structure, how to protect the system.
- ✤ Understand the concepts of paging and different Page Replacement algorithms, of I/O systems, Directory Implementation and File allocation methods, RAID and stable storage.
- ✤ System and Network Threats, Firewalls

UNIT-I (10 Lectures)

INTRODUCTION & SYSTEM STRUCTURES:

Overview of computer operating systems, computer system organization, computer system architecture, operating systems operations, protection and security, distributed systems, special purpose systems, operating systems services, systems calls and its types, operating systems structure, operating systems generation.

UNIT-II (14 Lectures)

PROCESS CONCEPT:

Process, Process Control Blocks, Operations on Processes,Interprocess Communication, Scheduling Criteria, scheduling-criteria algorithms(FCFS, SJF, Round Robin, Priority) and their evaluation, Multiprocessor scheduling, Thread scheduling. Case Study: Linux

SYNCHRONIZATION:

The Critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples, atomic transactions. Case Study: Linux

UNIT-III (14 Lectures)

MEMORY MANAGEMENT STRATEGIES:

Swapping, contiguous memory allocation, paging, structure of the page table, segmentation.

VIRTUAL-MEMORY MANAGEMENT:

Virtual memory, demand paging, Copy on write, page-Replacement algorithms (FIFO, LRU, LFU, Optimal Page Replacement)

DEADLOCKS:

System model, deadlock characterization, Methods for Handling Deadlock, deadlock prevention, detection and Avoidance, recovery form deadlock.

UNIT-IV (12 Lectures)

I/O SYSTEMS:

I/O Hardware, application interface, kernel I/O subsystem, Transforming I/O requests, Hardware operations, STREAMS, performance.

FILE SYSTEMS:

File Concept, Access Methods, Directory Structure, File System Mounting.

IMPLEMENTING FILE SYSTEMS:

File system structure, File System Implementation, Directory Implementation, Allocation Methods, Free-space Management, Efficiency and performance, Log-Structured File Systems, Network File Systems. Case Study: Linux

UNIT-V (10 Lectures)

SECONDARY-STORAGE STRUCTURE:

Overview of Mass-storage structure, disk structure, disk attachment, disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure.

PROTECTION:

Goals of Protection, Principles of Protection, Domain of protection,Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability- Based systems, Language – Based Protection.

SYSTEM SECURITY:

The Security problem, program threats, system and network threats cryptography as a security tool, user authentication, implementing security defenses, firewalling to protect systems and networks, computer–security classifications. Case Study: Linux

TEXT BOOKS:

1. Abraham Silberchatz, Peter B. Galvin, Greg Gagne, *"Operating System Principles"*, 8th Edition, John Wiley & Sons, 2010.

REFERENCES:

1. William Stallings, *"Operating Systems – Internal and Design Principles"*, 6th Edition, Pearson education/PHI, 2011.
2. D.M. Dhamdhere, *"Operating systems - A Concept based Approach"*, 2nd Edition, TMH, 2010.
3. Charles Crowley, *"Operating Systems - A Design Approach"*, 1st Edition, TMH, 2011.

4. Andrew S Tanenbaum, *"Modern Operating Systems"*, 3rd Edition, Pearson/PHI, 2010.

WEB REFERENCES:

http://nptel.iitm.ac.in/courses/Webcoursecontents/IIScBANG/Operating%20Systems/New_index1.html

SWITCHING THEORY AND LOGIC DESIGN
(Common to ECE, EEE, CSE, IT)

Course code: 13EC1105

L	T	P	C
4	0	0	3

Course Educational Objectives:

- ✤ To familiarize students with different number systems, digital logic, simplification and minimization of Boolean functions.
- ✤ To design combinational & sequential digital circuits and state machines.
- ✤ To introduce programmable logic devices.

Course Outcomes:

Students can design optimized logic circuits through combinational and sequential logic.

UNIT-I (10 Lectures)

NUMBER SYSTEMS & CODES:

Introduction to number systems, Complement representation of negative numbers, binary arithmetic, binary codes, Error detecting & correcting codes.

UNIT-II (15 Lectures)

BOOLEAN ALGEBRA AND SWITCHING FUNCTION:

Fundamental postulates of Boolean algebra, Basic theorems and properties, switching functions, Simplification of Boolean equations, Digital logic gates, properties of XOR gates, universal gates - NAND/NOR realizations. K-map method, Prime implicants, don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime –Implicant chart, simplification rules.

UNIT-III (13 Lectures)

COMBINATIONAL LOGIC DESIGN:

Adders, Subtractor, Multiplexer, De-Multiplexer, MUX Realization of

switching functions, Encoder, Decoder, Parity bit generator, Code-converters, Basic PLD's-ROM, PROM, PLA, PAL Realizations.

UNIT-IV **(13 Lectures)**

SEQUENTIAL CIRCUITS:

Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples) Latches and Flip-flops-Triggering and excitation tables, registers, shift registers, Steps in synchronous sequential circuit design, synchronous counters, ripple counters, Design of modulo-N Ring & Shift counters, Serial binary adder, sequence detector.

UNIT-V **(9 Lectures)**

FINITE STATE MACHINES:

Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified sequential machines, Partition techniques, incompletely specified sequential machines using merger table.

ALGORITHMIC STATE MACHINES:

Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.

TEXT BOOKS:

1. Morris Mano, *"Digital Design"* PHI, 3rd Edition, 2006.
2. Anand Kumar, *"Switching Theory and Logic Design"* PHI,2008

REFERENCES:

1. Zvi Kohavi, *"Switching & Finite Automata Theory"* TMH, 2nd Edition
2. R.P.Jain. *"Modern Digital Electronics"*, 4th Edition, TMH, 2009.
3. John M. Yarbrough, *"Digital Logic Applications and Design"* Thomson Publications, 2006.
4. Charles H. Roth, *"Fundamentals of Logic Design"* Thomson Publications, 5th Edition, 2004.

COMPUTER ORGANIZATION
(Common to CSE, ECE, EEE, IT)

Course Code : 13CT1105

L	T	P	C
4	0	0	3

Course Educational Objectives:

To give detailed information about the structure of computers and internal organization of different units regarding memory, I/O devices and registers.

- The internal organization of the computer system
- The internal operations.
- To know about register transfer and micro operations.
- To know about memory organization
- To know about pipeline and vector processing.

Course Outcomes:

At the end of the course student will be able to

- Get knowledge on basic structure of computers, register transfer operations.
- Get knowledge on memory organization and pipe line processing.
- Get knowledge on Arithmetic operations with float values.
- Get knowledge on input output devices organization.
- Get knowledge on vector processing.

UNIT-I: (12 Lectures)

BASIC STRUCTURE OF COMPUTERS:

Organization and Architecture, Structure and Function, Computer Components, Computer Function, Bus Interconnection, Processor Organization, Register Organization.

BASIC COMPUTER ORGANIZATION AND DESIGN:

Instruction codes, Computer instructions, Memory reference instructions, Instruction Cycle.

CENTRAL PROCESSING UNIT:

Stack organization, instruction formats, addressing modes, data transfer and manipulation, program control, RISC.

UNIT-II (12 Lectures)

REGISTER TRANSFER AND MICRO OPERATIONS:

Register transfer language, Register transfer, Bus and Memory transfers, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations, Arithmetic Logic Shift Unit.

MICRO PROGRAMMED CONTROL:

Control Memory, Address Sequencing, Micro Program examples, Design of control unit, Hardwired control..

UNIT-III (12 Lectures)

COMPUTER ARITHMETIC:

Data representation- Fixed point representation, Floating point representation, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating-point Representations, Floating-point Arithmetic Operations, Decimal Arithmetic Units, Decimal Arithmetic Operations.

UNIT-IV (12 Lectures)

MEMORY ORGANIZATION:

Memory system overview, Memory Hierarchy, Semi-conductor Main Memory, Cache Memory principle, Elements of cache design, Virtual Memory, Magnetic Disk, Optical Memory, Magnetic Tape, RAID.

INPUT- OUTPUT:

External Devices, I/O modules, Interrupts, Programmed I/O, Interrupt-driven I/O, Direct Memory Access, I/O Channels and Processors, PCI.

Asynchronous Data Transfer, Priority Interrupt, Serial Communication.

UNIT-V (12 Lectures)

PIPELINE AND VECTOR PROCESSING:

Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

MULTI PROCESSORS:

Multiprocessors and Multi computers, Characteristics of Multi-processors, Multiple Processor Organizations, Symmetric Multi-Processors, Cache Coherence, Clusters, Non Uniform Memory Access (NUMA).

TEXT BOOKS:

1. William Stallings, *Computer Organization and Architecture*, 8th Edition, Pearson Education, 2010.
2. M.Moris Mano, *Computer Systems Architecture*, 3rd Edition, Pearson Education, 2007.

REFERENCES:

1. John D. Carpinelli, *Computer Systems Organization and Architecture*, 3rd Edition, Pearson Education, 2001.
2. Carl Hamacher, Zvonks Vranesic, SafeaZak , *Computer Organization* , 5th Edition, TMH,2011.

WEB REFERENCES:

http://nptel.iitm.ac.in/video.php?subjectId=106106092

DATA STRUCTURES
(Common to CSE, IT, ECE & EEE)

Course Code : 13CT1106

L	T	P	C
4	0	0	3

Course Educational Objectives:

Student will be able to

- ✤ Analyze algorithms.
- ✤ Develop software applications which are efficient in terms of space time complexity.
- ✤ Choose suitable Data Structures for different real world applications.
- ✤ Apply best algorithm to sort set of elements.
- ✤ Employ a structured methodology while providing a software solution to an engineering problem.

Course Outcomes:

At the end of the course student will be able to

- ✤ Get knowledge on how to develop algorithms, operations on queues and stacks.
- ✤ Work on different searching methods and graphs.
- ✤ Get knowledge on trees and binary trees.
- ✤ Work on different sorting methods.
- ✤ Get knowledge on different types of linked operations.

UNIT-I **(12 Lectures)**

ANALYSIS OF ALGORITHMS:

Efficiency of algorithms, apriori analysis, asymptotic notations, time complexity of an algorithm using O notation, polynomial Vs exponential algorithms, average, best and worst case complexities, analyzing recursive programs.

STACKS: Introduction, stack operations, applications.

QUEUES: Introduction, Operations on queues, circular queues, other types of queues, applications.

UNIT-II (12 Lectures)

LINKED LISTS:

Introduction, Singly linked lists, circularly linked lists, doubly linked lists, multiply linked lists, applications.

LINKED STACKS AND LINKED QUEUES:

Introduction, operations on linked stacks and linked queues, dynamic memory management and linked stacks, implementation of linked representations, applications.

UNIT-III (12 Lectures)

SEARCHING:

Introduction, linear search, transpose sequential search, interpolation search, binary search, Fibonacci search.

INTERNAL SORTING:

Introduction, bubble sort, insertion sort, selection sort, merge sort, quick sort.

UNIT-IV (12 Lectures)

TREES AND BINARY TREES:

Introduction, Trees: definition and basic terminologies, representation of trees, binary trees: basic terminologies and types, representation of binary trees, binary tree traversals, threaded binary trees, applications.

BINARY SEARCH TREES AND AVL TREES:

Introduction, binary search trees: definition and operations, AVL Trees: definition and operations, applications.

UNIT-V (12 Lectures)

GRAPHS:

Introduction, definitions and basic terminologies, representations of graphs, graph traversals and applications.

TEXT BOOKS:

1. G A V PAI, *Data Structures and Algorithms, Concepts, Techniques and Applications*, Volume 1, 1st Edition, Tata McGraw-Hill, 2008.
2. Richard F. Gilberg & Behrouz A. Forouzan, *Data Structures, A Pseudo code Approach with C*, 2nd Edition, Cengage Learning India Edition, 2007.

REFERENCES:

1. Langsam ,M. J. Augenstein, A. M. Tanenbaum ,*Data structures using C and C++*, 2ndEdition, PHI Education,2008.
2. Sartaj Sahni, Ellis Horowitz ,*Fundamentals of Data Structures in C*, 2ndEdition, Orient blackswan , 2010.

WEB REFERENCES:

http://nptel.iitm.ac.in/video.php?subjectId=106105085

DATA STRUCTURES LAB

(Common to CSE&IT)

Course Code :13CT1107

L	T	P	C
0	0	3	2

Course Educational Objectives:

To teach the students how to write programs that implement data structures concepts.

- ✤ Write programs to implement various data structures concepts like Searching, Sorting, Trees, and Graphs.
- ✤ Solving the problems regarding large data structures like stack and queue.
- ✤ To know programming about linked stacks and linked queues.
- ✤ Advanced programming
- ✤ Solve the problem regarding memory locations practically so that the student will be benefitted in the usage of pointers.

Course Outcomes:

At the end of the course student will be able to

- ✤ Gain knowledge on how to develop programs using c .
- ✤ Implement various data structures using arrays.
- ✤ Implement linked lists , queues, trees and graphs.
- ✤ To obtain minimum cost spanning tree.
- ✤ Find shortest path using algorithms.

1. Write C programs that uses recursive function to:i) Compute factorial of a given number ii) Solve the towers of Hanoi problem.
2. Write C programs that implement the following data structures using arrays:i) Stack ii) Queue.

3. Write C programs to implement the following Stack applications i) Factorial ii) Evaluations of postfix expression.
4. Write C programto implement the following types of queues i) Priority Queue ii) Circular Queue.
5. Write C programs to implement the following types of Lists i) Singly linked list ii) Circularly Linked list iii) Doubly linked list.
6. Write C programs to implement the following data structures using Lists i) Stack ii) Queue.
7. Write C programsto implement the following search algorithms: i) Linear Search iv) Binary Search v) Fibonacci Search.
8. Write C programs to implement the following sorting algorithms i) Bubble Sort ii) Insertion Sort iii) Selection Sort.
9. Write C programs to implement the following sorting algorithms i) Merge Sort ii) Quick Sort.
10. Write a Cprogram to implement binary tree using arrays and to perform binary tree traversals i) inorder ii) postorder iii) preorder.
11. Write a C program to perform the following operations using linked lists: i)insert an element into a binary search tree. ii) Delete an elementfrom a binary search tree. iii) Search for a key element in abinary search tree.
12. Write a C program to perform the following operations using linked lists :i) Insert an element into an AVL tree. ii) Delete an element from an AVL tree.
13. Write C programs for the implementation of bfs and dfs fora given graph.
14. Write a C program for the implementation of Prim's algorithm to obtain the minimum cost spanning tree from a connected undirected graph.
15. Write a C program to implement Dijkstra's algorithm for the single source shortest path problem.

REFERENCES:

1. G A V PAI, *"Data Structures and Algorithms, Concepts, Techniques and Applications"*, Volume 1, 1st Edition, Tata McGraw-Hill, 2008.
2. Richard F. Gilberg & Behrouz A. Forouzan, *"Data Structures, A Pseudo code Approach with C"*, 2nd Edition, Cengage Learning India Edition, 2007.

ANALOG AND DIGITAL CIRCUITS LAB
(Common to CSE, IT)

Course Code: 13EC1143

L	T	P	C
0	0	3	2

Pre requisites:

Electronic Devices &Circuits, Digital Logic Design

Course Educational Objectives :

- To impart the practical knowledge in semiconductor diodes characteristics and applications of diodes as regulators, rectifiers.
- To measure the V-I characteristics of various devices that are used in the electronic equipment.
- Practical & functional verification through V-I characteristics of active devices like BJT, JFET, MOSFETS and applications.
- To have an idea of Digital Circuits

Course Outcomes :

- Student comprehends the depth of semiconductor devices like diodes, transistor, JFET characteristics are verified. Student gains hands on experience in handling electronic components and devices.
- Student gets the knowledge about PN junction diodes, zener & transistor configurations, and v-I characteristics.
- To impart the practical knowledge in various amplifiers design &verification ofimpedances, and band width calculations.
- Design different combinational and Sequential circuits

  Note: Any FIVE experiments from PART –A and FIVE experiments from Part- B are to be conducted.

LIST OF EXPERIMENTS:

Part- A

1. PN Junction diode characteristics.
2. Zener Diode Characteristics.
3. Rectifiers without filters (Full wave & half wave).
4. Transistor CE characteristics.
5. FET Characteristics.
6. CE Amplifier.
7. FET Amplifier.
8. RC Phase shift oscillator.

Part –B

1. Study of Logic Gates using Discrete Components.
2. Half Adder and Full Adder.
3. Encoder and Decoder.
4. Multiplexer and Demultiplexer.
5. Flip-flops.
6. Asynchronous Counter.
7. Synchronous Counter.
8. Shift Registers.

SYLLABI FOR
IV SEMESTER

PROBABILITY, STATISTICS AND NUMERICAL METHODS

(Common to CSE, IT & CE)

Course Code: 13BM1103	L	T	P	C
	4	1	0	3

Pre requisites:

- ✤ Fundamentals of Set theory and calculus.
- ✤ Basic concepts of Probability and Discrete Random Variables.

Course Educational Objectives:

To acquaint students with the fundamental concepts of probability and statistics and to develop an understanding of the role of statistics in engineering. Also to introduce Numerical techniques to solve the real world applications.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- ✤ Calculate fundamental concepts such as the cumulative distribution function, expectations, and distributions of random variables.
- ✤ Evaluate estimators, construct confidence intervals, and perform hypothesis tests.
- ✤ Solve engineering problems using Numerical techniques.

UNIT-I **(12 Lectures)**

Review of basic concepts in Probability and Discrete Random variables, Continuous Random variables - Probability density, Distribution. Calculating probabilities from Probability density, Determining Mean and Variance using Probability density, Normal Distribution- Density and Properties. Calculating Normal Probabilities, Normal Approximation to Binomial Distribution, Uniform Distribution.

(5.1, 5.2, 5.3, 5.5 of [1])

UNIT-II **(12 Lectures)**

Population and sample, Sampling distribution of the mean(s known), Central Limit theorem

(without Proof) and Problems, Sampling distribution of the mean(s unknown), Point Estimation, Maximum error and determination of sample size, Interval Estimation (Large sample and small sample)
(6.1, 6.2, 6.3, 7.1, 7.2 of [1])

UNIT-III **(12 Lectures)**

Tests of Hypotheses (Introduction, Null hypotheses, Alternative hypotheses, Type –I,II errors, Level of significance, Hypotheses concerning one mean (Large and Small samples), Inference concerning two means (Large and Small samples), Paired t-test.

Estimation of Variances (point and Interval estimation), Hypotheses concerning one variance, Hypotheses concerning two variance, Estimation of Proportions, Hypotheses concerning one Proportion, Hypotheses concerning several Proportions.
(7.3, 7.4, 7.5, 7.8, 8.1, 8.2, 8.3, 9.1, 9.2, 9.3 of [1])

UNIT-IV **(12 Lectures)**

Introduction to Numerical Methods, Solution of algebraic and transcendental equations-Bisection method, Method of false position Newton's method.

Finite differences-Forward differences Backward differences, Central differences, Differences of a polynomial, Other Difference operators – Shift operator, Average operator, Relations between the operators.
(28.1 to 28.3, 29.1 to 29.5 of Text book [2])

UNIT-V **(12 Lectures)**

Newton's interpolation formulae- Newton's forward interpolation formula Newton's backward interpolation formula, Interpolation with un equal intervals: Lagrange interpolation, Divided differences, Newton's divided difference formula Difference formula, Inverse interpolation.

Numerical solutions of Ordinary differential equations: Euler's Method, Modified Euler's Method, Runge-Kutta method of order 4.
(29.6, 29.9 - 29.13, 32.4, 32.5, 32.7 of Text book [2])

TEXT BOOKS:

1. Richard A.Johnson, C.B.Gupta, "*Miller. Freund's Probability and Statistics for Engineers*", Seventh Edition, Pearson Education, 2005.
2. Dr.B.S.Grewal, *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. S. S. Sastry, *"Introductory Methods of Numerical Analysis"*, 4th Edition, Prentice Hall India Pvt., Limited, 2005.
2. S.C. Gupta and V.K. Kapoor, *"Fundamentals of Mathematical Statistics"*, Ninth Revised Edition , Sultan Chand & Sons Educational Publishers, 2007.

DESIGN AND ANALYSIS OF ALGORITHMS
(Common to CSE & IT)

Course Code :13CT1108

L	T	P	C
4	1	0	3

Course Educational Objectives:

This course aims to introduce the classic algorithms in various domains, and techniques for designing efficient algorithms, apply the algorithms and design techniques to solve problems and also analyze the complexities of various problems in different domains.

- ✤ The objective of this course is to cover key techniques for designing and analyzing algorithms.
- ✤ To implement various searching ,sorting and back tracking, dynamic programming algorithms with the knowledge of algorithm implementation
- ✤ Major techniques for algorithm design and analysis are introduced through the study of various algorithms.
- ✤ To design and analyze an algorithm for all kinds of real time problems.
- ✤ To analyze complex non deterministic problems.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Measure the complexity of an algorithm, including best-case, worst-case, and average complexities as functions of the input size
- ✤ Classification in terms of asymptotic complexity classes.
- ✤ Learn the basic algorithmic design strategies, including recursion, divide-and-conquer, the greedy method, dynamic programming, and backtracking and branch-and bound.
- ✤ Know the different strategies that are known to be useful in finding efficient algorithms to solve problems and to be able to apply them.
- ✤ Know about non deterministic problems.

UNIT-I (16 Lectures)

INTRODUCTION:

Algorithm, Psuedocode for expressing algorithms, Performance Analysis-Space complexity,Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little ohnotation,Probabilistic analysis, Amortized analysis.

Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected componentsand biconnected components.

UNIT-II (13 Lectures)

DIVIDE AND CONQUER:

General method, applications-Binary search, Quick sort, Merge sort, Strassen'smatrix multiplication.

GREEDY METHOD: General method, applications-Job sequencing with dead lines, 0/1 knapsack problem,Minimum cost spanning trees, Single source shortest path problem.

UNIT-III (9 Lectures)

DYNAMIC PROGRAMMING:

General method, applications-Matrix chain multiplication, Optimal binary searchtrees, 0/1 knapsack problem, All pairs shortest path problem,Travelling sales person problem, Reliabilitydesign.

UNIT-IV (15 Lectures)

BACKTRACKING:

General method, applications-n-queen problem, sum of subsets problem, graph coloring,Hamiltonian cycles.

Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsackproblem- LC Branch and Bound solution, FIFO Branch and Bound solution.

UNIT-V (7 Lectures)

NP-HARD AND NP-COMPLETE PROBLEMS:

Basic concepts, non deterministic algorithms, NP - Hard andNPComplete classes, Cook's theorem.

TEXT BOOKS:

1. Ellis Horowitz,Satraj Sahni and Rajasekharam:*Fundamentals of Computer Algorithms*,2nd Edition,Univesity Press,2008.
2. M.T.Goodrich and R.Tomassia: *Algorithm Design Foundations, Analysis and Internet examples*, 1st Edition, John wiley and sons, 2006.

REFERENCES:

1. T.H.Cormen,C.E.Leiserson,R.L.Rivest,and C.Stein "*Introduction to Algorithms"*, 3rd Edition, PHI / Pearson Education, 2009.
2. R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, *"Introduction to Design and Analysis of Algorithms A strategic approach"*, 2nd Edition , Tata Mc Graw Hill,2009.
3. Allen Weiss, "*Data structures and Algorithm Analysis in C++"*, 2nd Edition, Pearson education, 2009.
4. Aho, Ullman and Hopcroft, *"Design and Analysis of algorithms"*, 3rd Edition ,Pearsoneducation,2008.

WEB REFERENCES:

http://nptel.iitm.ac.in/courses/106101060/

UNIX AND SHELL PROGRAMMING

(Common to CSE&IT)

Course Code :13CT1109

L	T	P	C
4	0	0	3

Course Educational Objectives:

The main object of this subject is to teach the students

- ✤ To use the commands according to user requirements.
- ✤ To write Shell scripts to perform the given task.
- ✤ To write their own programs in UNIX.
- ✤ To write AWK programs.
- ✤ It is powerful O.S. which will be used in servers, hence while working in industry this knowledge should be helpful.

Course Outcomes:

At the end of the course student would be able to

- ✤ Work on unix operating system.
- ✤ Develop programs that run on unix operating system.
- ✤ Develop shell programs in UNIX.
- ✤ Use unix operating system on servers.
- ✤ Use the system calls for file management.

UNIT-I (12 Lectures)

INTRODUCTION TO UNIX:

The UNIX Operating System, The UNIX Architecture, Features of UNIX, Internal And External Commands, Command Structure.

GENERAL-PURPOSE UTILITIES:

cal, date, echo, printf, bc, script, passwd,PATH, who, uname, tty, stty, pwd, cd, mkdir, rmdir, od.

HANDLING FILES:

The File System, cat, cp, rm, mv, more, file, ls, wc, pg, cmp, comm, diff, gzip, tar, zip, df, du, mount, umount, chmod, The vi editor ,security by file Permissions.

NETWORKING COMMANDS: ping, telnet, ftp, finger, arp, rlogin.

UNIT-II (12 Lectures)

INTRODUCTION TO SHELLS:

Unix Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell Edition Environment Customization.FILTERS: Filters, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters,Ordering a File, uniq.

UNIT-III (12 Lectures)

REGULAR EXPRESSIONS: Atoms,operators

GREP: Operation, grep Family, Searching for File Content.

SED: Scripts, Operation, Addresses, commands, Applications, grep and sed.

AWK: Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, String Functions, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk, Applications, awk and grep, sed and awk.

UNIT-IV (12 Lectures)

INTERACTIVE KORN SHELL:

Korn Shell Features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, Options, Startup Scripts, Command History, Command Execution Process.

KORN SHELL PROGRAMMING:

Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

UNIT-V (12 Lectures)

INTERACTIVE C SHELL:

C shell features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, On-Off Variables, Startup and Shutdown Scripts, Command History, Command Execution Scripts.

C SHELL PROGRAMMING:

Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

FILE MANAGEMENT:

File Structures, System Calls for File Management – create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir,closedir, mkdir, rmdir, umask.

TEXT BOOKS:

1. Sumitabha Das, *"Unix Concepts And Applications"*, 4th Edition. TMH, 2006. (1, 2 units)
2. Behrouz A. Forouzan, Richard F. Gilbery, *"Unix and shell Programming"*, 1st Edition, Cengage Learning India, 2003.

REFERENCES:

1. Graham Glass, King Ables, *"Unix for programmers and users"*, 3rd Edition, Pearson Education, 2009.
2. N.B Venkateswarlu, *"Advanced Unix programming"*, 2nd Edition, BS Publications, 2010.
3. Yashwanth Kanitkar, *"Unix Shell programming"*, 1st Edition, BPB Publisher, 2010.

DATABASE MANAGEMENT SYSTEMS

(Common to CSE&IT)

Course Code :13CT1110

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student confident in maintaining huge amount of data by creating tables, and accessing them.

- Capability of maintaining huge amount of data
- Design various database system and learn about different database models and their relationships
- To reduce the redundancy of data using the normal forms
- To learn external storage file organization and data indexing.
- To learn about transaction management
- To know about recovery mechanism

Course Outcomes:

At the end of the course student would be able to

- Learn about the basics of databases.
- Learn about Structured Query language(SQL) to manipulate data available in the databases.
- Learn about how to normalize the tables in a database.
- Learn about PL/SQL.
- Learn about transaction management.

UNIT-I (12 Lectures)

History of Data base Systems. Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor.

Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Conceptual Design for Large enterprises.

UNIT-II **(12 Lectures)**

Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views. Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus –Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

UNIT-III **(12 Lectures)**

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – FORTH Normal Form.

UNIT-IV **(12 Lectures)**

Transaction Concept- Simple Transaction Model-Storage Structure-Transaction State- Implementation of Atomicity and Durability, Isolation–Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation-Transactions as SQL Statements– Test for serializability.

Concurrency Control: Lock – Based Protocols-Dead lock Handling–Timestamp Based Protocols- Validation- Based Protocols-Multi version schemes-insert, delete and predicate operations– Multiple Granularity-weak levels of consistency-concurrency in index structures.

UNIT-V **(14 Lectures)**

Recovery System: Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- ARIES-Remote Backup systems.

Data on External Storage – overview of physical storage media-RAID-File Organization and Indexing-Data Dictionary Storage– Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning- Intuitions for tree Indexes –B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:

1. Raghurama Krishnan, Johannes Gehrke, *"Data base Management Systems"*, 3rd Edition, TATA McGrawHill, 2008.
2. Silberschatz, Korth, *"Data base System Concepts"*, 6th Edition, McGraw Hill, 2010.
3. C.J.Date, *"Introduction to Database Systems"*, 7th Edition, Pearson Education, 2002.

REFERENCES:

1. Peter Rob & Carlos Coronel, *"Data base Systems design, Implementation, and Management"*, 7thEdition, Pearson Education, 2000.
2. Elmasri Navrate, *"Fundamentals of Database Systems"*, 5thEdition, Pearson Education, 2007.

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

(Common to CSE, IT & ECE)

Course Code :13CT1111

L	T	P	C
4	0	0	3

Course Educational Objectives:

The main objective of the course is to expose the students to object oriented programming principles and how these principles can be applied with JAVA programming language. Upon completion of the course, the student should be able to:

- Understand fundamentals of programming such as variables, conditional and
- iterative execution, methods, etc.
- Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Have the ability to write a computer program using JAVA to solve specified problems.
- Have the ability to write multithread programs.
- Develop GUI based applications.
- Write small network based programs.

Course Outcomes:

At the end of the course the student will be able to

- Learn a new way of approaching the job of programming.
- Employ techniques for developing robust, reusable software.
- Learn the concept of algorithm design and implementation.
- Write Java codes using both console or command-line and dialog box or graphical user interface styles.
- Write, compile, execute, and debug their Java programs.

UNIT-I (12 Lectures)

FUNDAMENTALS OF OBJECT-ORIENTED PROGRAMMING:

Introduction, Object-Oriented Paradigm, Basic concepts of Object-Oriented Programming, Benefits of Object-Oriented Programming, Applications of Object-Oriented Programming

THE HISTORY AND EVOLUTION OF JAVA:

creation of Java, Java's Bytecode, Javas buzzwords, evolution of Java. An overview of Java- Simple Java Program. Date types, variables, automatic type conversion, Arrays, operators,expressions, control statements.

UNIT-II (12 Lectures)

INTRODUCING CLASSES:

Class fundamentals, declaring objects, assigning object reference variables, introducing methods- overloading methods,argument passing,recursion, access control,static keyword, final keyword, using command line arguments, variable length arguments.

Constructors, this keyword, garbage collection, finalize() method.

STRING HANDLING:

String class, String Buffer class, StringBuilder class.

INHERITANCE:

Inheritance basics, using super, creating a multilevel hierarchy, how constructors are called, Method overriding, dynamic method dispatch, using abstract classes, using final with inheritance, the Object class.

UNIT-III (14 Lectures)

PACKAGES AND INTERFACES: Packages, access protection, importing packages, interfaces.

Exploring java.lang package: Wrapper classes, Math class.

Exploring java.util package: Vector, Scanner, Date, Calendar, StringTokenizer, Random.

Exploring java.io package: Byte streams, Character streams, File, RandomAccessFile.

EXCEPTION HANDLING:

Exception-handling fundamentals, Exception types, uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws, finally, Java's built-in exceptions, creating your exception subclasses, using exceptions.

MULTITHREADING:

Java thread model, Main thread, creating a thread, creating multiple threads, using isAlive() and join(), thread priorities, synchronization, Interthread communication, suspending, resuming and stopping threads, using multithreading.

UNIT-IV (12 Lectures)

APPLETS:

Applet basics, architecture, skeleton, simple applet display methods, repainting, status window, HTML applet tag, passing parameters to applets.

AWT:

AWT classes, window fundamentals, working with frame windows, creating a frame window in an applet, creating a windowed program, displaying information within a window, working with graphics, working with color, working with fonts, AWT control fundamentals, Labels, using buttons, applying checkboxes, checkboxgroup, choice controls, using lists, scrollbars, textfield, text area, using layout managers, Menu bars and menus, dialog boxes.

UNIT-V (10 Lectures)

EVENT HANDLING:

Two event handling mechanisms, delegation event model, event classes, sources of events, event listeners interfaces, using the delegation event model, adapter classes, inner classes, handling events by extending AWT components.

SWINGS:

origin of swings, swings built on AWT, two key swing features, MVC architecture, components and containers, swing packages, simple swing application, event handling, painting in swing, JLabel, JTextField, JTabbedPane, JScrollPane,JList,JComboBox,Trees,JTable.

NETWORKING:

Basics,networking classes and interfaces,InetAddress,TCP/IP,URL

TEXT BOOKS:

1. E.Balaguruswamy, *"Programming with Java A Primer"*, 4th Edition, TataMcGraw-Hill, 2009.
2. Herbert Schildt, *"Java The complete reference"*, 8thEdition, McGrawHill, 2011.

REFERENCES:

1 Timothy budd, *"An introduction to object-oriented programming"*, 3rdEdition, Pearson Education, 2009.
2. Y. Daniel Liang, "*Introduction to Java programming*", 9thEdition, Pearson education, 2012.
3. Ivor Horton, *"Beginning Java"*, 7thEdition, Wrox Publications, 2011.
4. Cay.S.Horstmann and Gary Cornell "*Core Java 2, Vol I, Fundamentals*", 9thEdition, Pearson Education, 2012.
5. Cay.S.Horstmann and Gary Cornell, "*Core Java 2, Vol II, Fundamentals*", 9thEdition, Pearson Education, 2012.

COMPUTER GRAPHICS

(Common to CSE&IT)

Course Code :13CT1112

L	T	P	C
4	0	0	3

Course Educational Objectives:

To teach the students how to write programs that are related to different graphics like lines, polygons, circles and ellipse, also projecting 3D solids.

- ✤ To get awareness about different graphical devices used for personal computers.
- ✤ The algorithms that are adopted by different devices in line, and ellipse drawing and filling which improves the programming capabilities in graphics.
- ✤ The algorithms that are adopted by different devices in polygon, and circle drawing and filling which improves the programming capabilities in graphics.
- ✤ This subject also gives the awareness about creating message box and windows using C.
- ✤ This subject mainly deals with the different objects used in animations both 2D and 3D.

Course Outcomes:

At the end of the course student will be able to

- ✤ Acquire the knowledge about working principles of different Output devices.
- ✤ Different types of 2D and 3D graphics along with transformation techniques.
- ✤ Get the idea about projections of different views of objects along with elimination of invisible components (points, lines and surfaces).
- ✤ Motion oriented graphics will give the idea about implementing different animation sequences.
- ✤ Get knowledge on visible surface detection methods .

UNIT-I (12 Lectures)

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster - scan systems, random scan systems, graphics monitors and work stations and input devices.

OUTPUT PRIMITIVES :

Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

UNIT-II (12 Lectures)

2-D GEOMETRICAL TRANSFORMS:

Translation, scaling, rotation, reflection and shear transformations, matrix homogeneous coordinates, composite transforms. transformations between coordinate systems.

2-D VIEWING:

The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm.

UNIT-III (12 Lectures)

3-D GEOMETRIC TRANSFORMATIONS:

Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D VIEWING:

Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping, Introduction to curves: spline and Bezier curve.

UNIT-IV (12 Lectures)

VISIBLE SURFACE DETECTION METHODS:

Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods.

WINDOWS PROGRAMMING:

Dos Programming Model, Windows Programming Model, Sample Window Program, Message Box, Creation and Display of Window, Interaction with Window, Reacting to Messages.

UNIT-V (12 Lectures)

COMPUTER ANIMATION:

Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications

TEXT BOOKS:

1. Donald Hearn and M.Pauline Baker, *"Computer Graphics C version"*, 2nd Edition, Pearson Education, 2011.
2. Yaswanth Kanetkar, *"Let Us C"*, 9th Edition, Infinity Science Press, 2009.
3. Foley, VanDam, Feiner and Hughes, *"Computer Graphics Principles & Practice in C"*, 2nd Edition, Pearson Education, 2002.

REFERENCES:

1. Donald Hearn and M.Pauline Baker, *"Computer Graphics"*, 2nd Edition, PHI/Pearson Education, 2008.
2. Zhigand xiang, Roy Plastock , *"Computer Graphics, Schaum's outlines"*, 2nd Edition, Tata Mc- Graw Hill Edition, 2007.
3. David F Rogers, *"Procedural elements for Computer Graphics"*, 2nd Edition, Tata Mc Graw Hill, 2008.
4. Neuman and Sproul, *"Principles of Interactive Computer Graphics"*, 2nd Edition, TMH, 2008.
5. Shalini Govil, Pai, *"Principles of Computer Graphics"*, 1st Edition, Springer International Edition, 2005.
6. Steven Harrington, *"Computer Graphics - A Programming approach"*, 1st Edition TMH, 2010.

WEB REFERENCES:

http://nptel.iitm.ac.in/courses/Webcourse-contents/IITDelhi/Computer%20Graphics/csmain.html

ENVIRONMENTAL STUDIES

(Common to all Branches)

Course Code: 13NM1102

L	T	P	C
2	0	0	0

Course Educational objectives:

This course introduces the students to the following

- ✤ Important & Scope of the Environment.
- ✤ Awareness about the resources and their limitations.
- ✤ Appreciate the variedness of nature and role of different species in nature.
- ✤ The importance of understanding the impact of any development of nature.
- ✤ Population control and its importance.

Course Outcomes:

After studying the course the student will have good understanding of

- ✤ Environment and its conservation.
- ✤ The impacts of human action on nature and remedial measures.
- ✤ Being proactive instead of reactive.

UNIT-I (8 Lectures)

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES & NATURAL RESOURCES

Definition, Scope and Importance – Need for Public Awareness.

Renewable and non-renewable resources– Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems -Mineral resources: Use and

exploitation, environmental effects of extracting and using mineral resources, case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Case studies. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT-II (7 Lectures)

ECOSYSTEMS, BIODIVERSITY AND ITS CONSERVATION:

Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Definition: genetic, species and ecosystem diversity.- Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a mega diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. - Endangered and endemic species of India Conservation of biodiversity: In-situ and Exsitu conservation of biodiversity.

UNIT-III (7 Lectures)

ENVIRONMENTAL POLLUTION:

Definition, Cause, effects and control measures of a) Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards.

SOLID WASTE MANAGEMENT:

Causes, effects and control measures of urban and industrial wastes. – Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT-IV (6 Lectures)

SOCIAL ISSUES AND THE ENVIRONMENT:

From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, and watershed management -Resettlement and rehabilitation of people; its problems and concerns. Case Studies Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. -Wasteland reclamation. -Consumerism and waste products. –Environment.

Protection Act. -Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution)

Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

UNIT-V (8 Lectures)

HUMAN POPULATION AND THE ENVIRONMENT:

Population growth, variation among nations. Population explosion - Family Welfare Programme. -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. -Women and Child Welfare. -Role of information Technology in Environment and human health. – Case Studies.

FIELD WORK:

Visit to a local area to document environmental assets

River /forest grassland/hill/mountain -Visit to a local polluted site-

Urban/ Rural/industrial/ Agricultural Study of common plants, insects, birds. - Study of simple ecosystems-pond, river, hill slopes, etc.

TEXT BOOKS:

1. Bharucha. E., "*Textbook of Environmental Studies for Undergraduate Courses*", University Press, 2005.
2. Rajagopalan. R., "*Environmental Studies*", Oxford University Press, 2005.

REFERENCE:

AnjiReddy. M., "*Textbook of Environmental Sciences and Technology*", BS Publications, 2010.

OBJECT ORIENTED PROGRAMMING LAB

(Common to CSE & IT)

Course Code :13CT1113

L	T	P	C
0	0	3	2

Course Educational Objectives:

To write various application programs using JAVA programming language.

- ✤ Develop small applications using JAVA programming language.
- ✤ Write multithreaded programs
- ✤ Build Graphical User Interfaces based applications.
- ✤ Write applet applications
- ✤ Write small network based programs

Course Outcomes:

Atthe end of the course the student would be able to

- ✤ Write simple java programs.
- ✤ Develop java programs using different oop principles
- ✤ Use different packages available in java.
- ✤ Create window based programs and applet driven programs.
- ✤ Write simple client/server program.

1. a. Write a program that displays welcome dear user followed by user name. Accept username from the user.

   b. Write a program to print the multiplication table (till 20) of a given number.

   c. Write a program that prompts the user for an integer and then prints out all the prime numbers up to that Integer.

2. a. Create a class Rectangle. The class has attributes length and width. It should have methods that calculate the perimeter and area

of the rectangle. It should have readAttributes method to read length and width from user.

b. The Fibonacci sequence is defined by the following rule: The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it.

Write a Java program that uses both recursive and non recursive functions to print the n^{th} value in the Fibonacci sequence.

3. a. Write a program to check the compatibility for multiplication, if compatible multiply two matrices and find its transpose.

   b.Write a program that checks whether a given string is a palindrome or not. Ex: MALAYALAM is a palindrome. Accept the string as command line argument.

   c. Write a program for sorting a given list of names in ascending order

4. a. Create an inheritance hierarchy of Rodent, Mouse, Gerbil, Hamster etc. In the base class provide methods that are common to all Rodents and override these in the derived classes to perform different behaviors, depending on the specific type of Rodent. Create an array of Rodent, fill it with different specific types of Rodents and call your base class methods.

   b. Write a program to create an abstract class named Shape that contains an empty method named numberOfSides( ).Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method numberOfSides ( ) that shows the number of sides in the given geometrical figures.(Use Runtimepolymorphism).

5. Design a package to contain the class Student that contains data members such as name, roll number and another package contains the interface Sports which contains some sports information. Import these two packages in a package called Report which process both Student and Sport and give the report.

6. a. Write a program to demonstrate wrapper classes, and to fix the precision.

b. Write a program that calculates roots of a quadratic equation.

c. Write a program that illustrates Vector class.

7. a. Write a program that reads on file name from the user then displays information about whether the file exists, whether the file is readable/ writable, the type of file and the length of the file in bytes and display the content of the using *FileInputStream* class.

   b. Write a program that displays the number of characters, lines and words in a text file.

   c. Write a program that copies contents from one file to another file.(Using character streams).

8. a. Write a program to generate a set of random numbers between two numbers x1 and x2, and x1>0.

   b. Write a program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use StringTokenizer class of java.util)

   c. Using the Java API write a program to obtain the following output:

   Today’s date is <<today’s date>>

   The month is <<current month>>

   The year is <<current year>>

   <<number of days passed in year>> days have passed in this year so far.

9. a. Write a program that reads two numbers from the user to perform integer division into Num1 and Num2 variables. The division of Num1 and Num2 is displayed if they are integers. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException.

   b. Create a user defined exception.

10. a. Write a program that creates 3 threads by extending Thread class. First thread displays “Good Morning” every 1 sec, the second thread displays “Hello” every 2 seconds and the third displays Welcome” every 3 seconds. (Repeat the same by implementing Runnable).

b. Write a program that correctly implements Producer-Consumer problem using the concept of Inter ThreadCommunication.

11. a. Develop an applet that displays a simple message.

    b. Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.

12. a. Write a program that allows user to draw lines, rectangles and ovals.

    b. Write a program that illustrates different AWT controls.

13. a. Write a program for handling mouse events with adapter classes.

    b. Write a program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the+, -,*, % operations. Add a text field to display the result.

    c. Write a program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time No light is on when the program starts.

14. Write a program that illustrates JTabbedPane, JScrollPane and JTable.

15. Write a program that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result, and then sends the result back to the client. The client displays the result on the console. For ex: The data sent from the client is the radius of a circle, and the result produced by the server is the area of the circle.

REFERENCES:

1. E.Balaguruswamy: *"Programming with Java A Primer"*, 4th Edition, TataMcGraw-Hill, 2009.
2. Herbert Schildt: *"Java The complete reference"*, 8th Edition, McGrawHill, 2011.

DATABASE MANAGEMENT SYSTEMS LAB
(Common to CSE & IT)

Course Code :13CT1114

L	T	P	C
0	0	3	2

Course Educational Objectives:

The main objective of the lab course is to expose the students to:

- ✤ Teach the student logical database design and querying the database using SQL & PL/SQL. Upon completion of this course, the student should be able to:
- ✤ Create and maintain tables of a database using SQL
- ✤ Handle all types of SQL Queries.
- ✤ Write all kinds of programming scripts in PL/SQL and transaction managements
- ✤ Create stored procedures, functions, cursors & triggers.

Course Outcomes:

At the end of this course student would be able to

- ✤ Create his own database.
- ✤ Manipulate data in database using SQL language.
- ✤ Experiment with various SQL queries with database created
- ✤ Write programs using PL/SQL language.
- ✤ Create triggers using SQL.

RECOMMENDED SYSTEMS/SOFTWARE REQUIREMENTS:

Mysql /Oracle latest version Recommended

1. Introduction to Oracle, Creation of table, data types, Displaying table definition using DESCRIBE, inserting rows into table and SELECT command.

2. Projection, ORDER BY clause, Altering and dropping of tables (use constraints while creating tables) examples using SELECT command.
3. Queries using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.
4. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
5. Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date).
6. SUBQUERIES(Multiple Subqueries, Nested subqueries)
7. Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found).

a. Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.

8. CONTROL STRUCTURES (IF statement, Loop…End Loop, Exit command, While Loop, For loop, Goto statement).
9. Nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE- APPLICATION ERROR.
10. Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.
11. Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.
12. Program development using creation of package specification, package bodies, private objects, package variables and cursors and calling stored packages.

13. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.

14. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers.

REFERENCES:

1. Raghurama Krishnan, Johannes Gehrke, “Data base Management Systems”, 3rd Edition, TATA McGrawHill, 2008.

2. Silberschatz, Korth, “Data base System Concepts”, 6th Edition, McGraw Hill, 2010.

3. C.J.Date, “Introduction to Database Systems”, 7th Edition, Pearson Education, 2002.

NOTES

SYLLABI FOR V SEMESTER

FORMAL LANGUAGES AND AUTOMATA THEORY

(Common to CSE & IT)

Course Code :13CT1115	L	T	P	C
	4	1	0	3

Course Educational Objectives:

The course aims to develop an appreciation of the theoretical foundations of computer science through study of mathematical and abstract models of computers and the theory of formal languages.

- Theory of formal languages and use of various abstract machines as 'recognizers' and parsing will be studied for identifying the synthetic characteristics of programming languages.
- To understand the fundamental models of computation that underlies modern computer hardware, software, and programming languages.
- Explain computational thinking
- Learn the foundations of automata theory, computability theory.
- Discuss the applications of theory to other areas of computer science such as algorithms, programming languages, compilers, natural language translation, operating systems, and software verification.

Course Outcomes:

At the end of the course the student will be able to

- Design deterministic and non-deterministic machines.
- Design the pushdown automata.
- Comprehend the hierarchy of problems arising in the computer sciences.
- The Student will get an idea for designing Compiler Design.
- The students will get knowledge about regular expressions and computability theory .

UNIT-I (14 Lectures)

FUNDAMENTALS & FINITE AUTOMATA:

Basic concepts, Formal languages, Strings, Alphabets, Languages, Finite state machine, definitions, Finite automaton model, Acceptance of strings and languages, Deterministic finite automaton (DFA) and Non-deterministic finite automaton (NFA), Transition diagrams and Language recognizers.Acceptance of languages, Equivalence of NFA and DFA, NFA to DFA conversion(Proof needed), NFA with $\in$ - transitions, Significance, Conversion of NFA with - transitions to NFA without - transitions, Minimization of finite automata, Equivalence between two DFA's, Finite automata with output - Moore and Mealy machines, Equivalence between Moore and Mealy machines, conversion of Moore to Mealy and Mealy to Moore.

UNIT-II (8 Lectures)

REGULAR LANGUAGES:

Regular sets, Regular expressions, Operations and applications of regular expressions, Identity rules, Conversion of a given regular expression into a finite automaton, Conversion of finite automata into a regular expression (Arden's theorem Proof) , Pumping lemma for regular sets (Proof needed), Closure properties of regular sets (proofs not required).

UNIT-III (14 Lectures)

GRAMMAR FORMALISM:

Definition of a grammar, Language of a grammar, Types of grammars, Chomsky classification of languages, Regular grammars, Right linear and left linear grammars, Conversion from left linear to right linear grammars, Equivalence of regular grammar and finite automata, Inter conversion, Context sensitive grammars and languages, Linear bounded automata, Context free grammars and languages, Derivation trees, Leftmost and rightmost derivation of strings and Sentential forms.

CONTEXT FREE GRAMMARS:

Ambiguity, left recursion and left factoring in context free grammars, Minimization of context free grammars, Normal forms for context free grammars, Chomsky normal form, Greibach normal form, Pumping lemma for context free languages(Proof), Closure and decision properties of context free languages(Proofs needed), Applications of context free languages. (Proofs omitted).

UNIT-IV (12 Lectures)

PUSHDOWN AUTOMATA:

Pushdown automata, definition, model, Graphical notation, Instantaneous descriptions, Acceptance of context free languages, Acceptance by final state and acceptance by empty state and its equivalence, Equivalence of context free grammars and pushdown automata, Inter-conversion(Proofs not required), Introduction to deterministic pushdown automata.

TURING MACHINE:

Turing Machine, definition, model, Instantaneous descriptions, Representation of Turing machines, Design of Turing machines, Types of Turing machines, Computable functions, Unrestricted grammar, Recursive and recursively enumerable languages and Church's hypothesis. (Proofs required)

UNIT-V (8 Lectures)

COMPUTABILITY THEORY:

LR(0) grammar, Decidable and un-decidable problems, Universal Turing machine, Halting problem of a Turing machine, Un-decidability of post's correspondence problem(Proof needed) and modified post's correspondence problem, Turing reducibility, Definition of classes P and NP problems, NP complete and NP hard problems.

TEXT BOOKS:

1. Hopcroft H.E. and Ullman J. D, *"Introduction to Automata Theory Languages and Computation"*, 3rd Edition, Pearson Education, 2011.

REFERENCES:

1. Daniel I.A. Cohen, *"Introduction to Computer Theory"*, 2nd Edition, John Wiley Publication, 2007
2. Mishra and Chandrashekaran, *"Theory of Computer Science –Automata Languages and Computation"*, 3rd Edition, PHI, 2009.

3. John C Martin, *“Introduction to languages and the Theory of Computation”*, 3rd Edition, TMH, 2010.

4. Michel Sipser, *“Introduction to Theory of Computation”*, 2nd Edition, Thomson, 2012.

5. J.E.Hopcraft and JefferyD.Ulman,S.N.Maheswari, *“Introduction to Automata Theory, Languages & Computation”*, 2nd Edition, Narosa publishing company, 2011.

6. K.V.N.Sunitha , N.Kalyani, *“Formal Languages and Automata Theory”*, 1st Edition, TMH, 2010.

7. Rajendra Kumar, *“Theory of Automata, Languages & Computations”*, 1st Edition, TMH, 2010.

WEB REFERENECES:

http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-%20Guwahati/afl/index.htm

WEB PROGRAMMING
(Common to CSE & IT)

Course Code :13CT1116

L	T	P	C
4	0	0	3

Course Educational Objectives:

The main objective of the course is to expose the students to different web technologies and prepare him to design , develop and maintain a web site .

- ✤ Describe and explain the relationship among HTML, XHTML, CSS, JavaScript, XML and other web technologies.
- ✤ Create and publish advanced HTML pages with the help of frames, scripting languages, and CSS.
- ✤ understand and use JavaScript variables, control structures, functions, arrays, and objects.
- ✤ Understand and develop XML Technologies such as XML Schemas, XSLT.
- ✤ Understand and develop Server-Side Programming using Servlets and JSP's.
- ✤ Develop web pages using AJAX and PHP.

Course Outcomes:

At the end of the course the student should be able to

- ✤ Describe and explain the relationship among HTML, XHTML, CSS, JavaScript, XML and other web technologies.
- ✤ Create and publish advanced HTML pages with the help of frames, scripting languages, and CSS.
- ✤ Understand and use JavaScript variables, control structures, functions, arrays, and objects. Understand and develop XML Technologies such as XML Schemas, XSLT.

- Understand and develop Server-Side Programming using Servlets and JSP's.
- Develop web pages using AJAX and PHP.

UNIT-I (14 Lectures)

INTRODUCTION TO HTML5:

Part 1, Introduction to HTML5: Part 2: New HTML5 Form input Types, Introduction to Cascading Style Sheets: Part 1: Inline Styles, Embedded Style Sheets , Conflicting Styles , Linking External Style Sheets (Text Book : 1)

Java Script: Introduction to scripting, Control Structures-I, Control Structures-II, Functions, Arrays, Objects. (Text Book: 1)

UNIT-II (8 Lectures)

XML: Introduction, XML Basics, Structuring Data, XML Namespaces, Document Type Definitions (DTDs), W3C XML Schema Documents, XML Vocabularies, Extensible Stylesheet Language and XSL Transformations, Document Object Model (DOM): Objects and Collections(Text Book : 1)

UNIT-III (14 Lectures)

DATABASE ACCESS:

Overview of JDBC, JDBC Drivers, Connecting to a Database, The Statement Interfaces, Result Sets, Using Metadata (Text Book: 3)

SERVLETS :

The Life Cycle of a Servlet, Using Tomcat for Servlet Development, A Simple Servlet, The Servlet API, The javax.servlet Package , Reading Servlet Parameters, The javax.servlet.http Package, Handling HTTP Requests and Responses, Cookies, Session Tracking(Text Book : 2)

UNIT-IV (12 Lectures)

JSP:

JSP Overview, How JSP Works , A Basic Example, JSP Syntax and Semantics: The JSP Development Model, Components of a JSP Page: Directives, Comments, Expressions, Scriptlets, Declarations, implicit objects, Standard Actions, Tag Extensions, A Complete Example (Text

Book : 3)Expressions , Scriptlets, Expression and Scriptlet Handling by the JSP Container, Implicit Objects and the JSP Environment, Initialization Parameters,

Request Dispatching: Anatomy of Request Processing, include Directive, The <jsp:include> Action, Forwarding Requests , RequestDispatcher Object (Text Book : 3)

UNIT-V **(12 Lectures)**

AJAX-ENABLED RICH INTERNET APPLICATIONS WITH XML AND JSON:

Traditional Web Applications vs. Ajax Applications, Rich Internet Applications (RIAs) with Ajax, History of Ajax, Ajax Example Using the XMLHttpRequest Object, Using XML and the DOM, Creating a Full-Scale Ajax-Enabled Application

PHP: Introduction, Simple PHP Program, Converting Between Data Types, Arithmetic Operators, Initializing and Manipulating Arrays, String Comparisons, String Processing with Regular Expressions, Form Processing and Business Logic, Reading from a Database (Text Book : 1)

TEXT BOOKS:

1. Dietel and Dietel : *"Internet and World Wide Web - How to Program"*, 5th Edition, PHI/Pearson Education, 2011
2. Herbert Schildt : *"The complete Reference Java 2"*, 8th Edition, TMH, 2011.
3. Phil Hanna: *"The Complete Reference JSP"*, 1st Edition, TMH, 2003.

REFERENCES:

1. Hans Bergsten : *"Java Server Pages"*, 3rdEdition, O'Reilly publication, 2008.
2. Raj Kamal : *"Internet & web technologies"*, 8th Edition , Tata McGraw-Hill, 2007.
3. Chris Bates : *"Web Programming, building internet applications"*, 2ndEdition, WILEY, Dreamtech, 2008.

4. Xavier. C : *"web technology and design"*, 1st Edition, New Age International, 2011.

5. Marty Hall and larry Brown : *"Core servlets and java Server pages volume 1: core technologies"*, 2nd Edition, Pearson Eduacation, 2007.

EMBEDDED SYSTEMS - 1

(Common to CSE & IT)

Course Code :13CT1117

L	T	P	C
4	0	0	3

Course Educational Objectives:

This syllabus was designed to provide a comprehensive exposure on popular 8-bit embedded processors and their programming.

- ✤ To expose 8-bit Embedded-processors, and their versatility in programming.
- ✤ To gain hands on experience of peripheral systems builtin in these processors.
- ✤ To enable a student the confidence to writing application programs.
- ✤ To provide alternate ways of building solutions to the given practical exercises so that they understand creative solutions to applications.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Understand the essentials of the INTEL 8051, PIC16F877 and Atmega8535 architectures
- ✤ Understand the instruction sets , its registers.
- ✤ Write programs in assembly language for real time problems.
- ✤ Understand the serial communication buses.
- ✤ Understand the peripheral systems in atmega 8535.

UNIT-I (12 Lectures)

Introduction to Classic 8051 family Architecture. Address and data bus with multiplexed I/O pins. Registers Examples with arithmetic and Boolean instruction set. Applications using, Timers, Counters and I/O programming for external logic sensing and control.Interrupts and their reatime programming in all applications. This processor is based on the classic architecture the Von Neumann Architecture.

UNIT-II (15 Lectures)

Introduction to the advanced Harvard architecture for faster instructions. Introduction to PIC family Architecture and instruction set. Introduction to the shorter RISC instruction set and its usage with example programs. Interrupts using change of state on ports and its use in all application programming.

PERIPHERAL SYSTEMS IN PIC 16F877A PROCESSOR.

(a) Digital Input and Output Programming,

(b) Timers and Counters

(c) Capture Control and PWM

(d) Analog to Digital Converters and their Programming

(e) Simple data acquisition systems and programming.

UNIT-III (9 Lectures)

Introduction to Atmega processor with a large register set. Family architecture exposes Accumulator free programming, with advanced addressing modes and faster Cache memory controlled I/O . Programming using the popular Atmega 8535 processor and instruction set. The versatile peripherals and their applications in 8535.

Logical sequence of steps to design a program to suit an objective. Examples in Robotics, Motor control, Display control will be exposed.

UNIT-IV (12 Lectures)

PERIPHERAL SYSTEMS IN ATMEGA 8535

(a) Digital Input and Output Programming

(b) Timers and Counters wave form generation.

(c) Capture Control and PWM

(d) Analog to Digital Converters and their Programming

(e) Simple data acquisition programming.

UNIT-V (12 Lectures)

SERIAL COMMUNICATION BUSSES

(a) USART, with addressable communication feature

(b) SPI bus, ants speed and versatility

(c) 12c {inter integrated bus] the two wire communication bus .

(d) Introduction to USB bus and its features for fast synchronous communication.

TEXT BOOKS :

1. Bendapudy Kanta Rao : *"Embedded Systems"*, Prentice Hall India, 1st Edition, 2011.

2. Milan Verle: *"PIC microcontrollers, Mikro Elektronika"*, 1st Edition,2008

3. Muhammad Ali Mazidi, Sarmad Naimi, Sepehar Naimi: *"The AVR Microcontroller and Embedded systems using assembly & C"*, 1st Edition, Prentice Hall, Pearson education, 2009.

REFERENCES :

1. Ali Mazidi Mohammed Gillispie, Mazide Janice: *"The 8051Microcontroller and Embedded Systems using assembly & C"*, 2nd Edition, Pearson Education, 2009

2. Timothy D.Green: *"Embedded Systems Programming with the PIC16F877"*, 2nd Edition,2008

3. Kenneth J Ayala : *"The 8051 Micro Controller"*, 3rd Edition, Thomson Publishers, 2009.

OBJECT ORIENTED ANALYSIS AND DESIGN

(Common to CSE& IT)

Course Code :13CT1118

L	T	P	C
4	0	0	3

Course Educational Objectives:

The main objective of the course is to expose the students to model the software architecture using different UML diagrams.

✤ Giving basics Designing a product or a system.

✤ Giving idea about things, relationships and diagrams.

✤ Giving idea about Structural things.

✤ Giving idea about Behavioral things & Architectural Modeling.

✤ Giving practice with the help of a Case Study.

Course Outcomes:

At the end of the course the student will be able to

✤ Understand the Object Oriented Systems Development.

✤ Understand the Basic & Advanced Structural Modeling.

✤ Understand the Basic & Advanced Behavioral.

✤ Understand the Architectural Modeling.

✤ Understand the concepts required for implementing ATM and railway reservation system.

UNIT-I (15 Lectures)

AN OVERVIEW OF OBJECT ORIENTED SYSTEMS DEVELOPMENT:

Introduction, Two Orthogonal Views of the Software, Object Oriented Systems Development Methodology, Why an Object Orientation?

WHY WE MODEL:

The Importance of Modeling, Principles of Modeling, Object Oriented Modeling

INTRODUCING THE UML:

An overview of the UML, A Conceptual Model of the UML, Architecture, Software Development Life Cycle

UNIT-II (12 Lectures)

BASIC STRUCTURAL MODELING:

Classes, Relationships, Common Mechanisms, and diagrams, class diagrams

ADVANCED STRUCTURAL MODELING:

Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages, Object Diagrams

UNIT-III (10 Lectures)

BASIC BEHAVIORAL MODELING:

Interactions, Interaction diagrams, Use cases, Use case diagrams, Activity Diagrams

ADVANCED BEHAVIORAL MODELING:

Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

UNIT-IV (11 Lectures)

ARCHITECTURAL MODELING I:

Component, Deployment, Component diagrams and Deployment diagrams

ARCHITECTURAL MODELING II:

Patterns and Frameworks, Collaborations, Systems and Models.

UNIT-V (10 Lectures)

CASE STUDY:

Bank ATM Application, Railway Reservation System.

TEXT BOOKS:

1. Grady Booch, James Rumbaugh, Ivar Jacobson : *"The Unified Modeling Language User Guide"*, 2nd Edition, Pearson Education, 2007.
2. Ali Bahrami : *"Object Oriented Systems Development using the unified modeling language"*, 1st Edition, TMH, 2008.

REFERENCES:

1. Meilir Page-Jones: *"Fundamentals of Object Oriented Design in UML"*, 1st Edition, Pearson Education, 2006.
2. Pascal Roques: *"Modeling Software Systems Using UML2"*, 1stEdition, WILEY Dreamtech, 2007.
3. Atul Kahate: *"Object Oriented Analysis & Design"*, 1stEdition, TMH, 2007.
4. Mark Priestley: *"Practical Object-Oriented Design with UML"*, 2nd Edition, TMH, 2005.
5. Craig Larman: *"Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process"*, 3rdEdition, Pearson Education, 2007.

SOFTWARE ENGINEERING
(Common to CSE & IT)

Course Code :13CT1119

L	T	P	C
4	0	0	3

Course Educational Objectives:

The main objective of the course is to give an overall idea about the software development process.

- To Analyze, Design, Test and Maintain Software Systems.
- To develop Software Using good Quality Concepts.
- Use Cost Estimation Techniques to estimate the cost of the software
- To avoid risks by using Risk Management Techniques.
- Understands various project , process and product metrics.

Course Outcomes:

At the end of the course the student should be able to

- Analyze and Design Software Systems.
- Test and MaintainSoftware Systems.
- Develop Software Using good Quality Concepts.
- Understand the risk management.
- Use Cost Estimation Techniques to estimate the cost of the software and avoid risks by using Risk Management Techniques.

UNIT-I (12 Lectures)

INTRODUCTION TO SOFTWARE ENGINEERING:

Software, The Nature of Software, Software Engineering, The Software Process, Software Engineering practice, Software Myths, A Generic Process Model, Process Assessment and Improvement, Product and Process, CMMI. (Text Book-1)

PROCESS MODELS:

Prescriptive Process Models- The Waterfall Model, Incremental Process

Models, Evolutionary Process Models, Concurrent Models. Specialized Process Models.The Unified Process, Personal and Team Process Models.(Text Book-1)

UNIT-II (12 Lectures)

SOFTWARE REQUIREMENTS:

Functional and Non-functional Requirements, User Requirements, Interface Specification, the Software requirements document.

REQUIREMENTS ENGINEERING PROCESS:

Feasibility Studies, Requirements Elicitation and Analysis, Requirements Validation, Requirements Management. (Text Book-2)

UNIT-III (12 Lectures)

DESIGN ENGINEERING:

The Design Process, Design Concepts, the Design Model.

ARCHITECTURAL DESIGN:

Software Architecture, Architectural Genres, Architectural Styles, Architectural Design, Architectural Mapping using Data Flow. (Text Book-1)

SYSTEM MODELS:

Context Models, Behavioral Models, Data Models, Object Models, Structured Methods.

OBJECT ORIENTED DESIGN:

Objects and Object Classes, an Object Oriented Design Process, Design Evolution. (Text Book-2)

UNIT-IV (12 Lectures)

USER-INTERFACE DESIGN:

The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation.

SOFTWARE TESTING STRATEGIES:

A Strategic Approach to Software Testing, Test Strategies for Conventional Software and Object Oriented Software, Validation Testing, White- Box Testing, Basis Path Testing, Black-Box Testing, System Testing. (Text Book-1)

PRODUCT METRICS:

A Framework for Product Metrics, Metrics for Requirements Model, Metrics for Design Model, Metrics for Source Code, Metrics for Testing, Metrics for Maintenance.

PROCESS AND PROJECT METRICS:

Software Measurement, Metrics for Software Quality. (Text Book-1)

UNIT-V (12 Lectures)

RISK MANAGEMENT:

Reactive versus Proactive Risk Strategies, Software Risks, Risk Identification, Risk Projection, Risk Refinement, RMMM, RMMM Plan.

QUALITY MANAGEMENT:

Software Quality, Informal Reviews, Formal Technical Reviews, Statistical Software Quality Assurance, Software Reliability, the ISO 9000 Quality Standards. (Text Book-1)

TEXT BOOKS:

1. Roger S. Pressman: *"Software Engineering- A Practitioner's Approach"*, 6th Edition , TMH, 2010.
2. Sommerville: *"Software Engineering"*, 9th Edition, Pearson Education, 2011.

REFERENCES:

1. K.K.Agarwal & Yogesh Singh: *"Software Engineering"*, 3rd Edition, New Age International Publishers, 2008.
2. Shely Cashman Rosenblatt: *"System Analysis and Design"*, 2nd Edition, Thomson Publications, 2011.
3. PankajJalote: *"An Integrated Approach to Software Engineering"*, 3rd Edition, Narosa Publishing House, 2011.

WEB REFERENCES:

1. http://nptel.iitm.ac.in/courses/106101061/
2. http://nptel.iitm.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Soft%20Engg/New_index1.html

ARTIFICIAL INTELLIGENCE
(Common to CSE & IT)

Course Code :13CT1127

L	T	P	C
4	1	0	3

Course Educational Objectives:

The main objective of the course is to introduce Artificial Intelligence, Knowledge Representation and Game Playing. Upon completion of this course, the student should be able to:

- Learn what AI is?
- Define problems, problem space and search spaces.
- Learn heuristic search techniques.
- Know the knowledge representation.
- About game playing.

Course Outcomes:

At the end of the course the student will be able to

- Understand the Basics of Artificial Intelligence.
- Understand the Searching for solutions, uninformed search strategies.
- Understand the Knowledge Representation & First Order Logic.
- Understand the Planning, Uncertainty and Practice.
- Understand the Basics of neural networks.

UNIT-I (14 Lectures)

INTRODUCTION:

AI problems, foundation of AI and history of intelligent agents, Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

SEARCHING:

Searching for solutions, uninformed search strategies- Breadth first search, depth first search, Search with partial information (Heuristic search) Greedy best first search , A*search. Game Playing: Adversarial search, Games, minimax algorithm, optimal decisions in multiplayer games, Alpha Beta pruning, Evaluation functions, cutting of search.

UNIT-II (12 Lectures)

KNOWLEDGE REPRESENTATION:

Knowledge Based agents, the Wumpus world, logic, propositional logic, Resolution patterns in propositional logic, Resolution, Forward and Backward chaining.

FIRST ORDER LOGIC:

Inference in first order logic, propositional vs first order inference, unification and lifts, forward chaining, backward chaining, resolution

UNIT-III (12 Lectures)

PLANNING :

Classical planning problem, Language of planning problems, Expressiveness and extension, planning with state-space search, Forward state space search, Backward state space search, Heuristics for state space search. Planning search, planning with state space search, partial order planning graphs.

UNIT-IV (14 Lectures)

UNCERTAINTY:

Acting under uncertainty, Basic probability notation, axioms of probability, Inference using Full joint distributions, Baye's Rule and its use. Probabilistic Reasoning: Representing knowledge in an uncertain domain, the semantics of Bayesian Networks, Efficient representation of conditional distributions. Exact inference in Bayesian networks.

PROBABILISTIC REASONING OVER TIME:

Time and Uncertainty, Inference in Temporal models, Hidden Markov models, Kalman Filters, Dynamic Bayesian Networks, Speech Recognition.

UNIT-V (10 Lectures)

LEARNING :

Forms of learning, Induction learning, Learning Decision trees, statistical learning methods, learning with complex data, learning with hidden variables-the EM algorithm, instance based learning, neural networks.

TEXT BOOKS:

1. Stuart Russel, Peter Norvig , *"Artificial Intelligence-A Modern Approach"*, 2nd Edition PHI/Pearson Education , 2003.

REFERENCES:

1. Patrick Henry Winston , *"Artificial Intelligence"*, 3rd Edition, Pearson Edition, 2001.
2. E.Rich and K.Knight , *"Artificial Intelligence"*, 3rd Edition, TMH, 2008.
3. Patterson, *"Artificial Intelligence and Expert Systems"*, 2nd Edition, PHI, 2008.

WEB REFERENCES:

http://nptel.iitm.ac.in/video.php?subjectId=106105079

EMBEDDED SYSTEMS-1 LAB
(Common to CSE & IT)

Course Code :13CT1120

L	T	P	C
0	0	3	2

Course Educational Objectives:

To explore the different embedded processors and its programming that are adopted in different real time systems.

- ✤ It exposes students to the field of Embedded Systems and gives them a chance to hear and read about embedded system topics, and then put those concepts to work by developing and debugging embedded system hardware and firmware.
- ✤ To exposure Integrated development for the different embedded processors.
- ✤ To use these programs, students are encouraged to suggest new scope for applications.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Understand the different IDE tools for different embedded processors
- ✤ Write programs in assembly language for real time problems
- ✤ Design the application by interfacing System Peripherals

LIST OF EXPERIMENTS :

1. STUDY OF TYPICAL PROGRAMS:

i. Multi precision Addition, Subtraction, and Multiplication.

ii. Handling Fractional numbers

iii. BCD-Binary Conversion examples

iv. ASCII to BCD conversion

v. Binary to ASCII conversion

2. INPUT OUTPUT CONTROL PROGRAMMING.

ith direction control. Individual pin control, and drive capability. Using the I/O the following programs are practiced.

i. Controlling the external logical switching, for DC motors, Steppers

ii. Clock generation and timing using Timers ad Counters

iii. Pulse width modulation s for DAC application.

iv. Capture control of external events

3. ANALOG TO DIGITAL CONVERTERS:

Usage of multiplexed channels for in fast data acquisition and storage. Learn about acquisition speed, and waveform storage by sampling. interrupt driven data acquisition.

4. PROGRAMMING USING BUILT IN TIMERS.

i. As Event Timers

ii. As fast Counters

iii. Frequency Generation

iv. Simple programs to generate FSK

5. CAPTURE CONTROL AND ITS APPLICATION EXAMPLES

i. Measurement of Duty cycle, power factor etc

ii. Measurement of velocity and acceleration.

iii. Sensing touch.

6. SERIAL COMMUNICATION METHODS.

i. USART and its programming

ii. SPI bus and its programming

7. WAVE FORM GENERATION USING PWM METHODS.

i. Generation of Sine wave

ii. Generation of FSK

REFERENCES:

1. Bendapudy Kanta Rao, *“Embedded Systems”*, Prentice Hall India, 1st Edition, 2011.
2. Milan Verle, *“PIC microcontrollers”*, MikroElektronika, 1st Edition,2008
3. Muhammad Ali Mazidi, Sarmad Naimi, Sepehar Naimi, *“The AVR Microcontroller and Embedded systems using assembly & C”*, 1st Edition , Prentice Hall, Pearson education, 2009.

WEB PROGRAMMING LAB
(Common to CSE & IT)

Course Code :13CT1121

L	T	P	C
0	0	3	2

Course Educational Objectives:

The main objective of the lab course is to expose the students to different programming aspects related to web designing using different technologies. Upon completion of this course, the student should be able to:

- ✤ Understand web page site planning, designing, and maintenance.
- ✤ Develop web sites which are secure and dynamic in nature and writing scripts which get executed on server as well.
- ✤ Study the actual advanced Web methodologies, specifications and techniques.
- ✤ Acquire the skills necessary to design, implement and deploy complex Web sites and applications.
- ✤ Understands the concepts of PHP and AJAX to develop web pages

Course Outcomes:

At the end of the course the student should be able to

- ✤ Get practical exposure on HTML, XHTML, CSS, JavaScript, XML and other web technologies.
- ✤ Get practical exposure to develop XML Technologies such as XML Schemas, XSLT.
- ✤ Get practical exposure to develop Server-Side Programming using Servlets and JSP's.
- ✤ Develop web pages using AJAX and PHP.
- ✤ Develop a website using the above technologies.

LIST OF PROGRAMS:

WEEK-1 & 2:

Design the following static web pages required for an online book store web site.

1) HOME PAGE:

The static home page must contain three **frames**.

Top frame : Logo and the college name and links to Home page, Login page, Registration page,

Catalogue page and Cart page (the description of these pages will be given below).

Left frame : At least four links for navigation, which will display the catalogue of respective links. For e.g.: When you click the link **"CSE"** the catalogue for **CSE** Books should be displayed in the Right frame.

Right frame: The *pages to the links in the left frame must be loaded here*. Initially this page containms description of the web site.

Logo	Web Site		Name	
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Description of the website			

2) Login Page

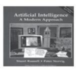
Logo	Web Site		Name	
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Log in [ ] Password [ ] Submit [ ] Reset [ ]			

3) CATALOGUE PAGE:

The catalogue page should contain the details of all the books available in the web site in a table.

The details should contain the following:

1. Snap shot of Cover Page.
2. Author Name.
3. Publisher.
4. Price.
5. Add to cart button.

Login	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE		Book: XML Bible Author: Winston Publication: Wiely	$ 40.5	ADD TO CART
EEE CIVIL		Book: AI Author: S. Russel Publication: Princeton hall	$ 63	ADD TO CART
		Book: Java 2 Author: Watson Publication: BPB publications	$ 35.5	ADD TO CART
		Book: HTML in 24 hours Author: Sam Peter Publication: Sam publication	$ 50	ADD TO CART

Note: Week 2 contains the remaining pages and their description.

4) CART PAGE:

The cart page contains the details about the books which are added to the cart.

The cart page should look like this:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE				
ECE	Book name	Price	Quantity	Amount
EEE	Java 2	$ 35.5	2	$ 70
CIVIL	XML bible	$ 40.5	1	$ 40.5
			Total amount- $130.5	

5) REGISTRATION PAGE:

Create a “*registration form* “with the following fields

1) Name (Text field)

2) Password (password field)

3) E-mail id (text field)

4) Phone number (text field)

5) Sex (radio button)

6) Date of birth (3 select boxes)

7) Languages known (check boxes – English, Telugu, Hindi, Tamil)

8) Address (text area)

WEEK 3:

VALIDATION:

Write *JavaScript* to validate the following fields of the above registration page.

1. Name (Name should contains alphabets and the length should not be less than 6 characters).
2. Password (Password should not be less than 6 characters length).
3. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)
4. Phone number (Phone number should contain 10 digits only).

Note : You can also validate the login page with these parameters.

WEEK 4:

Design a web page using **CSS (C**ascading **S**tyle **S**heets**)** which includes the following:

1) Use different font, styles: In the style definition you define how each selector should work

(font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles.

For example:

```
<HTML>
<HEAD>
<style type=”text/css”>
B.headline {color:red; font-size:22px; font-family:arial; textdecoration:
underline}
</style>
</HEAD>
<BODY>
<b>This is normal bold</b><br>
Selector {cursor:value}
```

For example:

```
<html>
<head>
<style type=”text/css”>
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>
<body>
<b>
<a href=”mypage.htm” class=”xlink”>CROSS LINK</a>
<br>
<a href=”mypage.htm” class=”hlink”>HELP LINK</a>
</b>
</body>
</html>
<b class=”headline”>This is headline style bold</b>
```

</BODY>

</HTML>

2) Set a background image for both the page and single elements on the page. You can define the background image for the page like this:

BODY {background-image:url(myimage.gif);}

3) Control the repetition of the image with the background-repeat property. As background-repeat: repeat Tiles the image until the entire page is filled, just like an ordinary background image in plain HTML.

4) Define styles for links as

A:link

A:visited

A:active

A:hover

Example:

<style type=”text/css”>

A:link {text-decoration: none}

A:visited {text-decoration: none}

A:active {text-decoration: none}

A:hover {text-decoration: underline; color: red;}

</style>

5) Work with layers:

For example:

LAYER 1 ON TOP:

<div style=”position:relative; font-size:50px; z-index:2;”>LAYER 1</div>

<div style=”position:relative; top:-50; left:5; color:red; font-size:80px; z-index:1">LAYER 2</div>

LAYER 2 ON TOP:

<div style=”position:relative; font-size:50px; z-index:3;”>LAYER1</div>

```
<div style=”position:relative; top:-50; left:5; color:red; fontsize:80px; zindex:4">LAYER 2</div>
```

6) Add a customized cursor:

Selector {cursor:value}

For example:

```
<html>
<head>
<style type=”text/css”>
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>
<body>
<b>
<a href=”mypage.htm” class=”xlink”>CROSS LINK</a>
<br>
<a href=”mypage.htm” class=”hlink”>HELP LINK</a>
</b>
</body>
</html>
```

WEEK 5:

Write an XML file which will display the Book information which includes the following:

1) Title of the book

2) Author Name

3) ISBN number

4) Publisher name

5) Edition

6) Price

Write a Document Type Definition (DTD) to validate the above XML file. Display the XML file as follows. The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns. Use XML schemas XSL and CSS for the above purpose.

Note: Give at least for 4 books. It should be valid syntactically.

Hint: You can use some xml editors like XML-spy

WEEK 6:

1) Install TOMCAT web server and APACHE. While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port.

2) Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root. Access the pages by using the urls : http://localhost:4040/rama/books.html (for tomcat) http://localhost:8080/books.html (for Apache)

WEEK 7:

USER AUTHENTICATION :

Assume four users user1,user2,user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a servelet for doing the following.

1. Create a Cookie and add these four user id's and passwords to this Cookie.

2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.

If he is a valid user(i.e., user-name and password match) you should welcome him by name(user-name) else you should display " You are not an authenticated user ". Use init-parameters to do this. Store the user-names and passwords in the webinf.xml and access them in the servlet by using the getInitParameters() method.

WEEK 8:

Install a database(Mysql or Oracle). Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form).

Practice 'JDBC' connectivity. Write a java program/servlet/JSP to connect to that database and extract

data from the tables and display them. Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week1).

WEEK 9:

Write a JSP which does the following job: Insert the details of the 3 or 4 users who register with the web site (week7) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies)

WEEK 10:

1. Create a simple XMLHttpRequest, and retrieve data from a TXT file using AJAX
2. Create an XMLHttpRequest to retrieve data from an XML file using AJAX

WEEK 11:

1. How a web page can communicate with a web server while a user type characters in an input field. (Retrieve the content of an JSP file)

2. Retrieve content from a database using AJAX.

WEEK 12:

Design the web pages required for an online book store web site using PHP, AJAX, and HTML5.

REFERENCES:

1. Dietel and Dietel, *"Internet and World Wide Web - How to Program"*, 5th Edition, PHI / Pearson Education, 2011
2. Herbert Schildt, *"The complete Reference Java 2"*, 8th Edition, TMH, 2011.
3. Phil Hanna, *"The Complete Reference JSP"*, 1st Edition, TMH, 2003.

INTELLECTUAL PROPERTY RIGHTS AND PATENTS

(Common to all Branches)

Course Code: 13NM1103

L	T	P	C
2	0	0	0

Course Educational Objectives:

- ✤ To acquaint the learners with the basic concepts of Intellectual Property Rights.
- ✤ To develop expertise in the learners in IPR related issues and sensitize the learners with the emerging issues in IPR and the rationale for the protection of IPR.

Course Outcomes:

At the end of this course, the student will be able to

- ✤ Gain knowledge on Intellectual Property assets and generate economic wealth
- ✤ Assist individuals and organizations in capacity building and work as a platform for development, promotion, protection, compliance, and enforcement of Intellectual Property & knowledge.

UNIT-I **(7 Lectures)**

Introduction to intellectual property Act and Law-the evolutionary past-the IPR tool kit- legal tasks in intellectual property law-ethical obligations in Para legal tasks in intellectual property law

UNIT-II **(8 Lectures)**

Introduction to trade mark – Trade mark registration process-Post registration procedures-Trade mark maintenance – transfer of rights- inter party's proceeding – Infringement-Dilution ownership of trade mark-likelihood of confusion – trademark claims- trademark litigations

UNIT-III **(6 Lectures)**

Introduction to copy rights- principles of copyright – subjects matter of copy right- rights afforded by copyright law- copyright ownership- transfer and duration – right to prepare derivative works- right of distribution- right to perform the work publicity- copyright formalities and registrations

UNIT-IV **(7 Lectures)**

Introduction to patent law- Rights and limitations- Rights under patent law- patent requirements- ownership – transfer- patent application process- patent infringement- patent litigation

UNIT-V **(6 Lectures)**

Introduction to transactional law- creating wealth and managing risk – employment relationship in the Internet and technologic cal sector- contact for internet and technological sector

TEXT BOOKS:

1 Kompal Bansal and Praishit Bansal, "Fundamentals of IPR for Engineers", 1st Edition, BS Publications, 2012.

2 Prabhuddha Ganguli, *"Intellectual Property Rights"*, 1st Edition, TMH, 2012.

REFERENCES:

1 R Radha Krishnan & S Balasubramanian, *"Intellectual Property Rights"*, 1st Edition, Excel Books, 2012.

2 M Ashok Kumar & mohd Iqbal Ali, *"Intellectual Property Rights"*, 2nd Edition, Serial publications, 2011.

NOTES

SYLLABI FOR VI SEMESTER

MANAGEMENT SCIENCE

(Common to Chemical, CSE, IT, ECE, EEE)

Course Code: 13HM1102

L	T	P	C
4	0	0	3

Course Educational Objectives:

To familiarize with the process of management and to provide basic insights into to select contemporary management practices.

Course Outcomes :

To understand the management processes and evolve management levels for effective decision making

UNIT-I (16 Lectures)

INTRODUCTION TO MANAGEMENT:

Concept-nature and importance of management- functions of management- evolution of management thought- decision making process- designing organization structure- principles of organization – types of organization structure

UNIT-II (12 Lectures)

OPERATIONS MANAGEMENT:

Principles and types of plant layout- work study- statistical quality control- control charts(R Chart, P Chart & C Chart- Simple numerical problems) – materials management- Need for Inventory Control- EOQ, ABC Analysis(Simple numerical Analysis)- Types of Inventory Analysis(HML. SDE, VED, FSN Analysis)

UNIT-III (10 Lectures)

HUMAN RESOURCE MANAGEMENT:

Concept of HRM, HRD and PMIR- Functions of HR Manager- theories of motivation and leadership styles- Job Evaluation and Merit Rating,

Welfare measures-statutory and non statutory compliance – grievance handling

UNIT-IV (12 Lectures)

MARKETING MANAGEMENT:

Marketing Management- Functions of Marketing Management- Marketing mix-Market segmentation - Marketing strategies based on product life cycle- Channels of Distribution- Consumer Behavior and marketing research

UNIT-V (14 Lectures)

PROJECT MANAGEMENT:

Project planning and control- Project life cycle- Development of network- Difference between PERT and CPM- Identifying critical path- probability of completing the project within the given time, cost analysis, - project crashing(simple numerical problems)

TEXT BOOKS :

1 Ramanujam Naidu & Sastry, *"Management Science"*, 1st Himalaya Publisher, 2012.

2 Vijaya Kumar & Appa Rao, *"Management Science"*, 1st Cengage Publishers, 2012.

3 AR Aryasri, *"Management Science"*, 4th Edition, Tata McGraw-Hill, 2009.

REFERENCES :

1 O P Khanna, *"Industrial Engineering & Management"*, 2nd Edition, Dhanpat Rai, 2004.

2 Martand Telsang, *"Industrial Engineering & Production Management"*, 2nd Edition, S. Chand & Company, 2008.

DATA WAREHOUSING AND DATA MINING

(Common to CSE & IT)

Course Code :13CT1122	L	T	P	C
	4	0	0	3

Course Educational Objectives:

To introduce the student to various data warehousing and data mining techniques. The course will cover all the issues of KDD process and will illustrate the whole process by examples of practical applications.

- ✤ To make the student capable of applying data mining techniques in real time applications.
- ✤ To make the student capable to compare and contrast different conceptions of data mining as evidenced in both research and application.
- ✤ Explain the role of finding associations in commercial market basket data.
- ✤ Identify and characterize sources of noise, redundancy, and outliers in presented data.
- ✤ To get an idea about the data that how it is going to be classified into clusters

Course Outcomes:

At the end of the course the student will be able to

- ✤ Understand the application of data mining techniques in real time applications
- ✤ Understand the Comparing and contrast different conceptions of data mining
- ✤ Understand the finding associations in commercial market basket data

- ✤ Understand the identifying and characterizing the noise, redundancy and outliers in presented data
- ✤ Understand about the clusters.

UNIT-I (12 Lectures)

INTRODUCTION:

Data mining-On what kinds of Data, what kinds of patterns can be mined, which technologies are used, which kinds of applications are targeted, major issues in Data Mining.

DATA PREPROCESSING: An Overview, Data Cleaning, Data Integration, Data Reduction, Data .Transformation and Data discretization.

UNIT-II (12 Lectures)

DATA WAREHOUSE AND OLAP TECHNOLOGY:

Data Warehouse: Basic concepts, Data Warehouse Modeling: Data Cube and OLAP, Data Warehouse Implementation, Data cube computation method- Multi way array aggregation for full cube computation.

DATA GENERALISATION: Data generalization by Attribute-Oriented Induction.

UNIT-III (12 Lectures)

MINING FREQUENT PATTERNS, ASSOCIATION AND CORRELATIONS:

Basic Concepts, Efficient and Scalable Frequent Item set Mining Methods, Which patterns Are interesting?-Pattern Evaluation methods.

UNIT-IV (12 Lectures)

CLASSIFICATION: BASIC CONCEPTS:

Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation.

UNIT-V (12 Lectures)

CLUSTER ANALYSIS: BASIC CONCEPTS:

Cluster analysis, Partitioning Methods (k- Means, k- Medoids) Hierarchical Methods: Agglomerative Vs Divisive, (BIRCH), Density-Based Methods: DBSCAN, Grid-Based Methods (STING).

TEXT BOOKS:

1 Jlawei Han & Micheline Kamber, Data Mining, *"Concepts and Techniques"*, 3rd Edition, Morgan Kaufmann Publishers, 2011.

2 Margaret H Dunham, *"Data Mining Introductory and advanced topics"*, 6th Edition, Pearson Education, 2009.

REFERENCES:

1. Arun K Pujari, *"Data Mining Techniques"*,1st Edition, University Press, 2005.
2. Pang- Ning Tan, Michael Steinbach, Vipin Kumar, *"Introduction to Data Mining"*, 1st Edition, Pearson Education,2012.
3. Sam Aanhory & Dennis Murray, *"Data Warehousing in the Real World"*, 1st Edition, Pearson Edn Asia,2008.
4. Paulraj Ponnaiah, *"Data Warehousing Fundamentals"*, 1st Edition, Wiley student Edition,2007.
5. Ralph Kimball, *"The Data Warehouse Life Cycle Tool Kit"*, 2nd Edition, Wiley student Edition, 2005.

COMPILER DESIGN

(Common to CSE& IT)

Course Code :13CT1123

L	T	P	C
4	1	0	3

Course Educational Objectives:

The main objective of the course is to give an overall idea about the compiler development process. Upon completion of this course the student should be able to:

- Analyze the source code and differentiate between lexical, syntax and semantic errors.
- Understand the run time storage requirements to run a program.
- Optimize the source code by applying optimization techniques.
- Develop a Compiler by having an idea of the six different phases.
- Giving idea about the Data-Flow Analysis of Structured Flow graphs

Course Outcomes:

At the end of the course the student will be able to

- Understand the internal process of Compilation
- Understand Lexical Analyzer
- Understands both top-down and bottom-up parsers
- Understand Semantic Analyzer
- Understands intermediate code generation and optimization techniques

UNIT-I (12 Lectures)

INTRODUCTION TO COMPILING:

Overview of Compilers, Analysis of the Source Program, the Phases of a Complier, Pre-Processors, Assemblers, Two Pass Assembly, Loaders and Link-Editors, Bootstrapping, The Grouping of Phases, Compiler Construction Tools.

UNIT-II (12 Lectures)

LEXICAL ANALYSIS:

The Role of the Lexical Analyzer, Strings and Languages, Operations on Languages, Regular Expressions, Regular Definitions, Notational Shorthands, Recognition of Tokens, A Language for specifying Lexical Analyzers(LEX).

SYNTAX ANALYSIS:

The Role of the Parser, Context-free Grammars, Writing a Grammar.

UNIT-III (12 Lectures)

TOP-DOWN PARSING:

Recursive Descent Parsing, Predictive Parsers, Non-Recursive Predictive Parsing, First and Follow, Construction of Predictive Parsing Tables, LL(1) Grammars, Error Recovery in Predictive Parsing.

BOTTOM-UP PARSING:

Handles, Handle Pruning, Stack Implementation, Operator-Precedence Parsing, LR Parsers-SLR, Canonical LR, LALR. Using Ambiguous Grammars, Parser Generator (YACC).

SYNTAX-DIRECTED TRANSLATION:

Syntax-Directed Definition, Construction of Syntax Trees, S-Attributed Definitions, L-Attributed Definitions.

UNIT-IV (12 Lectures)

SEMANTIC ANALYSIS:

Type Systems, Specification of a Type Checker, Equivalence of type-expressions, Type Conversions, Overloading of functions and operators, Polymorphic functions, Algorithm for Unification.

RUN-TIME ENVIRONMENT:

Source Language Issues, Storage Organization, Storage Allocation Strategies, Blocks, Access Links, Procedure Parameters, Displays, Parameter Passing, Symbol Tables.

UNIT-V (12 Lectures)

INTERMEDIATE CODE GENERATION:

Intermediate Languages-Graphical Representations, Three Address Code, Implementations, Boolean Expressions.

CODE OPTIMIZATION:

Introduction, Principle sources of Optimization, Optimization of Basic Blocks.

CODE GENERATION:

Issues, the Target Machine, Run-Time Storage Management, Basic Blocks and Flow graphs, Loops in Flow graphs, Data-Flow Analysis of Structured Flow graphs, Peephole Optimization, DAG, Simple Code Generator.

TEXT BOOKS:

1. Alfred V Aho, Ravi Sethi, Jeffrey D.Ullman, *"Compilers-Principles Techniques and Tools"*, 2nd Edition, Pearson Education, 2008.

REFERENCES:

1. Raghavan, *"Principles of Compiler Design"*, 2nd Edition, TMH, 2011.
2. Kenneth C.Louden, *"Compiler Construction-Principles and Practice"*, 2nd Edition, Cengage, 2010.
3. Cooper and Linda, *"Engineering a Compiler"*, 4th Edition, Elsevier, 2008.

WEB REFERENCES:

http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-%20Guwahati/afl/index.htm

COMPUTER NETWORKS

(Common to CSE, IT & ECE)

Course Code :13CT1124

L	T	P	C
4	1	0	3

Course Educational Objectives:

To make the student learn the design of computer networks.

- ✤ Basics of Computer Networks and different Transmission Media.
- ✤ Giving idea about Design issues in framing.
- ✤ Giving idea about Design issues in Routing Algorithms.
- ✤ Giving idea about Design issues in transport protocols.
- ✤ Giving idea about Design issues in Domain Name Systems and SNMP.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Understand the Network Models and Physical Layer.
- ✤ Understand the data link layer and medium access sub layer.
- ✤ Understand the Network Layer and Congestion Control.
- ✤ Understand the Transport Layer.
- ✤ Understand the concepts and their implementation in Application Layer.

UNIT-I (12 Lectures)

NETWORK MODELS:

Layered Tasks, WAN, LAN, MAN, OSI model, TCP/ IP protocol stack, addressing (Text book 2), Novell Networks Arpanet, Internet.(Text book 1).

PHYSICAL LAYER:

Transmission media: copper, twisted pair, wireless; switching and encoding asynchronous communications; Narrow band ISDN, broad band ISDN and ATM. (Text book 1)

UNIT-II (12 Lectures)

DATA LINK LAYER:

Design issues, framing, error detection and correction, CRC, Elementary data link protocols, Sliding Window Protocol, Slip, HDLC, Internet, and ATM.

MEDIUM ACCESS SUB LAYER:

Random access, Controlled access, Channelization, IEEE 802.X Standards, Ethernet, wireless LANS, Bridges. (Text book 2)

UNIT-III (12 Lectures)

NETWORK LAYER:

Network Layer Design Issues, Routing Algorithms, Internetworking, Network Layer in Internet.(Text book-1)

CONGESTION CONTROL:

General Principles, policies, traffic shaping, flow specifications,

Congestion control in virtual subnets, choke packets, loads shedding, jitter control.(Text book-2)

UNIT-IV (13 Lectures)

TRANSPORT LAYER: Transport Services, Elements of Transport Protocols, Internet Transport Protocols (TCP & UDP); ATM AAL Layer Protocol.(Text book-1)

UNIT-V (11 Lectures)

APPLICATION LAYER:

Network Security, Domain name system, SNMP, Electronic Mail: the World WEB, Multi Media.

TEXT BOOKS:

1. Andrew S Tanenbaum , *"Computer Networks"*, 6th Edition. Pearson Education / PI, 2012.

2. Behrouz A. Forouzan , *"Data Communications and Networking"*, 4th Edition TMH, 2012.

REFERENCES:

1. S.Keshav, *"An Engineering Approach to Computer Networks"*, 2nd Edition, Pearson Education, 2001.
2. William, A. Shay , *"Understanding communications and Networks"*, 3rd Edition, Thomson Publication, 2006

WEB REFERENCES:

1. http://nptel.iitm.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Computer%20networks/New_index1.html
2. http://nptel.iitm.ac.in/courses/IIT-MADRAS/Computer_Networks/index.php

INFORMATION STORAGE SYSTEMS
(ELECTIVE-1)
(Common to CSE & IT)

Course Code :13CT1126

L	T	P	C
4	0	0	3

Course Educational Objectives:

The main objective of the course is to introduce the students to different storage requirements, Data Center Environment, Data Protection Policies, Intelligent Storage Systems, and Storage Technologies. Upon completion of this course, the student should be able to:

- ✤ Giving idea about storage technology solutions.
- ✤ Giving idea about describing common storage management and roles.
- ✤ Giving idea about the concept of information availability and its measurement.
- ✤ Giving idea about the Components of an Intelligent Storage System.
- ✤ Giving idea about the File Systems and Network File Sharing.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Understand the Basics Of Information Storage.
- ✤ Understand the Data Center Environment.
- ✤ Understand the Data Protection Raid.
- ✤ Understand the Fiber Channel Storage Area Networks.
- ✤ Understand the Network-Attached, Object Based & Unified Storage.

UNIT-I (11 Lectures)

INTRODUCTION TO INFORMATION STORAGE:

Information Storage, Evolution of Storage Architecture, Data Center Infrastructure, Virtualization and Cloud Computing

UNIT-II (11 Lectures)

DATA CENTER ENVIRONMENT:

Application, Database Management System (DBMS), Host (Compute), Connectivity, Storage, Disk Drive Components, Disk Drive Performance, Host Access to Data, Direct-Attached Storage , Storage Design Based on Application Requirements and Disk Performance, Disk Native Command Queuing , Introduction to Flash Drives, Concept in Practice: VMware ESXi.

UNIT-III (12 Lectures)

DATA PROTECTION: RAID:

RAID Implementation Methods , RAID Array Components, RAID Techniques , RAID Levels , RAID Impact on Disk Performance, RAID Comparison, Hot Spares.

INTELLIGENT STORAGE SYSTEMS:

I Components of an Intelligent Storage System, Storage Provisioning, Types of Intelligent Storage Systems, Concepts in Practice: EMC Symmetric and VNX.

Storage Networking Technologies.

UNIT-IV (12 Lectures)

FIBRE CHANNEL STORAGE AREA NETWORKS:

Fibre Channel: Overview, The SAN and Its Evolution, Components of FC SAN , FC Connectivity, Switched Fabric Ports, Fibre Channel Architecture, Fabric Services , Switched Fabric Login Types, Zoning, FC SAN Topologies, Virtualization in SAN, Concepts in Practice: EMC Connectrix and EMC VPLEX .

IP SAN and FCoE : FCIP, FCoE.

UNIT-V (13 Lectures)

NETWORK-ATTACHED STORAGE :

General-Purpose Servers versus NAS Devices, Benefits of NAS, File Systems and Network File Sharing, Components of NAS, NAS I/O Operation, NAS Implementations, NAS File-Sharing Protocols, Factors Affecting NAS Performance, File-Level Virtualization, Concepts in Practice: EMC Isilon and EMC VNX Gateway.

OBJECT-BASED AND UNIFIED STORAGE:

Object-Based Storage Devices, Content-Addressed Storage, CAS Use Cases, Unified Storage, Concepts in Practice: EMC Atoms, EMC VNX, and EMC Centera.

TEXT BOOKS:

1. G.Somasundaram, A.Shrivastava, *"EMC Corporation, Information Storage and Management: Storing, Managing and Protecting Digital Information in Classic, Virtualized and Cloud Environment"*, 2nd Edition, Wiley publication, 2012.
2. Robert Spalding, *"Storage Networks: The Complete Reference"*, 1st Edition, Tata McGraw Hill/Osborne, 2003.

REFERENCES:

1. Marc Farley, *"Building Storage Networks"*, 2nd Edition, Tata McGraw Hill/Osborne, 2001.
2. Meeta Gupta, *"Storage Area Network Fundamentals"*, 1st Edition, Pearson Education, 2002.

IMAGE PROCESSING
(ELECTIVE-I)

Course Code:13CS1101	**L**	**T**	**P**	**C**
	4	**0**	**0**	**3**

Course Educational Objectives:

- The primary objective of this course is to introduce students to basic principles of digital images, image data structures, and image processing algorithms.
- Thorough understanding of the theoretical underpinnings of digital image processing and compression.
- Extensive experience with the design, implementation and testing of various image processing and compression algorithm.

Course Outcomes:

A student who successfully completes this course should, at a minimum, be able to:

- Understanding of digital image fundamentals
- Understanding of image digitization
- Ability to understand and apply image enhancement and restoration techniques
- Understanding of image encoding techniques
- Understanding of image segmentation approaches
- Introduction to pattern recognition and feature detection approaches
- Ability to apply image processing techniques in both the spatial and frequency (Fourier) domains

UNIT-I (12 Lectures)

Elements of digital image processing, Sampling and Quantization, Relationships between pixels, Enhancement by point processing, Spatial filtering: Smoothing, Median, & Sharpening, FFT, Discrete cosine Transform, Wavelet Transform.

UNIT-II **(12 Lectures)**

Image Segmentation: Discontinuity detection, Edge linking and boundary detection, Threshing, Region oriented segmentation, Hough Transform, Canny edge detection, Color Models, Pseudo Color processing, Color Image segmentation.

UNIT-III **(12 Lectures)**

Morphological Image Processing: Dilation and Erosion, Opening and Closing, Morphological algorithm, like, Hit Miss transform, Convex Hull, Thinning, Thickening, Skeltonization. Boundary descriptor, Regional descriptor.

UNIT-IV **(12 Lectures)**

Image Restoration and Compression: Degradation and observation models, Inverse filtering, Weiner filter, Noise models. Image compression models, Huffman coding, LZW Coding, Arithmetic Coding, JPEG compression, Wavelet compression

UNIT-V **(12 Lectures)**

Object reorganization: Statistical pattern recognition, Neural networks, Fuzzy systems, Boosting in pattern recognition (Ada boost algorithm).

TEXT BOOKS:

1. R.C. Gonzalez & R.E. Woods, *"Digital Image processing"*, Addison Wesley/ Pearson education, 2nd Edition,2010.
2. Milan Sonaka,Vaclav Hivac and Roger Boyle, *"Digital Image processing and Computer Vision"*,2008 by Cenage Learning.

REFERENCES:

1. A.K.Jain, *"Fundamentals of Digital Image Processing"*, PHI.
2. William K. Pratt,John Wilely, *"Digital Image processing"*, 3rd Edition,2004.
3. Rafael C. Gonzalez, Richard E Woods and Steve, *"Digital Image processing using MAT LAB"*, Edition, PEA, 2004

4. Weeks Jr., *"Fundamentals of Electronic Image Processing"*, SPIC/IEEE Series, PHI

Reference Http://www.jntu.ac.in/.

WEB REFERNCES:

http://www.nptel.iitm.ac.in/video.php?subjectId=117105079

HUMAN COMPUTER INTERACTION
(ELECTIVE –I)

Course code: 13CS1102

L	T	P	C
4	0	0	3

Course Educational Objectives:

The student will learn how interaction with computers takes place at user interface, which comprises both hardware and software.

Course Outcomes:

The student will learn

- ✤ The importance of User Interface and interaction with computers using a Graphical User Interface and Keyboard and function keys along with video drivers

UNIT-I (12 Lectures)

INTRODUCTION:

Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design.

UNIT-II (12 Lectures)

THE GRAPHICAL USER INTERFACE :

Popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics-Principles of user interface.

DESIGN PROCESS – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, and understanding business junctions.

UNIT-III (12 Lectures)

SCREEN DESIGNING:

Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow –

Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

WINDOWS – New and Navigation schemes selection of window, selection of devices based and screen based controls.

UNIT-IV **(12 Lectures)**

COMPONENTS – Text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

SOFTWARE TOOLS – Specification methods, interface – Building Tools.

UNIT-V **(12 Lectures)**

INTERACTION DEVICES – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

TEXT BOOKS:

1. Ben Shneidermann, Designing the User Interface,3rdEdition,Pearson Education Asia,2007.

REFERENCES:

1. Alan Dix, Janet Finclay, *“Human Computer Interaction”*, 3rd Edition,Pearson ,2003.
2. Rogers, Sharps,Interaction Design,PRECE,1st Edition,Wiley Dreamtech,2002
3. Soren Lauesen, *“User Interface Design”*, 1st Edition, Pearson Education, 2005
4. Willbert O Galitz, *“The Essential guide to User Interface design”*, 3rd Edition,Wiley Dreamtech,2007

WEB RERENCES:

1.nptel.iitm.ac.in/courses/106103115/41ý

MACHINE LEARNING
(ELECTIVE-II)

Course Code: 13CS1103

L	T	P	C
4	0	0	3

Course Educational Objectives:

To give an in depth perspective of Machine Learning principles

Course Outcomes:

- To give a holistic perspective of Machine learning.
- To introduce concept learning, version spaces.
- To explain in depth the various concepts of decision trees, artificial neural networks, Bayesian learning, instance based learning.
- To familiarize the student with evaluating the hypotheses.
- To introduce Computational Learning theory and the various theorems of Statistical Machine Learning theory.

UNIT-I **(12 Lectures)**

INTRODUCTION TO MACHINE LEARNING:

Well-Posed Learning Problem, Designing a Learning system, Perspectives and Issues in Machine Learning.

CONCEPT LEARNING AND THE GENERAL-TO-SPECIFIC ORDERING:

Introduction, A Concept Learning Task, Concept Learning as Search, FIND-S: Finding a Maximally Specific Hypothesis, Version Spaces and the Candidate Elimination Algorithm, Remarks on Version spaces and Candidate-Elimination, Inductive Bias

UNIT-II **(12 Lectures)**

DECISION TREE LEARNING:

Introduction, Decision Tree Representation, Appropriate Problems for Decision Tree Learning, The Basic Decision Tree Learning Algorithm, Hypothesis Space Search in Decision Tree Learning, Inductive Bias in Decision Tree Learning, Issues in Decision Tree Learning

UNIT-III (12 Lectures)

ARTIFICIAL NEURAL NETWORKS:

Introduction, Neural Network Representations, Appropriate Problems for Neural Network Learning, Perceptrons, Multilayer Networks and the Backpropagation Algorithm, Remarks on Back Propagation Algorithm, An Illustrative Example: Face Recognition, Advanced Topics in Artificial Neural Networks

UNIT-IV (12 Lectures)

EVALUATING HYPOTHESES:

Motivation, Estimating Hypothesis Acuracy, Basics of Sampling Theory , A General Approach for Deriving Confidence Intervals, Differene in Error of Two Hypotheses, Comparing Learning Algorithms

BAYESIAN LEARNING:

Introduction, Bayes Theorem, Bayes Theorem and Concept Learning, Maximum Likelihood and Least-Squared Error Hypotheses, Maximum Likelihood Hpotheses for Predicting Probabilities, Minimum Description Length Principle, Bayes Optimal Classifier, Gibbs Algorithm, Naive Bayes Classifier, An Example: Learning to Classify Text, Bayesian Belief Networks, The EM Algorithm

UNIT-V (12 Lectures)

COMPUTATIONAL LEARNING THEORY:

Introduction, Probably Learning an Approximately Correct Hypothesis, Sample Complexity for Infinite Hypothesis Spaces, The Mistake Bound Model of Learning

INSTANCE BASED LEARNING:

Introduction, k-Nearest neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning

TEXT BOOK:

Tom Mitchell, *"Machine Learning"*, Mc GrawHill publications, 1997

REFERENCES:

1. Christopher.M.Bishop, *"Pattern Recognition and Machine Learning"*, Springer publications, October 2007.
2. Ethem Alpaydin, *"Introduction to Machine Learning"*, 2nd Edition, MIT Publishers, 2010

WEB REFERNCES:

https://www.coursera.org/course/ml

MIDDLEWARE TECHNOLOGIES
(ELECTIVE-II)
(Common to CSE & IT)

Course Code :13CT1131

L	T	P	C
4	0	0	3

Course Educational Objectives:

The main objective of the course is to create a practical, wide-ranging discussion on Middleware Technologies to help students understand what is going on so they can pick out the real issues from the imaginary issues and start building complex distributed systems with confidence. Upon completion of this course the students will be able to

- ✤ Understand Distributed systems design and implementation
- ✤ Understand existing Distributed Technologies
- ✤ Use Middleware to Build Distributed Applications
- ✤ Understand Middleware Interoperability
- ✤ Understand Web services architectures

Course Outcomes:

At the end of the course the student will be able to

- ✤ Learn how to use Middleware to Build Distributed Applications
- ✤ Implement Business Processes
- ✤ Learn about MiddleWare Technologies
- ✤ Implement Business Processes
- ✤ Learn application design and IT architecture

UNIT-I (12 Lectures)

INTRODUCTION:

Moving to e-business, what is IT architecture? Why is this different from what we did before? Rewrite or evolve? , Who develops the architecture? Early days, Preliminaries, Remote procedure calls, Remote database access, Distributed transaction processing, Message queuing, Message queuing versus distributed transaction processing, what happened to all this technology?

OBJECTS, COMPONENTS, AND THE WEB:

Using object middleware, Transactional component middleware, COM, EJB, Final comments on TCM, Internet Applications.

WEB SERVICES: Service concepts, Web services, and Using Web services: A pragmatic approach.

UNIT-II (12 Lectures)

A TECHNICAL SUMMARY OF MIDDLEWARE:

Middleware elements, The communications link, The middleware protocol, The programmatic interface, Data presentation, Server control, Naming and directory services, Security, System management, Comments on Web services, Vendor architectures, Vendor platform architectures, Vendor-distributed architectures, Using vendor architectures, Positioning, Strawman for user target architecture, Marketing, Implicit architectures, Middleware interoperability.

UNIT-III (12 Lectures)

USING MIDDLEWARE TO BUILD DISTRIBUTED APPLICATIONS:

What is middleware for? Support for business processes, Information retrieval, Collaboration, Tiers, The presentation tier, The processing tier, The data tier, Services versus tiers, Architectural choices, Middleware bus architectures, Hub architectures, Web services architectures, Loosely coupled versus tightly coupled.

UNIT-IV (12 Lectures)

SECURITY:

What security is needed, Traditional distributed system security, Web services security, Architecture and security.

APPLICATION DESIGN AND IT ARCHITECTURE :

:Problems with today's design approaches, Design up front or as needed?, The role of business rules, Existing systems, Reuse, Silo and monolithic development, The role of architecture, Levels of design, Reconciling design approaches.

UNIT-V (12 Lectures)

IMPLEMENTING BUSINESS PROCESSES:

What is a process? Business processes, Information and processes, Architecture process patterns, Clarification and analysis, Error Handling, Timing, Migration, Flexibility.

TEXT BOOK:

Chris Britton and Peter Eye, *"IT Architectures and Middleware: Strategies for Building Large, Integrated Systems"*, 2nd Edition, Pearson Education, 2004.

REFERENCES:

1. Qusay H. Mahmoud, *"Middleware for Communications"*, 1st Edition, John Wiley and Sons,2004.
2. Michah Lerner, *"Middleware Networks: Concept, Design and Deployment of Internet Infrastructure"*, 1st Edition, Kluwer Academic Publishers, 2000.

ADVANCED COMPUTER ARCHITECTURE
(ELECTIVE-II)

Course Code: 13CS1104

L	T	P	C
4	0	0	3

Course Educational Objectives:

The objective of this course is to provide an exposure to current and emerging trends in Computer Architectures, focusing on performance and the hardware/software interface. The emphasis is on studying and analyzing fundamental issues in architecture design and their impact on performance.

Course Outcomes:

The Student will be able to:

- ✤ Understand the advanced concepts of computer architecture.
- ✤ Expose the major differentials of RISC and CISC architectural characteristics.
- ✤ Investigating modern design structures of Pipelined and Multiprocessors systems.

UNIT-I (12 Lectures)

Fundamentals of Computer design- Technology trends- cost- measuring and reporting performance quantitative principles of computer design. Instruction set principles and examples- classifying instruction set- memory addressing- type and size of operands- addressing modes for signal processing-operations in the instruction set- instructions for control flow-encoding an instruction set.-the role of compiler

UNIT-II (12 Lectures)

Instruction level parallelism (ILP)- over coming data hazards- reducing branch costs –high performance instruction delivery- hardware based speculation- limitation of ILP. ILP software approach- compiler techniques-static branch protection - VLIW approach - H.W support for more ILP at compile time- H.W verses S.W Solutions

UNIT-III **(12 Lectures)**

Memory hierarchy design- cache performance- reducing cache misses penalty and miss rate – virtual memory- protection and examples of VM.

UNIT-IV **(12 Lectures)**

Multiprocessors and thread level parallelism- symmetric shared memory architectures- distributed shared memory- Synchronization- multi threading. Storage systems- Types – Buses - RAID- errors and failures- bench marking a storage device- designing a I/O system.

UNIT-V **(12 Lectures)**

Inter connection networks and clusters - interconnection network media – practical issues in inter connecting networks – examples-cluster and designing a cluster.

TEXT BOOK:

John L. Hennessy & David A. Patterson Morgan Kufmann, *"Computer Architecture A Quantitative Approach"*, 3rd Edition, An Imprint of Elsevier, 2011.

REFERENCES :

1. Kai Hwang and A.Briggs, *"Computer Architecture and parallel Processin"*g, 1st Edition , International Edition McGraw-Hill, 2004.
2. DezsoSima, Terence Fountain, Peter Kacsuk, *"Advanced Computer Architectures"*, 1st Edition, Pearson, 2005.
3. David E. Culler, Jaswinder Pal singh, "Parallel Computer Architecture, A Hardware / Software APPROACH", 2nd Edition, Princeton, 2005.

WEB REFERENCES:

http://www.youtube.com/course? feature=edu&list = EC07FAB55C66 9A6CF0 & category = University % 2F Science % 2F Computer % 2520 Science % 2F Computer % 2520 Architecture

TECHNICAL COMMUNICATION AND SOFT SKILLS LAB

Course Code : 13HE1103

L	T	P	C
0	0	3	2

Introduction

The introduction of the Advanced English Communication skills Lab is considered essential at B.Tech. level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context. The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

- Gathering ideas and information: organizing ideas relevantly and coherently
- Engaging in debates
- Participating in group discussions
- Facing interviews
- Writing project proposals / technical reports
- Making oral presentations
- Writing formal letters and essays
- Transferring information from non-verbal to verbal texts and vice versa
- Taking part in social and professional communication

Course Educational Objectives:

The Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the students' accuracy and fluency in English through a well-developed vocabulary, and enable them to listen to English

spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.

- ✤ To enable students face competitive exams such as, GRE, TOEFL, IELTS, UPSC and other Bank examinations.
- ✤ To enable them communicate their ideas relevantly and coherently in writing.

Course Outcomes:

- ✤ Students will be able to use language accurately, fluently and appropriately.
- ✤ They will be able to show their skills of listening, understanding and interpreting.
- ✤ They will be able to write project reports, reviews and resumes.
- ✤ They will be able to express their ideas relevant to given topics.
- ✤ Students will also exhibit advanced skills of interview, debating and discussion.

LIST OF TASKS :

1. Listening comprehension – Achieving ability to comprehend material delivered at relatively fast speed; comprehending spoken material in Standard Indian English, British English, and American English; intelligent listening in situations such as interview in which one is a candidate.
2. Vocabulary building, Creativity, using Advertisements, Case Studies etc.
3. Personality Development: Decision-Making, Problem Solving, Goal Setting, Time Management & Positive Thinking
4. Cross-Cultural Communication : Role-Play/ Non-Verbal Communication.
5. Meetings- making meeting effective, chairing a meeting, decision-making, seeking opinions , interrupting and handling interruptions, clarifications, closure- Agenda, Minute writing

6. Group Discussion – dynamics of group discussion, Lateral thinking, Brainstorming and Negotiation skills

7. Resume writing – CV – structural differences, structure and presentation, planning, defining the career objective

8. Interview Skills – formal & informal interviews,concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing

9. Writing Skills - Business Communication, Essays for competitive examinations.

10. Technical Report Writing/ Project Proposals – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.- Feasibility, Progress and Project Reports.

REFERENCES:

1. Simon Sweeny, *"English for Business Communication"*, CUP, First South Asian Edition, 2010.

2. M. Ashraf Rizvi, *"Effective Technical Communication"*, Tata McGraw-Hill Publishing Company Ltd. 2005.

3. Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, *"English Language Communication: A Reader cum Lab Manual"*, Anuradha Publications, Chennai, 2006.

4. Dr. Shalini Verma, *"Body Language- Your Success Mantra"*, S. Chand, 2006.

5. Andrea J. Rutherford, *"Basic Communication Skills for Technology"*, 2^{nd} Edition, Pearson Education, 2007.

6. Sunita Mishra & C. Muralikrishna, *"Communication Skills for Engineers"*, Pearson Education, 2007.

7. Jolene Gear & Robert Gear, *"Cambridge Preparation for the TOEFL Test"*, 2010.

8. Meenakshi Raman & Sangeeta Sharma, *"Technical Communication"*, Oxford University Press, 2011.

9. Nick Ceremilla & Elizabeth Lee- Cambridge *"English for the Media"* CUP, 2010.

10. R.C. Sharma, Krishna Mohan, *"Business Correspondence and Report writing"*, 4th Edition, Tata Mcgraw-Hill Publishing Co. Ltd., 2010.

11. DELTA's key to the Next Generation TOEFL Test: *"Advanced Skill Practice,"* New Age International (P) Ltd., Publishers, New Delhi. 2010.

12. Books on TOEFL/GRE/GMAT/CAT by Barron's/ CUP, 2011.

13. IELTS series with CDs by Cambridge University Press, 2010.

BASIC COMPUTATIONS LAB

Course Code : 13ES11BC

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to enable the student to learn the basics of MATLAB Toolbox and to solve general mathematical problems.

Course Outcomes :

- ✤ Student will able to solve mathematical problems numerically.
- ✤ The student able to solve ODE-IVP, ODE-BVP, Regression using MAT LAB.

LIST OF EXERCISES:

1. Basic commands like representing arrays, matrices, reading elements of a matrix, row and columns of matrices, random numbers.
2. Round, floor ceil, fix commands.
3. Eigen values and Eigen vectors of a matrix.
4. Plotting tools for 2-D and 3-D plots, putting legends, texts, using subplot tool for multiple plots, log-log and semilog plots.
5. Linear Regression and polynomial regression, Interpolation.
6. Non linear regression.
7. Solving non linear algebraic equations.
8. ODE IVP problems using Runge - Kutta method.
9. Using quadrature to evaluate integrals (1-D, 2-D and 3-D cases).
10. Control statements like switch, if else statement etc.
11. Write a Matlab code for reading an image and to display its negative effect .
12. Write a Matlab code for embedding Salt & Pepper Noise using “imnoise” inbuilt function and perform median filtering on the noisy image by varying mask size and observe the filtering performance.

DATA MINING AND DATA WAREHOUSING LAB

Course Code:13CS1105

L	T	P	C
0	0	3	2

Course Educational Objectives:

- To introduce Weka software.
- To make students implement data mining algorithms in Java.
- To introduce text mining techniques to students.
- To build data cube either by using open source tools or using SQL.
- To design, develop and implement data warehouse for simple applications.
- To understand and study data warehouse administration support concepts by considering any one commercial data warehouse.
- Learn Weka Software.
- Mplementations of various data mining algorithms.
- OLAP Operations and Data warehouse design and development case study.

LIST OF EXPERIMENTS:

1. Introduction to Weka : All the features of Weka software will be explored in this assignment.(2 weeks)
2. Implementation of Apriori algorithm (2 weeks)
3. Implementation of FP tree algorithm (2 weeks)
4. Implementation of Naïve Bayesian classification algorithm(1 week)
5. Implementation of K-means clustering algorithm (1 week)
6. Introduction to text mining : Text mining preprocessing tasks such as stop word removal, POS tagging, Introduction to Wordnet, Indexing,Classification of text using Naïve bayes etc.(3weeks)

7. OLAP operators, building of data cube, simulation of data cube using powerful functions of SQL (1 week).
8. Data warehouse design and development-case study (1week).
9. Data warehouse administration support-partitioning in SQL, parllel execution, materialized views, and demonstration using a data base (1 week).

SYLLABI FOR VII SEMESTER

EMBEDDED SYSTEMS - 2

(Common to CSE & IT)

Course Code :13CT1129

L	T	P	C
4	0	0	3

Pre requisites: Embedded Systems - 1

Course Educational Objectives:

To present to the student the computational devices, peripherals and networks along with software and hardware description languages.

- To provide students fundamental concept and insight for advance ARM7 and PIC32 Processor based architecture and programming Embedded System based on ARM
- PIC32 powered MCU for application in control, multimedia, Mobiles, wireless communication.
- It exposes students to the field of Embedded Systems and gives them a chance to hear and read about embedded system topics, and then put those concepts to work by developing and debugging embedded system hardware and firmware.
- The students will have the opportunity to develop various Embedded Systems from the ground up, starting with electronic components and data sheets.
- Progressing through construction of hardware and implementation of firmware.

Course Outcomes:

At the end of the course the student will be able to

- Understand the essentials of the ARM7 instruction set and its registers and able to write programs in assembly language for real time problems.

- Understand the essentials of the PIC32 instruction set and its registers and able to write programs in assembly language for real time problems.
- Design their application by interfacing System Peripherals and external sensors.
- Understand modern communication protocols starting with addressable USART, SPI bus, 12C bus and USB; their characteristics protocols and usage in high speed communication.
- Know the basics of In Circuit Emulation techniques using JTAG.

UNIT-I **(12 Lectures)**

The ARM Architecture: ARM / THUMB register organization, Modes of operations, The bus structure and the peripherals, memory organization, load store instruction set, addressing modes. Basic assembly language programming (64 bit addition, string operations, block transfer).

UNIT-II **(12 Lectures)**

ARM interfacing programs: GPIO, Timers, Counters, PWM, ADC. Application coding examples: Measurement and control of time, frequency velocity acceleration, power control and touch monitoring.

UNIT-III **(12 Lectures)**

Introduction to MIPS processor architecture in PIC 32 bit family, CPU architecture and a detailed introduction to peripherals, present. GPIO, timers, capture control and PWM features. Instruction set usage with application examples.

(http://ww1.microchip.com/downloadsEditionn/DeviceDoc/61146B.pdf)

UNIT-IV **(12 Lectures)**

PIC 32 Interrupts, modes and vectored interrupt priority processing using the many shadow registers. Interfacing programs using interrupts. Measurement of time, frequency, velocity & acceleration.

UNIT-V **(12 Lectures)**

Modern communication protocols starting with addressable USART, SPI bus, 12C bus and USB; their characteristics protocols and usage in high speed communication. Introduction to In

TEXT BOOKS:

1. B.Kanta Rao, *"Embedded Systems"*, 1st Edition, PHI Learning Private Limited, 2011. (Units 1, 2, 5)
2. Trevor Martin, *"Introduction to the LPC2000"*, 1st Edition, Hitex (UK) Ltd, 2005. (Units 1, 2, 5)
3. Lucio Di Jasio, *"Programming 32-bit Microcontrollers in C Exploring the PIC 32"*, 1st Edition, Newnes, 2008. (Units 3 ,4)

REFERENCES:

1. A.N.Sloss, D.Symes and C. Wright, *"RM system's Developer Guide, Designing an Optimizing system software"*, 1st Edition, Morgann Kaufmann Publishers, 2004.
2. Steve Furber, *"ARM system on Chip Architecture"*, 2nd Edition, Adison Wesley Publishers, 2000.
3. David Seal, *"ARM Architecture reference Manual"*, 2nd Edition, Adison Wesley Publishers, 2001.
4. http://ww1.microchip.com/downloadsEdition/DeviceDoc/61146B.pdf (Unit 5)

WEB REFERENCES :

1. http://www.nptel.iitm.ac.in/video.php?subjectId=108102045

SOFTWARE TESTING
(Common to CSE & IT)

Course Code : 13CT1125

L	T	P	C
4	0	0	3

Pre-Requisite: Software Engineering

Course Educational Objectives:

The main objective of the course is to expose the students how to test the large scale projects module wise, program wise. Also to give awareness to the student how to validate a particular program with proper and improper inputs. Upon completion of this course, the student should be able to:

- ✤ Determine software testing objectives and criteria.
- ✤ Develop and validate a test plan.
- ✤ Select and prepare test cases.
- ✤ Studying various testing methodologies.
- ✤ Prepare testing policies and standards.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Understand Creating An Environment Supportive Of Software Testing.
- ✤ Understand the Flow Graphs, Data flow & Path Testing.
- ✤ Understand the Domain Testing.
- ✤ Understand the Logic Based Testing.
- ✤ Understand the way of testing with different tools.

UNIT-I (12 Lectures)

INTRODUCTION:

Purpose of testing, Dichotomies, model for testing, consequences of bugs.

CREATING AN ENVIRONMENT SUPPORTIVE OF SOFTWARE TESTING:

Writing policy for software testing, economics of testing, building a structured approach for software testing process, work bench Concept.

OVERVIEW OF SOFTWARE TESTING PROCESS:

Advantages of following process cost of computer testing, the seven step software testing process.

UNIT-II (12 Lectures)

FLOW GRAPHS AND PATH TESTING:

Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

DATAFLOW TESTING: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT-III (12 Lectures)

DOMAIN TESTING:

Domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domains and testability.

PATHS, PATH PRODUCTS AND REGULAR EXPRESSIONS:

Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection

UNIT-IV (12 Lectures)

LOGIC BASED TESTING:

Overview, decision tables, path expressions, KV charts, specifications.

STATE, STATE GRAPHS AND TRANSITION TESTING:

State graphs, good & bad state graphs, state testing.

UNIT-V (12 Lectures)

BUILDING TOOLS.

Win Runner: Introduction to win runner, Features, Add Ins, Identifying GUI objects, Creating GUI map file, Recording test, Choosing Record mode, Running the test, Win Runner Testing process, GUI Check point, Data driven test, Synchronization, Batch Test, Dialogue Boxes, Functions, Regular Expressions, Exception handling, Break points.

TEXT BOOKS:

1. Baris Beizer, *"Software Testing Techniques"*, 2nd Edition, , Dreamtech Press ,2002 .
2. Dr.K.V.K.K.Prasad, *"Software Testing Tools"*, 1st Edition, Dreamtech, 2011.
3. William E Perry, *"Effective methods of Software Testing"*, 3rd Edition , John Wiley,2006 .

REFERENCES:

1. Brian Marick, *"The craft of Software Testing"*, 1st Edition, Pearson Education, 1994.
2. Edward Kit, *"Software Testing in the Real World"*, 1st Edition, Pearson Education, 2002.

WEB REFERENCES:

1. http://books.google.co.in/books/about/Software_Testing_Techniques.html? id = Ixf97h356zcC & redir_esc=y
2. http://my.safaribooksonline.com/book/software-engineering-and-development/software-testing/9780764598371
3. http://www.tmhshop.com/9780070583528
4. http://en.wikipedia.org/wiki/Software_testing
5. http://www.testingstuff.com/references.html

PRINCIPLES OF PROGRAMMING LANGUAGES

Course Code:13CS1106

L	T	P	C
4	1	0	3

Course Educational Objectives:

To enable the students to learn about various constructs and their respective comparisons in different high-level languages so that he can choose suitable programming language for solving a particular problem.

Course Outcomes:

Upon completion of this course, the student should be able to:

- ✤ Understand the reason for learning a programming language.
- ✤ Understand the usage and existence of various programming languages.
- ✤ Understand the various features of a programming language with syntactical description.
- ✤ Describe the usage of data types in various languages.
- ✤ Understand the concepts like abstract data types, sub programs and will be able to apply in realistic manner.
- ✤ Understand the overview of programming language like Prolog, FPL, LISP, ML.

UNIT-I (12 Lectures)

PRELIMINARY CONCEPTS:

Reasons for studying, concepts of programming languages, Language Evaluation Criteria, influences on Language design, Language categories. Programming Language Implementation – Compilation, Hybrid Implementation, Pure Interpretation and Virtual Machines.

methods of describing syntax - BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, attribute SYNTAX

AND SEMANTICS: General Problem of describing Syntax and Semantics, formal grammars.

UNIT-II (12 Lectures)

DATA TYPES:

Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization.

EXPRESSIONS AND STATEMENTS:

Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements, Control Structures – Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements.

UNIT-III (12 Lectures)

SUBPROGRAMS AND BLOCKS:

Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions user defined overloaded operators, co routines

ABSTRACT DATA TYPES:

Abstractions and encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT, object oriented programming in small talk, C++, Java, C#, Ada 95

UNIT-IV (12 Lectures)

CONCURRENCY:

Subprogram level concurrency, semaphores, monitors, massage passing, Java threads, C# threads.

EXCEPTION HANDLING:

Exceptions, exception Propagation, Exception handler in Ada, C++ and Java.

UNIT-V (12 Lectures)

FUNCTIONAL PROGRAMMING LANGUAGES:

Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages.

LOGIC PROGRAMMING LANGUAGE:

Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

TEXT BOOKS :

1. Robert .W. Sebesta, *"Concepts of Programming Languages"*, 6th Edition , Pearson Education, 2002 .(1 to 5 units)
2. Louden, *"Programming Languages"*, 3rd Edition,2012.

REFERENCES:

1. Ghezzi, *"Programming Languages"*, 3rd Edition, John Wiley, 2008.
2 Pratt and Zelkowitz, *"Programming Languages Design and Implementation"*, 4th Edition PHI/Pearson Education,2008.
3. Watt, "*Programming languages*", 1st Edition, Wiley Dreamtech., 2004.
4. Patric Henry Winston and Paul Horn, *"LISP"*,3rd Edition, Wiley Dreamtech,2005.
5. Clocksin, *"Programming in PROLOG"*, 5th Edition, Springer, 2004.

CRYPTOGRAPHY AND NETWORK SECURITY

Course Code: 13CS1107

L	T	P	C
4	0	0	3

Pre-requisite: Computer Networks.

Course Educational Objectives:

To make the student learn different encryption techniques along with hash functions, MAC, digital signatures and their use in various protocols for network security and system security.

Course Outcomes:

The student who successfully completes this course will be able to:

- Analyze and design classical encryption techniques and block ciphers.
- Understand and analyze data encryption standard.
- Understand and analyze public-key cryptography, RSA and other public-key cryptosystems
- such as Diffie-Hellman Key Exchange, ElGamal Cryptosystem, etc.
- Understand key management and distribution schemes and design User Authentication
- Protocols.
- Analyze and design hash and MAC algorithms, and digital signatures.
- Design network application security schemes, such as PGP, S/MIME, IPSec, SSL, TLS,
- HTTPS, SSH, etc.
- Know about Intruders and Intruder Detection mechanisms, Types of Malicious software,
- Firewall Characteristics, Types of Firewalls, Firewall Location and Configurations.

UNIT-I (12 Lectures)

INTRODUCTION :

Computer Security Concepts, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security.

CLASSICAL ENCRYPTION TECHNIQUES:

Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Steganography.

BLOCK CIPHERS AND THE DATA ENCRYPTION STANDARD:

Block Cipher Principles, The Data Encryption Standard (DES), A DES Example, The Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles.

BLOCK CIPHER OPERATION:

Multiple Encryption and Triple DES, Electronic Codebook Mode, Cipher Block Chaining Mode, Cipher Feedback Mode, Output Feedback Mode, Counter Mode.

STREAM CIPHERS : Stream Ciphers, RC4.

UNIT-II (12 Lectures)

PSEUDORANDOM NUMBER GENERATION:

Principles of Pseudorandom Number Generation, Pseudorandom Number Generators.

NUMBER THEORY-:

Divisibility and the Division Algorithm, The Euclidean Algorithm, Modular Arithmetic, Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithms.

PUBLIC-KEY CRYPTOGRAPHY, RSA AND OTHER PUBLIC-KEY CRYPTOSYSTEMS:

Principles of Public-Key Cryptosystems, The RSA Algorithm, Diffie-Hellman Key Exchange, ElGamal Cryptosystem.

UNIT-III (12 Lectures)

CRYPTOGRAPHIC HASH FUNCTIONS:

Applications of Cryptographic Hash Function, Two Simple Hash Functions, Requirements and Security, Hash Functions Based on Cipher Block Chaining, Secure Hash Algorithm (SHA).

MESSAGE AUTHENTICATION CODES :

Message Authentication Requirements, Message Authentication Functions, Message Authentication Codes, Security of MACs, MACs Based on Hash Functions (HMAC).

DIGITAL SIGNATURES- Digital Signatures, ElGamal Digital Signature Scheme, Schnorr Digital Signature Scheme, Digital Signature Standard (DSS).

UNIT-IV (12 Lectures)

KEY MANAGEMENT AND DISTRIBUTION:

Symmetric Key Distribution Using Symmetric Encryption, Symmetric Key Distribution Using Asymmetric Encryption, Distribution of Public Keys, X.509 Certificates, Public Key Infrastructure.

USER AUTHENTICATION PROTOCOLS:

Remote User Authentication Principles, Remote User Authentication Using Symmetric Encryption, Kerberos, Remote User Authentication Using Asymmetric Encryption.

ELECTRONIC MAIL SECURITY:

Pretty Good Privacy (PGP), S/MIME.

UNIT-V (12 Lectures)

TRANSPORT-LEVEL SECURITY :

Web Security Issues; Secure Sockets Layer (SSL), Transport Layer Security (TLS), HTTPS, Secure Shell (SSH).

IP SECURITY:

IP Security Overview, IP Security Policy, Encapsulating Security Payload, Combining Security Associations.

INTRUDERS- Intruders, Intrusion Detection.

MALICIOUS SOFTWARE :

Types of Malicious Software, Viruses, Worms.

FIREWALLS :

The Need for Firewalls, Firewall Characteristics, Types of Firewalls, Firewall Configurations.

TEXT BOOKS:

1.William Stallings: Cryptography And Network Security- Principles And Practice, 5th Edition, Pearson/PHI, 2011.

REFERENCES:

1. William Stallings, *"Network Security Essentials (Applications and Standards)"*, 4th Edition, Pearson Education. ,2012
2. Charlie Kaufman, Radia Perlman and Mike Speciner: *"Network Security – Private Communication in a Public World"*, 2nd Edition, Pearson/PHI, 2002.
3. Eric Maiwald: *"Fundamentals of Network Security"*, 1st Edition, Dreamtech Press, 2003.
4. Whitman: *"Principles of Information Security"*, 3rd Edition, Thomson, 2009.
5. Robert Bragg, Mark Rhodes: *"Network Security: The complete reference"*, 1st Edition, TMH, 2004.
6. Buchmann: *"Introduction to Cryptography"*, 2nd Edition, Springer, 2004.

WEB REFERENCES

http://www.nptel.iitm.ac.in/courses/106105031/

MOBILE COMMUNICATIONS

(Common to CSE & IT)

Course Code :13CT1128

L	T	P	C
4	1	0	3

Pre requisites: Computer Networks.

Course Educational Objectives:

To teach students about the fundamentals of mobile communications.

- The challenges imposed by wireless transmission, at the physical, Mac, IP, and TCP layers, and possible solutions.
- Wireless communications in a LAN environment (IEEE 802.11), and in a (cellular phone) Telecommunications Environment (GSM).
- MANETs, Routing in MANETs and technologies like Bluetooth, J2ME, and WAP.
- Giving idea about Location-aware and Context-aware computing
- Giving idea about Command Listener and Item State Listener interfaces

Course Outcomes:

At the end of the course the student must be able to to

- Understand the Basics of Mobile Communications And Computing.
- Understand the Global System for Mobile Communications.
- Understand the Mobile Network Layer.
- Understand the Wireless Application Protocol.
- Understand the Database issues.

UNIT-I **(12 Lectures)**

INTRODUCTION TO MOBILE COMMUNICATIONS AND COMPUTING :

Introduction to MC, Novel applications, Limitations, and Architecture.

(Wireless) Medium Access Control :

Motivation for a specialized MAC (Hidden and exposed term

inals, Near and far terminals), SDMA, FDMA, TDMA, CDMA. Wireless LAN(IEEE802.11):

System architecture, Protocol architecture, Basic DFW MAC-DCF using CSMA/CA, DFWMAC with RTS/CTS extensions, DFWMAC-PCF with polling.

GSM :

Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover security

UNIT-II (12 Lectures)

MOBILE NETWORK LAYER :

Mobile IP (Goals, assumptions, Entities and Terminology, IP packet delivery, Agent advertisement and Discovery, Registration, Tunneling and Encapsulation, Optimizations), Dynamic Host Configuration Protocol (DHCP).

MOBILE TRANSPORT LAYER :

Traditional TCP, Indirect TCP Snooping TCP, Mobile TCP, Fast retransmit/ fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT-III (12 Lectures)

MOBILE AD HOC NETWORKS (MANETS):

Overview, Properties of a MANET, Spectrum of MANET applications, Routing and various routing algorithms (DSR, DV/DSDV, AODV, LSR/ OLSR, FSR, CGSR, ZRP), Security issues in MANETs.

UNIT-IV (12 Lectures)

WIRELESS APPLICATION PROTOCOL-WAP:

Introduction, Protocol Architecture, Treatment of protocols of all layers.

Bluetooth:

User scenarios, Physical layer, MAC layer, Networking, Security,Link Management. J2ME:Configurations, Profiles, Packages, Midlet life cycle, Display and Displayable Classes, Command Listener and ItemState Listener interfaces.

UNIT-V (12 Lectures)

DATABASE ISSUES :

Hoarding techniques, Caching invalidation mechanisms. Client server computing with adaptation, Location-aware and Context-aware computing. Transactional models in Mobile Communication Systems.

DATA DISSEMINATION:

Communications Asymmetry, Classification of new data delivery mechanisms, Push-based mechanisms, Pull-based mechanisms, Hybrid mechanisms, Selective tuning (indexing) techniques.

TEXT BOOKS :

1. Jochen Schiller, *"Mobile Communications"*, 2nd Edition, Addison-Wesley, 2004. (Chapters 1-4,7-11)
2. Stojmenovic and Cacute, *"Handbook of Wireless Networks and Mobile Computing"*,1st Edition Wiley, 2002. (Chapters 11, 15,17, 26 and 27)

REFERENCES:

1. Reza Behravanfar, *"Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML"*, 1st Edition, Cambridge University Press, October 2004,
2. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden , Schwiebert, Loren, *"Fundamentals of Mobile and Pervasive Computing"*, 1st Edition, McGraw-Hill Professional, 2005.
3. Hansmann, Merk, Nicklous, Stober, *"Principles of Mobile Computing"*, 2nd Edition Springer, 2003.
4. Martyn Mallick, *"Mobile and Wireless Design Essentials"*, 1st Edition, Wiley DreamTech, 2003.

WEB REFERENCES:

1. IETF RFC's. www.ietf.org/
2. NPTEL Course Material. http://textofvideo.nptel.iitm.ac.in/1036/

NATURAL LANGUAGE PROCESSING
(ELECTIVE-III)

Course Code:13CS1108

L	T	P	C
4	0	0	3

Course Educational Objectives:

To lay out the mathematical and linguistic foundations for Natural Language Processing.

Course Outcomes:

- To introduce statistical methods and models to process natural languages.
- To introduce n-gram models, markov models

UNIT-I (12 Lectures)

INTRODUCTION:

Rationalist and Empiricist Approaches to Language,Scientific Content, Questions that linguistics should answer , Non-categorical phenomena in language , Language and cognition as

probabilistic phenomena, The Ambiguity of Language: Why NLP Is Difficult, Dirty Hands, Lexical resources, Word counts, Zipf's laws,Collocations, Concordances.

UNIT-II (12 Lectures)

MATHEMATICAL FOUNDATIONS :

Elementary Probability Theory, Probability spaces, Conditional probability and independence, Bayes' theorem, Random variables, Expectation and variance, Notation,Joint and conditional distributions, Determining, Standard distributions,Bayesian statistics, Essential Information Theory, Entropy, Joint entropy and conditional entropy, Mutual information, The noisy channel model,Relative entropy or Kullback-Leibler divergence, The relation to language:

Cross entropy , The entropy of English, Perplexity.

UNIT-III (12 Lectures)

LINGUISTIC ESSENTIALS:

Parts of Speech and Morphology,Nouns pronouns , Words that accompany nouns: Determiners and adjectives , Verbs, Other parts of speech, Phrase Structure , Phrase structures, Dependency: Arguments and adjuncts, X' theory, Phrase

structure ambiguity, Semantics and pragmatics.

WORDS COLLOCATIONS:

Frequency, Mean and Variance,Hypothesis Testing, The test, Hypothesis testing of differences, Pearson'schi-square test, Likelihood ratios, Mutual Information, The Notion of

Collocation.

UNIT-IV (12 Lectures)

STATISTICAL INFERENCE: N -GRAM MODELS OVERSPARSE DATA BINS:

Forming Equivalence Classes, Reliability vs.discrimination , n-gram models, Statistical Estimators, MaximumLikelihood Estimation, Laplace's law, Lidstone's law and the Jeffreys-

Perks law , Held out estimation, Cross-validation (deleted estimation),Good-Turing estimation, Briefly noted, Combining Estimators, Simple linear interpolation, Katz's backing-off, General linear interpolation,Briefly noted Language models for Austen.

UNIT-V (12 Lectures)

MARKOV MODELS :

Markov Models, Hidden Markov Models,Why use, General form of an HMM, The Three Fundamental Questions for HMMs, Finding the probability of an observation, Finding the best state sequence, The third problem: Parameter estimation , Implementation,Properties, and Variants, Implementation, Variants, Multiple input observations, Initialization of parameter values .

TEXT BOOK:

1. Christopher D. Manning and Heinrich Schutze, *"Statistical Language Processing"*, 1st Edition, MIT Press, 2009.

REFERENCES:

1. Dan Jurafsky and James H. Martin, *"Speech and LanguageProcessing"*, 2nd Edition, Prentice Hall, 2008.
2. Manu Konchady, *"Text Mining Application Programming"*, 1st Edition, Delmar Cengage, 2006

WEB REFERENCE:

https://www.coursera.org/course/nlp

UNIX NETWORK PROGRAMMING (ELECTIVE-III)

(Common to CSE & IT)

Course Code :13CT1130

L	T	P	C
4	0	0	3

Course Educational Objectives:

To teach the students how to write programs that communicates with other programs across a computer network.

- ✤ The student shall be able to write their own network programs in UNIX.
- ✤ To provide an opportunity to do network programming using TCP sockets.
- ✤ To provide an opportunity to do network programming using UDP sockets.
- ✤ To provide to do IPC programs.
- ✤ To know The importance of platform independent networks

Course Outcomes:

At the end of the course the student should be able to:

- ✤ Get familiar with the variety of interfaces and frameworks for writing network applications.
- ✤ Get the knowledge of Interfaces, STREAMS, sockets, and remote procedure call libraries.
- ✤ Know the basic steps and underlying mechanisms of writing programs using the client-server model.
- ✤ To get knowledge on I/O Multiplexing, UDP Sockets, Name and Address Conversions.
- ✤ Using UNIX socket system calls (socket, bind, listen, connect etc.). Writing a client. Using select to manage multiple I/O streams

UNIT-I (10 Lectures)

INTRODUCTION TO NETWORK PROGRAMMING:

OSI model, Unix standards, TCP and UDP, TCP connection establishment and termination, Buffer sizes and limitations, Standard Internet services, Protocol usage by common internet applications.

UNIT-II (14 Lectures)

SOCKETS:

Address structures, Value – result arguments, Byte ordering and manipulation functions and related functions. Elementary TCP sockets – socket, connect, bind, listen, accept, fork and exec functions, concurrent servers, close function and related functions.

UNIT-III (10 Lectures)

TCP CLIENT SERVER EXAMPLE:

Introduction, TCP Echo server and client functions, Normal startup and Termination, Signal handling, Server process termination, Crashing and Rebooting of server host, Shutdown of server host.

I/O MULTIPLEXING: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server.

UNIT-IV (13 Lectures)

ELEMENTARY UDP SOCKETS:

Introduction, recvfrom and sendto functions, UDP Echo server and client functions, Lost datagrams, , Lack of flow control with UDP, determining outgoing interface with UDP, TCP and UDP echo server using select.

ELEMENTARY NAME AND ADDRESS CONVERSIONS:

DNS, gethostbyname function, Resolver option, gethostbyname2 function and IPV6 support, uname function, getserverbyname and getservbyport functions, other networking information.

UNIT-V (14 Lectures)

IPC:

Introduction, File and record locking, Pipes, FIFOs, streams and messages, Message queues, Semaphores, Shared memory.

REMOTE LOGIN:

Terminal line disciplines, Pseudo-Terminals, Terminal modes, Control Terminals, RPC Transparency Issues.

TEXT BOOKS:

1. W.Richard Stevens, *"UNIX Network Programming, Sockets API"*, Volume I, 3rd Edition, PHI , 2010.
2. W.Richard Stevens, *"UNIX Network Programming, Volume II"*, 1st Edition, PHI, 2009.

REFERENCES:

1. T Chan, *"UNIX Systems Programming using C++"*, 1st Edition, PHI, 2010.
2. Graham Glass, King abls, *"UNIX for Programmers and Users"*, 3rd Edition, Pearson Education, 2010.
3. M. J. Rochkind, *"Advanced UNIX Programming"*, 2nd Edition, Pearson Education, 2008.

INFORMATION STORAGE SECURITY AND MANAGEMENT
(ELECTIVE-III)
(Common to CSE & IT)

Course Code :13CT1134

L	T	P	C
4	0	0	3

Pre requisites: Information Storage Systems.

Course Educational Objectives:

The main objective of the course is to expose the students to different Backup, Archive and Replication, Business Continuity, Local Replication, Cloud Computing, Securing Storage Infrastructure. Upon completion of this course, the student should be able to:

- Describe about Information availability and Business continuity.
- Describe the backup/recovery topologies.
- Describe local replication technologies and their operation.
- Describe remote replication technologies and their operation.
- Describe processes and technologies for identifying, analyzing, and mitigating security risks in storage infrastructure.

Course Outcomes:

At the end of the course the student will be able to

- Understands the Information availability and Business continuity.
- Understand storage infrastructure, backup/recovery topologies.
- Understands local replication technologies and their operation.
- Understands remote replication technologies and their operation
- Learn about processes and technologies for identifying, analyzing, and mitigating security risks.

UNIT-I (12 Lectures)

INTRODUCTION TO BUSINESS CONTINUITY:

Information Availability, BC Terminology, BC Planning Life Cycle, Failure Analysis, Business Impact Analysis, BC Technology Solutions, Concept in Practice: EMC PowerPath.

BACKUP AND ARCHIVE:

Backup Purpose, Backup Considerations, Backup Granularity, Recovery Considerations, Backup Methods, Backup Architecture, Backup and Restore Operations Backup Topologies, Backup in NAS Environments, Backup Targets, Data De duplication for Backup, Backup in Virtualized Environments, Data Archive, Archiving Solution Architecture, Concepts in Practice: EMC NetWorker, EMC Avamar, and EMC Data Domain.

UNIT-II (12 Lectures)

LOCAL REPLICATION:

Replication Terminology, Uses of Local Replicas, Replica Consistency, Local Replication Technologies , Tracking Changes to Source and Replica, Restore and Restart Considerations, Creating Multiple Replicas, Local Replication in a Virtualized Environment, Concepts in Practice: EMC TimeFinder, EMC SnapView, and EMC RecoverPoint.

UNIT-III (12 Lectures)

REMOTE REPLICATION:

Modes of Remote Replication, Remote Replication Technologies, Three-Site Replication, Data Migration Solutions, Remote Replication and Migration in a Virtualized Environment, Concepts in Practice: EMC SRDF, EMC MirrorView, and EMC Recover Point.

CLOUD COMPUTING:

Cloud Enabling Technologies , Characteristics of Cloud Computing, Benefits of Cloud Computing, Cloud Service Models, Cloud Deployment Models, Cloud Computing Infrastructure, Cloud Challenges, Cloud Adoption Considerations, Concepts in Practice: Vblock.

UNIT-IV (12 Lectures)

SECURING THE STORAGE INFRASTRUCTURE:

Information Security Framework, Risk Triad, Storage Security Domains, And Security Implementations in Storage Networking, Securing Storage Infrastructure in Virtualized and Cloud Environments, Concepts in Practice: RSA and VMware Security Products.

UNIT-V **(12 Lectures)**

MANAGING THE STORAGE INFRASTRUCTURE:

Monitoring the Storage Infrastructure, Storage Infrastructure Management Activities, Storage Infrastructure Management Challenges, Developing an Ideal Solution, Information Lifecycle Management, Storage Tiering, Concepts in Practice: EMC Infrastructure Management Tools.

APPLICATIONS & EXERCISES:

Application I/O Characteristics , Parallel SCSI , SAN Design Exercises , Information Availability Exercises , Network Technologies for Remote Replication.

TEXT BOOKS:

1. G.Somasundaram, A.Shrivastava: EMC Corporation, *"Information Storage and Management: Storing, Managing and Protecting Digital Information in Classic, Virtualized and Cloud Environment"*, 2nd Edition, Wiley Publication, 2012.
2. Robert Spalding, Storage Networks : *"The Complete Reference"*, 1st Edition, Tata McGraw Hill/Osborne, 2003.

REFERENCES:

1. Marc Farley, *"Building Storage Networks"*, 2nd Edition, Tata McGraw Hill/Osborne, 2001.
2. Meeta Gupta, *"Storage Area Network Fundamentals"*, 1st Edition, Pearson Education, 2002.

CLOUD COMPUTING
(ELECTIVE-III)
(Common to CSE & IT)

Course Code :13CT1135

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course introduces the fundamental concepts of cloud.

- ✤ Cloud Computing principles.
- ✤ Cloud Computing components.
- ✤ Cloud Computing architectures and implementations.
- ✤ Cloud Computing services.
- ✤ Cloud Computing Sharing

Course Oucomes:

At the end of the course the student will be able to

- ✤ Understand the fundamentals of big cloud and.
- ✤ Learn about cloud computing for the community.
- ✤ Learn about cloud services.
- ✤ Learn about cloud for the corporation.
- ✤ To know about cloud architectures.

UNIT-I (12 Lectures)

A MODEL OF VIRTUALIZATION:

What Is Virtualization, Access Virtualization: Providing Universal Access, Application Virtualization: Application Isolation, Delivery and Performance, Processing Virtualization: Doing System Tricks, Network Virtualization: Controlling the View of the Network, Storage Virtualization: Where Are Your Files and Applications, Security for Virtual Environments: Guarding the Treasure?

UNIT-II (14 Lectures)

INTRODUCTION :

Cloud Computing Introduction, From, Collaboration to cloud, Working of cloud computing, pros and cons, benefits, developing cloud computing services, Cloud service development, discovering cloud services.

CLOUD COMPUTING FOR EVERYONE :

Cloud Computing for the Family: Centralizing Email Communications, Collaborating on Schedules, Collaborating on Grocery Lists, Collaborating on To-Do Lists, Collaborating on Household Budgets, Collaborating on Contact Lists, Collaborating on School Projects, Sharing Family Photos. Cloud Computing for the Community: Communicating Across the Community, Collaborating on Schedules, Collaborating on Group Projects and Events.

UNIT-III (10 Lectures)

CLOUD COMPUTING FOR THE CORPORATION:

Managing Schedules, Managing Contact Lists, Managing Projects, Collaborating on Reports, Collaborating on Marketing Materials, Collaborating on Expense Reports, Collaborating on Budgets, Collaborating on Financial Statements, Collaborating on Presentations, Presenting on the Road Accessing Documents on the Road

UNIT-IV (12 Lectures)

CLOUD SERVICES-COLLABORATING EVENTS:

Collaborating on Calendars, Schedules, and Task Management , Collaborating on Event Management,

CLOUD SERVICES-collaborating database applications.

Collaborating on Word Processing, Collaborating on Spreadsheets, Collaborating on Databases, Collaborating on Presentations laborating on Contact Management, Collaborating on Project Management.

UNIT-V (12 Lectures)

OUTSIDE THE CLOUD :

Evaluating web mail services, Evaluating instant messaging, Evaluating web conference tools, creating groups on social networks, Evaluating on line groupware, collaborating via blogs and wikis.

STORING AND SHARING

Understanding Cloud Storage, Evaluating Online File-Storage and -Sharing Services, Exploring Online Bookmarking Services

SHARING DIGITAL PHOTOGRAPHS AND CONTROLLING IT ALL WITH WEB-BASED DESKTOPS

Exploring Online Photo-Editing Applications, Exploring Photo-Sharing Communities Understanding Web-Based Desktops, Evaluating Web-Based Desktops.

TEXT BOOKS:

1. Dan Kusnetzky , *"Virtualization: A Manager's Guide"*, 1st Edition, O'Reilly,2011
2. Michael Miller, Cloud Computing: *"Web-Based Applications That Change the Way You Work and Collaborate Online"*, 1st Edition, Pearson Education, New Delhi, 2009.

REFERENCES:

1. Barrie Sosinsky, *"Cloud Computing Bible"*, 1st Edition ,Wiley India Pvt Ltd, 2011.
2. Robert Elsenpeter, Toby J. Velte, Anthony T. Velte, *"Cloud Computing : A Practical Approach"*, 1st Edition, Tata Mcgraw Hill Education, 2011.

NETWORK SECURITY AND CASE TOOLS LAB

Course Code: 13CS1109

L	T	P	C
0	0	3	2

Course Educational Objective:

To understand the principles of encryption algorithms; conventional and public key cryptography practically.

Course Outcomes:

- ✤ To know the methods of conventional encryption.
- ✤ To understand the concepts of public key encryption and number theory
- ✤ Student will be capable of representing a program, module even a system in the form of diagrams. Student will also get the knowledge of developing background code along with the drawing of diagrams.

PART -A

1. Implement Linear Congruential Algorithm to generate 5 pseudorandom Numbers,BBS algorithm to generate pseudo random numbers
2. Implement Caesar cipher encryption and decryption
3. Implement Hill cipher encryption
4. Implemnet play fair cipher encryption
5. Implemnt fast modular exponentiation algorithm.
6. Implement Rabin-Miller Primality Testing Algorithm.
7 Implement the Euclid Algorithm to generate the GCD of an array of 10 integers.
8. Implement Extended Euclid Algorithm to find multiplicative inverse of a number
9. Implement the encryption and decryption of 8-bit data using Simplified DES Algorithm (created by Prof. Edward Schaefer).

10. Implement RSA algorithm for encryption and decryption.
11. Implement Diffie-Hellman Key Exchange Algorithm.
12. Implement CRT (Chinese Remainder Theorem).

PART-B

1. The student should take up the case study of Unified Library application which is mentioned in the theory, and Model it in different views i.e Use case view, logical view, component view, Deployment view, Database design, forward and Reverse Engineering, and Generation of documentation of the project.
2. Student has to take up another case study of his/her own interest and do the same what ever mentioned in first problem. Some of the ideas regarding case studies are given in reference books which were mentioned in theory syllabus can be referred for some idea.

   Note : The analysis, design, coding, documentation, database design of mini project which will be carried out in 4th year should be done in object-oriented approach using UML and by using appropriate software which supports UML, otherwise the mini project will not be evaluated.
3. Take an example subnet of hosts. Obtain broadcast tree for it

EMBEDDED SYSTEM-2 LAB

Course Code: 13CS1110

L	T	P	C
0	0	3	2

Course Educational Objectives:

This program exposes the emerging Technologies in the area which is expanding by leaps and bounds. It is imperative that our students get glimpse of the emerging development via hands on experience.

LIST OF EXPERIMENTS:

1) Basic programs using ARM Processors

   a) I/O PORTS b) ADC c) timers d)capture control and Pulse width modulation e) Serial communication d) ZIGBEE interfacing e) RF Communication

2) Use of Captures Control in the following applications

   a) Transit time of a moving object

   b) Velocity of acceleration measurement of a linear object/and above rotary object

   c) Pulse width Modulation in power Combine and regulator

   d) PWM to generate any wave from , control phase and magnitude

   e) Measurement of frequency

   f) Ultrasonic transit time measurement

3) Graphics

   a. Pixel programming and display control graphic Display

   b. Touch Sensitive search to select a Programming module

   c. Graphic representation of Wave forms generation in (1) above

4) Synchronous Communication using

   a. 12 c bus

   b. SPI bus

c. Enumeration in USB

d. Two wire Flash Program using of EEPROMS, Flash memories' and Programming

5) **In circuit-emulator** – Its examples application to

a) Debug a Program

b) Logic analysis of timing diagrams

6) a) ADC Measurement

b) Data Acquisition and analysts

c) Measurement of timing wave forms for peak and valleys

Bluetooth Wireless Transmission

SYLLABI FOR VIII SEMESTER

NETWORK MANAGEMENT SYSTEMS

Course Code: 13CS1111

L	T	P	C
4	0	0	3

Course Educational Objectives :

To understand the principles of network management, different standards and protocols used in managing complex networks. To understand the Automation of network management operations and making use of readily available network management systems.

Course Outcomes :

After the completion of course, the student will able to

- ✤ Acquire the knowledge about network management standards (OSI and TCP/IP)
- ✤ Acquire the knowledge about various network management tools and the skill to use them in monitoring a network
- ✤ Analise the challenges faced by Network managers
- ✤ Evaluate various commercial network management systems and open network management systems.
- ✤ Analise and interpret the data provided by an NMS and take suitable actions.

UNIT-I (12 Lectures)

DATA COMMUNICATION AND NETWORK MANAGEMENT OVERVIEW :

Analogy of Telephone Network Management, Communications protocols and Standards, Case Histories of Networking and Management, Challenges of Information Technology Managers, Network Management: Goals, Organization, and Functions, Network and System Management, Network Management System Platform, Current Status and future of Network Management.

UNIT-II (12 Lectures)

SNMPV1 NETWORK MANAGEMENT MANAGED NETWORK:

Organization and Information Models

MANAGED NETWORK:

Case Histories and Examples, The History of SNMP Management, The SNMP Model, The Organization Model, System Overview, The Information Model.

SNMPV1 NETWORK MANAGEMENT:

Communication and Functional Models

The SNMP Communication Model, Functional model.

SNMP MANAGEMENT: SNMPv2 Major Changes in SNMPv2, SNMPv2 System architecture, SNMPv2 Structure of Management Information, The SNMPv2 Management Information Base, SNMPv2 Protocol, Compatibility with SNMPv1.

UNIT-III (12 Lectures)

SNMP MANAGEMENT: RMON :

What is Remote Monitoring? ,RMON SMI and MIB, RMON1, RMON2, ATM Remote Monitoring, A Case Study of Internet Traffic Using RMON

TELECOMMUNICATIONS MANAGEMENT NETWORK:

Why TMN? , Operations Systems, TMN Conceptual Model, TMN Standards, TMN Architecture, TMN Management Service Architecture, An Integrated View of TMN, Implementation Issues.

UNIT-IV (12 Lectures)

NETWORK MANAGEMENT TOOLS AND SYSTEMS:

Network Management Tools, Network Statistics Measurement Systems, History of Enterprise Management, Network Management systems, Commercial Network management Systems, System Management, Enterprise Management Solutions.

UNIT-V **(12 Lectures)**

WEB-BASED MANAGEMENT :

NMS with Web Interface and Web-Based Management, Web Interface to SNMP Management,

Embedded Web-Based Management, Desktop management Interface, Web-Based Enterprise Management, WBEM: Windows Management Instrumentation, Java management Extensions, Management of a Storage Area Network , Future Directions.Case Studies:

TEXT BOOK:

Mani Subrahmanian, *"Network Management Principles and Practice"*, 2nd Edition, Pearson Education, 2010.

REFERENCES:

1. Morris, *"Network management"*, 1st Edition, Pearson Education, 2008.
2. Mark Burges, *"Principles of Network System Administration"*, 1st Edition, Wiley DreamTech, 2008.

WEB REFERENCES:

1. http://nptel.iitm.ac.in/courses/IIT-MADRAS/Computer_Networks/

BIO-INFORMATICS
(ELECTIVE-IV)
(Common to CSE & IT)

Course Code :13CT1133	L	T	P	C
	4	0	0	3

Course Educational Objectives:

The main objective of the course is to make students understand the concepts of Bio-informatics in the leading applications in engineering field.

- ✤ Understand protein information resources.
- ✤ Understand the genome information resources.
- ✤ Understand the DNA sequence analysis,
- ✤ To understand pair wise alignment techniques.
- ✤ Understand multiple sequence alignment.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Learn about DNA and its Sequences,
- ✤ To get idea about DNA Databases.
- ✤ Understand pair wise alignment techniques.
- ✤ Learn about Biological databases.
- ✤ To get idea about multiple sequence alignment

UNIT-I (12 Lectures)

INTRODUCTION:

Definitions, Sequencing, Biological sequence/structure, Genome Projects, Pattern recognition an prediction, Folding problem, Sequence Analysis, Homology and Analogy.

PROTEIN INFORMATION RESOURCES:

Biological databases, Primary sequence databases, Protein Sequence databases, Secondary databases, Protein pattern databases, and Structure classification databases.

UNIT-II (12 Lectures)

GENOME INFORMATION RESOURCES:

DNA sequence databases, specialized genomic resources

DNA SEQUENCE ANALYSIS:

Importance of DNA analysis, Gene structure and DNA sequences, Features of DNA sequence analysis, EST (Expressed Sequence Tag) searches, Gene hunting, Profile of a cell, EST analysis, Effects of EST data on DNA databases.

UNIT-III (12 Lectures)

PAIR WISE ALIGNMENT TECHNIQUES:

Database searching, Alphabets and complexity, Algorithm and programs, Comparing two sequences, sub-sequences, Identity and similarity, The Dotplot, Local and global similarity, different alignment techniques, Dynamic Programming, Pair wise database searching.

UNIT-IV (12 Lectures)

MULTIPLE SEQUENCE ALIGNMENT:

Definition and Goal, The consensus, computational complexity, Manual methods, Simultaneous methods, Progressive methods, Databases of Multiple alignments and searching.

SECONDARY DATABASE SEARCHING:

Importance and need of secondary database searches, secondary database structure and building a sequence search protocol.

UNIT-V (12 Lectures)

ANALYSIS PACKAGES:

Analysis package structure, commercial databases, commercial software, comprehensive packages, packages specializing in DNA analysis, Intranet Packages, Internet Packages.

TEXT BOOKS:

1. T K Attwood & D J Parry Smith Addison, *"Introduction to Bioinformatics"*, 1st Edition, Wesley Longman, 2008.
2. Jean-Michel Claveriw, Cerdric Notredame, *"Bioinformatics- A Beginner's Guide"*, 1st Edition, WILEY dreamtech India Pvt. Ltd, 2003.

REFERENCE:

Arthur M.Lesk, *"Introduction to Bioinformatics"*, 1st Edition, OXFORD Publishers (Indian Edition), 2002.

BIG DATA AND HADOOP

(ELECTIVE- IV)

(Common to CSE & IT)

Course Code :13CT1136

L	T	P	C
4	0	0	3

Pre-requisites:

Database Management Systems, Object Oriented Programming Through Java.

Course Educational Objectives:

This course introduces the fundamental concepts of cloud and lays a strong foundation of Apache Hadoop (Big data framework).

- ✤ The HDFS file system, MapReduce frameworks are studied in detail.
- ✤ Hadoop tools like Hive, and Hbase, which provide interface to relational databases, are also covered as part of this course work.
- ✤ Analyzing data with unix tools
- ✤ Sorting. Map side and Reduce side joins.
- ✤ Implementation. Java and Mapreduce clients

Course Oucomes:

At the end of the course the student will be able to

- ✤ Understand the fundamentals of Big cloud and data architectures.
- ✤ Understand HDFS file structure and Mapreduce frameworks, and use them to solve complex problems, which require massive computation power.
- ✤ Use relational data in a Hadoop environment, using Hive and Hbase tools of the Hadoop Ecosystem..
- ✤ Understand The Hive Shell.
- ✤ Understand the Comparison with traditional databases.

UNIT-I **(12 Lectures)**

Introduction to Big Data. What is Big Data. Why Big Data is Important. Meet Hadoop. Data. Data Storage and Analysis. Comparison with other systems. Grid Computing. A brief history of Hadoop. Apache hadoop and the Hadoop EcoSystem. Linux refresher; VMWare Installation of Hadoop.

UNIT-II **(12 Lectures)**

The design of HDFS. HDFS concepts. Command line interface to HDFS. Hadoop File systems. Interfaces. Java Interface to Hadoop. Anatomy of a file read. Anatomy of a file write. Replica placement and Coherency Model. Parallel copying with distcp, Keeping an HDFS cluster balanced.

UNIT-III **(12 Lectures)**

Introduction. Analyzing data with unix tools. Analyzing data with hadoop. Java MapReduce classes (new API). Data flow, combiner functions, Running a distributed MapReduce Job.

Configuration API. Setting up the development environment. Managing configuration. Writing a unit test with MRUnit. Running a job in local job runner. Running on a cluster.Launching a job. The MapReduce WebUI.

UNIT-IV **(12 Lectures)**

Classic Mapreduce. Job submission. Job Initialization. Task Assignment. Task execution .Progress and status updates. Job Completion. Shuffle and sort on Map and reducer side. Configuration tuning. MapReduce Types. Input formats. Output formats ,Sorting. Map side and Reduce side joins.

UNIT-V **(12 Lectures)**

The Hive Shell. Hive services. Hive clients. The meta store. Comparison with traditional databases. HiveQl. Hbasics. Concepts. Implementation. Java and Mapreduce clients. Loading data, web queries.

TEXT BOOKS:

1. Tom White, Hadoop, *"The Definitive Guide"*, 3rd Edition, O'Reilly Publications, 2012.
2. Dirk deRoos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutsch , *"Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data"*, McGraw-Hill Osborne Media; 1st Edition, 2011

WEB REFERENCES:

1. http://www.cloudera.com/content/cloudera-content/cloudera-docs/HadoopTutorial/CDH4/Hadoop-Tutorial.html
2. https://www.ibm.com/developerworks/community/blogs/SusanVisserEditionntry/flashbook_ understanding_big_data_analytics_for_enterprise_class_hadoop_and_streaming_data?lang=en

MULTI-CORE PROGRAMMING

(ELECTIVE-IV)

(Common to CSE & IT)

Course Code :13CT1137

L	T	P	C
4	0	0	3

Pre requisites: Linux

Course Educational Objectives:

The main objective of the course is to expose the students to the basic concepts of Multi Core programming and various practical models of Multi Core programming.

- ✤ Understand the Multi Core Architecture.
- ✤ Understand Parallel Programming Concepts and Threading API's.
- ✤ Understand OpenMP programming and MPI programming.
- ✤ Learn about Multi Core Debugging Techniques.
- ✤ Use Multi Core Processors efficiently with the help Multi Core programming tools.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Learn about different OpenMP programming, MPI programming,
- ✤ Learn multi-core processors software development products,
- ✤ Understand multi-threaded debugging techniques
- ✤ Understand OpenMP programming and mpi programming
- ✤ Learn various Multi-core processors

UNIT-I (12 Lectures)

INTRODUCTION TO MULTI-CORE ARCHITECTURE:

Motivation for Concurrency in Software, Parallel Computing Platforms(SIMD & MIMD systems, an overview of Single-Core, Multi-Processor, Multi-Core Architectures) , Parallel Computing in Microprocessors, Differentiating Multi-Core Architectures from Hyper-Threading Technology, Multi-threading on Single-Core versus Multi-Core Platforms, Understanding Performance, Amdahl's Law, Gustafson's Law

UNIT-II (12 Lectures)

MULTI-CORE PROCESSORS:

An Overview of Software Threading Defining Threads, System View of Threads: Threading above the Operating System, Threads inside the OS , Threads inside the Hardware , Application Programming Models and Threading ,Virtual Environment: Virtual Machines and Platforms, Runtime Virtualization, System Virtualization.

PARALLEL PROGRAMMING FUNDAMENTAL CONCEPTS:

Designing for threads, parallel programming patterns, Threading and parallel programming constructs: Synchronization, Critical sections, Deadlock, Synchronization Primitives, and Messages

UNIT-III (12 Lectures)

THREADING API'S:

Threading APIs for Microsoft Windows, Threading APIs for Microsoft .NET Framework: Creating Threads, Managing Threads, Thread Pools, Thread Synchronization, POSIX Threads: Creating Threads, Managing Threads, Thread Synchronization , Signaling ,Compilation and Linking

UNIT-IV (12 Lectures)

OPENMP PROGRAMMING:

OpenMP Challenges in Threading a loop, Minimizing Threading overhead, Performance oriented Programming ,Library Functions. Solutions to parallel programming problems: Data races, deadlocks and Livelocks Non-blocking algorithms, Memory and cache related issues.

MPI PROGRAMMING:

Message-Passing Model, Message-Passing Interface, MPI functions, Compiling and running MPI Programs, collective communication, data decomposition, Point-to-point communication – MPI Library.

UNIT-V (12 Lectures)

MULTI-THREADED DEBUGGING TECHNIQUES:

General Debug Techniques, Debugging Multi-threaded Applications in Windows: Threads Window, Trace points, Breakpoint Filters, Naming Threads, Multi-threaded Debugging Using GDB.

MULTI-CORE PROCESSORS SOFTWARE DEVELOPMENT PRODUCTS:

An Overview of Software tools on Multi-Core Processors, Intel Software Development Products: overview, Thread Checker, Compilers: OpenMP, Software-based Speculative Pre computation, Compiler Optimization and Cache Optimization, Debugger , Intel Libraries, Intel Threading Building Blocks , VTune Performance Analyzer , Thread Profiler , MPI Programming :Intel Support for MPI

TEXT BOOKS:

1. Shameem Akhter and Jason Roberts, *"Multi-core Programming- Increasing Performance through Software Multi-Threading"*, 1st Edition, Intel Press, 2006.
2. Michael J Quinn, *"Parallel programming in C with MPI and OpenMP"*, 2nd Edition, Tata McGraw Hill, 2007.

REFERENCES:

1. John L.Hennessey and David A.Patterson, *"Computer architecture – A quantitative approach"*, 4th Edition, Morgan Kaufmann Elsevier Publishers, 2007.
2. David E. Culler, Jaswinder Pal Singh, *"Parallel computing architecture: A hardware software approach"*, 1st Edition, Morgan Kaufmann Elsevier Publishers, 1999.

PATTERN RECOGNITION
(ELECTIVE-IV)

Course Code:13CS1112

L	T	P	C
4	0	0	3

Course Educational Objectives:

To provide the basic skill in methods of design and analysis to identify patterns across engineering areas. Student will know about different aspects of machine learning using concepts of pattern recognition.

Course Outcomes:

✤ The students will be able to understand the methods and processes that shall be adopted to identify hidden patterns in the large volumes of data.

✤ The students will be able to comprehend the theory and methods for learning from data with an emphasis on pattern classification.

UNIT-I (12 Lectures)

INTRODUCTION:

Machine perception, pattern recognition example,pattern recognition systems, the design cycle, learning and adaptation.

BAYESIAN DECISION THEORY:

Introduction, continuous features– two categories classifications, minimum error-rate classification- zero–one loss function, classifiers, discriminant functions, and decision surfaces.

UNIT-II (12 Lectures)

NORMAL DENSITY :

Univariate and multivariate density, discriminantfunctions for the normal densitydifferent cases, Bayes decision theory –discrete features, compound Bayesian decision theory and context.

MAXIMUM LIKELIHOOD AND BAYESIAN PARAMETER ESTIMATION :

Introduction, maximum likelihood estimation, Bayesianestimation, Bayesian parameter estimation–Gaussian case.

UNIT-III (12 Lectures)

UN-SUPERVISED LEARNING AND CLUSTERING :

Introduction,mixture densities and identifiability, maximum likelihood estimates,

application to normal mixtures, K-means clustering. Data description andclustering – similarity measures, criteria functions for clustering.

UNIT-IV (12 Lectures)

LINEAR DISCRIMINANT FUNCTIONS :

Introduction, Linear Discriminant Functions and Decision Surfaces, Generalized Linear Discriminant Functions, The Two-category Linearly Separable Case, Minimizing the Perceptron Criterion Function, Relaxation Procedures, Nonseparable Behavior, Minimum Squared-Error Procedures

COMPONENT ANALYSES :

Principal component analysis, non-linearcomponent analysis; Low dimensional representations and multi dimensionalscaling.

UNIT-V (12 Lectures)

DISCRETE HIDDEN MORKOV MODELS :

Introduction,Discrete–time markov process, extensions to hidden Markov models, three basic problems for HMMs.

CONTINUOUS HIDDEN MARKOV MODELS :

Observationdensities, training and testing with continuous HMMs, types of HMMs.

TEXT BOOKS:

1. Richard O. Duda, Peter E. Hart, David G. Strok, *Pattern classification*, 2nd Edition Wiley Student Edition, 2010.
2. Lawerence Rabiner, Biing, *Fundamentals of speechRecognition*, 1st Edition, Hwang Juang Pearson Education, 2009.

REFERENCES:

1. Earl Gose, Richard John baugh, *"Pattern Recognition and Image Analysis"*, 1st Edition, PHI, 2004.
2. Sergios Theodoridis, Konstantinos Koutroumbas, *"Pattern Recognition"*, 4th Edition, Academic Press, 2008
3. Narasimha Murthy, Susheeela Devi, *"Pattern Recognition"*, University Press

WEB REFERENCES:

https://www.coursera.org/course/ml

NOTES

SEMESTER - I

Code	COURSE TITLE	L	T	P	C
13BM1101	Mathematics-I	4	1	0	3
13BP1101	Physics	4	0	0	3
13CT1102	Computer Programming through C	4	0	0	3
13ME1102	Engineering Mechanics	4	1	0	3
13EE1101	Basic Network Analysis	4	0	0	3
13BP1102	Physics Lab	0	0	3	2
13CT1103	Computer Programming Lab	0	0	3	2
13ME1103	Engineering Drawing	1	0	3	3
13MT1101	Engineering Workshop	0	0	3	2
	TOTAL	**21**	**2**	**12**	**24**

SEMESTER - II

Code	COURSE TITLE	L	T	P	C
13HE1101	English	4	0	0	3
13BM1102	Mathematics-II	4	1	0	3
13BC1101	Chemistry	4	0	0	3
13EC1101	Electronic Devices	4	1	0	3
13EE1144	Electrical Technology	4	0	0	3
13HE1102	English Language Lab	0	0	3	2
13BC1103	Chemistry Lab	0	0	3	2
13EC1102	Electronic Devices Lab	0	0	3	2
13NM1101	Professional Ethics	2	0	0	0
	TOTAL	**22**	**2**	**9**	**21**

SEMESTER - III

Code	COURSE TITLE	L	T	P	C
13BM1104	Special functions and complex variables	4	1	0	3
13HM1101	Managerial Economics and Financial Accounting	4	0	0	3
13EC1103	Electronic Circuits	4	0	0	3
13EC1104	Signals and Systems	4	1	0	3
13EC1105	Switching Theory and Logic Design	4	0	0	3
13EC1106	Pulse and Digital circuits	4	0	0	3
13EC1107	Electronic Circuits Lab	0	0	3	2
13EE1145	Electrical Technology Lab	0	0	3	2
13NM1102	Environmental Studies	2	0	0	0
	TOTAL	**27**	**2**	**6**	**22**

SEMESTER - IV

Code	COURSE TITLE	L	T	P	C
13BM1107	Random variables and Numerical Methods	4	1	0	3
13EC1108	Digital IC Applications	4	1	0	3
13EC1109	Analog Communications	4	0	0	3
13EC1110	Linear IC applications	4	0	0	3
13EC1111	EM Waves and Transmission Lines	4	0	0	3
13CT1105	Computer Organization	4	0	0	3
13EC1112	Pulse and Integrated Circuits lab	0	0	3	2
13EC1113	Analog Communications Lab	0	0	3	2
	TOTAL	**24**	**2**	**6**	**22**

SEMESTER - V

Code	COURSE TITLE	L	T	P	C
13EE1104	Network Analysis and Synthesis	4	1	0	3
13EE1105	Control Systems	4	1	0	3
13EC1114	Digital Communications	4	0	0	3
13EC1115	Microprocessors and Microcontrollers	4	0	0	3
13EC1116	Antennas and Wave propagation	4	0	0	3
13EC1117	VLSI Design	4	0	0	3
13EC1118	Digital Communication Lab	0	0	3	2
13EC1119	VLSI Design Lab	0	0	3	2
13NM1103	Intellectual Property rights and Patents	2	0	0	0
	TOTAL	**26**	**2**	**6**	**22**

SEMESTER - VI

Code	COURSE TITLE	L	T	P	C
13HM1102	Management Science	4	0	0	3
13EC1120	Electronic Measurements and Instrumentation	4	1	0	3
13EC1121	Microwave Engineering	4	0	0	3
13EC1122	Digital Signal Processing	4	1	0	3
	ELECTIVE- I	4	0	0	3
13EC1123	Information Theory and Coding				
13CT1106	Data Structures				
13EC1124	Microcontrollers and Applications				
	ELECTIVE-II	4	0	0	3
13EC1125	Digital IC Design				
13CT1111	Object Oriented Programming Through JAVA				
13EC1126	Data Communications				
13EC1127	Microprocessor and Microcontroller Lab	0	0	3	2
13ES11BC	Basic Computations Lab	0	0	3	2
13HE1103	Technical Communication and Soft Skills Lab	0	0	3	2
	TOTAL	**24**	**2**	**9**	**24**

SEMESTER - VII

Code	COURSE TITLE	L	T	P	C
13EC1128	TV & Satellite Communications	4	1	0	3
13EC1129	Radar Engineering	4	1	0	3
13EC1130	Optical Communications	4	0	0	3
13EC1131	Digital Image Processing	4	0	0	3
13CT1124	Computer Networks	4	0	0	3
	ELECTIVE-III	4	0	0	3
13EC1132	Digital Design Through Verilog				
13EC1133	Embedded Systems				
13EC1134	Electromagnetic Interference and Compatibility				
13EC1135	Microwave and Optical Communication Lab	0	0	3	2
13EC1136	Digital Signal Processing Lab	0	0	3	2
13EC11MP	Industry Oriented Mini Project	0	0	0	2
	TOTAL	**24**	**2**	**6**	**24**

SEMESTER - VIII

Code	COURSE TITLE	L	T	P	C
13EC1137	Wireless Communications	4	0	0	3
	ELECTIVE-IV	4	0	0	3
13EC1138	DSP Processors & Architecture				
13EC1139	Real Time Operating Systems				
13EE1113	Power Electronics				
	OPEN ELECTIVE	4	0	0	3
13EC11SM	SEMINAR	0	0	3	2
13EC11CV	COMPREHENSIVE VIVA	0	0	0	2
13EC11PW	PROJECT WORK	0	0	12	8
	TOTAL	**12**	**0**	**15**	**21**

LIST OF OPEN ELECTIVES

CODE	COURSE TITLE	OFFERING DEPARTMENT
13CH1128	Design and Analysis of Experiments*	Chemical Engineering
13CE1155	Green Buildings and Infrastructure	Civil Engineering
13CE1156	Disaster Management	Civil Engineering
13CS1113	E-Commerce	Computer Science and Engineering
13CT1132	Software Project Management*	Computer Science and Engineering
13EC1140	Bio-Medical Instrumentation	Electronics and Communications Engineering
13EE1138	Electrical Safety Management	Electrical and Electronics Engineering
13EE1139	Reliability Evaluation of Engineering Systems	Electrical and Electronics Engineering
13EE1140	Design Concepts for Engineers	Electrical and Electronics Engineering
13EE1141	Special Electrical Machines for Industrial Applications	Electrical and Electronics Engineering
13IT1113	Neural Networks	InformationTechnology
13IT1114	Biometrics	InformationTechnology
13ME1143	Renewable Sources Of Energy*	Mechanical Engineering
13ME1153	Project Management*	Mechanical Engineering
13BP1103	Nano Technology	Physics
13HM 1104	Entrepreneurship and Small Business Management	Management Studies
13HM 1105	Financial Management	Management Studies
13HM 1106	Indian and International Business Environment	Management Studies

*These courses can be taken by the students of respective departments if they are not offered /opted earlier in the structure.

NOTES

SYLLABI FOR I SEMESTER

MATHEMATICS-I

(Common to all branches)

Course Code: 13BM1101

L	T	P	C
4	1	0	3

Pre requisites:

- Basic formulae of differentiation, product rule, and quotient rule.
- Basic Integration formulae, integration by parts, definite integrals and properties.
- Basic concept of partial differentiation.

Course Educational Objectives:

- The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- Solve ordinary differential equations of first, second and higher order.
- Learn the technique of Laplace transform and apply it to solve differential equations.
- Understand the concept of Double and Triple integrals and their applications to calculation of areas, volumes .
- Extend the concept of integration to vector functions, understand the significance of the operators, gradient, divergence and curl.
- Find surface areas and volumes of certain solids using Green, Stokes and Gauss divergence theorems.

UNIT-I (12 Lectures)

ORDINARY DIFFERENTIAL EQUATIONS:

Linear equations of first order, Bernoulli differential equation, Linear differential equations of higher order with constant coefficients, Method of Variation of parameters, Linear differential equations with variable coefficients (Cauchy's homogeneous linear equation, Legendre's linear equation).

APPLICATIONS OF LINEAR DIFFERENTIAL EQUATIONS:

Orthogonal trajectories, Models on R-L-C circuits, Newton's law of cooling.
(11.9, 11.10, 13.1—13.7, 13.8(1), 13.9, 12.3, 12.5, 12.6)

UNIT-II (12 Lectures)

LAPLACE TRANSFORMS:

Laplace transform of elementary functions, properties, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, division by t, evolution of integrals by Laplace transforms.

INVERSE TRANSFORM:

Introduction, Finding inverse transforms by the method of partial fractions, other methods of finding Inverse Transform, Convolution theorem, Unit step function, and Unit impulse function.

Application of Laplace transforms:

Initial and Boundary Value Problems.
(21.1-21.5, 21.7-21.15, 21.17, 21.18

UNIT-III (12 Lectures)

PARTIAL DIFFERENTIATION:

Total derivative, change of variables, Jacobians, Tangent Plane and Normal to the Surface, Taylor's theorem for functions of two variables.

APPLICATIONS OF PARTIAL DIFFERENTIATION:

Maxima and Minima of functions of two variables, Lagrange method of undetermined multipliers.
(5.5 – 5.9, 5.11, 5.12)

UNIT-IV (12 Lectures)

MULTIPLE INTEGRALS:

Introduction to Non-Cartesian Coordinates, Double integrals, Change of order of integration, Double integral in polar co-ordinates, Triple integrals, Change of variables in double integrals, Change of variables in triple integrals. Simple Applications of Multiple Integrals**:** Area enclosed by plane curves, Volumes of solids.
(8.19, 8.21, 7.1, 7.7,)

UNIT-V (12 Lectures)

VECTOR DIFFERENTIATION:

Differentiation of vectors, curves in space, velocity, acceleration, Scalar and Vector point functions. Gradient of a scalar field and directional derivatives- Divergence and curl of a Vector field and it's physical interpretation.

VECTOR INTEGRATION:

Line integral, Circulation, work done, surface and volume integrals.

Vector integral theorems: Green's, Stoke's and Gauss Divergence theorems (without proofs) and related problems.
(8.1- 8.16)

TEXT BOOK:

Dr.B.S.Grewal *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. Kreyszig E, "*Advanced Engineering Mathematics*", 8th Edition, John Wiley, Singapore, 2001.
2. Greenberg M D, "*Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, "*Advanced Engineering Mathematics*", 7th Edition, Cengage Learning, 2011.

PHYSICS

(Common to all branches)

Course Code: 13BP1101

L	T	P	C
4	0	0	3

Course Educational Objectives:

The aim and objective of the course curriculum is to impart learners the basic knowledge that enables effective understanding of various core subjects of engineering branches through principles of physics such as architectural acoustics, wave mechanics, dielectrics, fiber optics, Electromagnetism and so on.

Course Outcomes:

- Students will acquire knowledge of basic physical principles and they can correlate the same to natural environment and social concern.
- Students will be able to apply the knowledge in the selection of materials for various engineering applications.
- Enables students to learn the characteristics and applications of laser devices and enhances information levels on fiber optic communications.
- Enables the students gain a research orientation and innovative spirit.

UNIT-I (10 Lectures)

ELASTIC PROPERTIES OF MATERIALS & ARCHITECTURAL ACOUSTICS:

Introduction – classification of stress, strain and Hooke's law – Elastic behavior of materials – Poisson's ratio and relationship between modulus of elasticity – Twisting couple on a solid shaft – bending of beams – bending moment - Y by cantilever – Uniform bending - Reverberation and reverberation time – absorption coefficient – Sabine's law (quantitative treatment) – Factors affecting the acoustics of buildings and their remedies – Acoustical design of a hall.

UNIT-II (15 Lectures)

ELECTROSTATICS AND DIELECTRICS:

Vectors - unit vectors - Gradient of a scalar field – divergence & curl of a vector field – Coulombs law - Electric flux - Gauss law in electrostatics – differential form of Gauss law – derivation of Coulombs law from Gauss Law – Applications of Gauss Law (Electric Field due to a solid charged sphere and thin sheet of charge) - Gauss law in dielectric medium - Dipole - Electric displacement vector - Dielectric permittivity and susceptibility- Dielectric constant and dielectric polarization in materials - Types of polarizabilities - Electronic polarizability derivation - Internal fields in solids and Claussius - Mosotti equation - frequency dependence of dielectric constant - Dielectric loss - Dielectric Strength and dielectric breakdown - important dielectric materials in electrical engineering.

UNIT-III (10 Lectures)

ELECTROMAGNETICS:

Biot-Savart Law - Magnetic flux – Magnetic scalar potential - Magnetic Vector Potential - Ampere's law – Force and torque on a magnetic dipole due to external magnetic field, Magnetization - Bound volume and surface current densities - auxiliary field H (Ampere's law in magnetized materials) - Magnetic susceptibility and permeability - Force on charged particle under electric and magnetic fields - Faraday's law of electromagnetic induction - Self and mutual Inductances - Displacement current density - Maxwell's equations – Physical Significance of Maxwell's equations.

UNIT-IV (10 Lectures)

WAVE MECHANICS & BAND THEORY OF SOLIDS :

Introduction to wave mechanics – wave particle duality – de-Broglie matter waves – Wave function characteristics and significance – Schrodinger's time independent wave equation – particle in one dimensional rigid box - Fermi-Dirac distribution function – Fermi level - Effect of temperature on Fermi function - Bloch theorem (Qualitative), Kronig - Penny model (Qualitative treatment) – Concept of effective mass, Origin of energy band formation in solids – Classification of materials in to conductors, semi-conductors and insulators based on number of effective electrons.

UNIT-V (15 Lectures)

OPTICS & LASERS:

Introduction to optics – Interference phenomenon - interference through thin films in reflected light – Newton's rings – determination of wave length of a source – Diffraction due to single slit – intensity pattern discussion – Diffraction grating – Resolving Power of grating (qualitative) - Polarization – Law of Malus - Brewster's law – double refraction – Nicol prism - Basic principle of a LASER – Induced absorption, spontaneous and stimulated emissions – Einstein's coefficients – Population inversion – Ruby laser, CO_2 laser and Semiconductor laser – Laser Applications – Introduction to optical fibers – Classification of fibers on the basis of refractive index profile – Acceptance angle and numerical aperture definitions and expression for Numerical aperture – Applications relating to communication and sensors (force and temperature).

TEXT BOOKS:

1. D.J. Griffiths, *"Introduction to Electrodynamics"*, 3rd Edition, PHI (EEE series), 2009.
2. M.N. Avadhanulu, P.G. Kshirasagar, *"A Text book of Engineering Physics"*, 10th Edition, S. Chand & Company Limited, 2013.
3. V. Rajendran, *"Engineering Physics"*, 2011 Edition, TMH Publishing Company, 2011.

REFERENCES:

1. A.J. Dekker, *"Electrical Engineering Materials"*, 1st Edition, Macmillan Publishers, 2007.
2. C. Kittel, *"Introduction to Solid State Physics"*, John Wiley Publishers, 2007.
3. M.N.Sadiku, *"Elements of Electromagnetics"*, 4th Edition, Oxford University Press, 2007.
4. V. Raghavan, *"Materials Science"*, 5th Edition, PHI Publishers, 2007.

5. R.K. Gaur, S.L. Gupta, *"Engineering Physics"*, 8th Edition, Dhanapat Rai Publishers, 2003.
6. P.K. Palanisamy, *"Applied Physics"*, 2nd Edition, Scitech Publishers, 2010.
7. M. R. Srinivasan, *"Engineering Physics"*, New Age Publishers, 2012.

COMPUTER PROGRAMMING THROUGH C

(Common to all Branches)

Course Code : 13CT1102

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course helps the student in understanding Computer Programming concepts. An individual will have ability to:

- Design Algorithmic solution for various problems and convert algorithms to C programs
- Design programs with Interactive Input and Output
- Design programs utilizing arithmetic expressions
- Design programs utilizing repetition and decision making
- Design programs utilizing arrays and structures
- Design programs using file Input and Output
- Test and verifying programs

Course Outcomes:

At the end of the course the student will be able to

- Know how to write algorithms and draw flowcharts and develop programs
- Write programs using sequential, condition, iterative control statements
- Write programs using derived data types like arrays, functions, pointers, strings, structures, unions
- Define user defined data types like type- def, enum
- Learn about files, their creation, and various operations that can be performed on files

UNIT-I (12 Lectures)

Introduction to Computers , Algorithm/ Pseudo code, Flow chart, Program Development steps, Basic structure of C Program, Input and Output statements (printf() & scanf()), A Simple C Program, Identifiers, Basic data types and sizes, Constants, Variables, Operators, Type Conversion, Expression Evaluation, Precedence & Associativity of operators.

CONTROL STATEMENTS:

If, switch, for, while and do- while statements, break, continue and goto statements.Sample programs covering all the above topics.

UNIT-II (12 Lectures)

FUNCTIONS:

Definition, Advantages, types of functions- user defined and standard library functions, categories of functions , scope rules, recursion, storage classes. Sample programs covering all the above topics.

UNIT-III (12 Lectures)

ARRAYS:

Introduction to arrays, 1 D Arrays: Definition, Declaration, Initialization, Accessing & storing the elements, 2 D Arrays: Definition, Declaration, Initialization, Accessing & storing the elements C Pre processors.

STRINGS:

String- Declaration, Initialization, pointers and strings, standard library string functions, array of pointers to strings. Sample programs covering all the above topics.

UNIT-IV (12 Lectures)

POINTERS:

Definition, Declaration of Pointer variables, the & and * operators, Pointer Expressions, Char, int, and float pointers, Pointer arithmetic, Passing addresses to functions, Functions returning pointers, Pointers & Arrays: Passing array elements to functions, pointer to pointer, array of pointers, Dynamic memory allocation functions, Sample programs covering all the above topics

UNIT-V **(12 Lectures)**

STRUCTURES & UNIONS:

Structures: Definition, Initialization, Accessing structures, nested structures, array of structures, additional features of structures, self referential structures, unions, type-def, bit fields, enum data type.

FILES:

Concept of a file, Text and Binary files, file I/O operations, Command line arguments. (Let Us C, Yashavant Kanetkar)

Sample programs covering all the above topics.

TEXT BOOKS:

1. B.A Forouzan and R.F. Gilberg, *"Computer science, A structured programming approach using C"*, 3rd Edition, Cengage Learning.
2. Yashavant Kanetkar, *"Let Us C"*, 12th Edition, BPB Publications, 2012.
3. Yashavant Kanetkar, *"Understanding pointers in C"*, 4th Edition, BPB Publications, 2009.

REFERENCES:

1. N. B. Venkateswarlu, E.V. Prasad, *"C & Data Structures"*, 1st Edition, S. Chand Publications, 2010.
2. K.R.Venugopal, S.R.Prasad, *"Mastering C"*, 1st Edition, TMH, 2007.

ENGINEERING MECHANICS

(Common to all Branches)

Course Code: 13ME1102

L	T	P	C
4	1	0	3

Course Educational Objectives:

To develop

- The skill of converting a physical problem into a suitable mathematical model
- Analytical skills of solving the mathematical model
- The skill of interpreting the results in terms of the given physical situation
- The skills of optimization

Course Outcomes:

The student will be able to

- Identify and list , for a given physical problem, all known's, intermediate unknowns, and final results
- Formulate suitable mathematical equations and the constraints.
- Resolve a given force into rectangular components, find the moment of a force about a given point and find the resultant of a set of forces
- Solve problems involving static and dynamic friction
- Locate the centroid and calculate the moments of inertia of a given plane area
- Find the resulting acceleration of a body subjected to a set of forces and moments
- Calculate the work done, energy, power and efficiency

UNIT-I (13 Lectures)

RESULTANTS OF FORCE SYSTEM:

Parallelogram law, forces and components, resultant of coplanar concurrent forces, components of forces in space, moment of force, principle of moments, coplanar applications, couples, resultant of any force system (coplanar concurrent cases only).

Equilibrium of force systems: Free body diagram, equations of equilibrium, equilibrium of planar systems, further discussion of planar equilibrium.

UNIT-II (09 Lectures)

FRICTION:

Theory of friction, angle of friction, laws of friction, static friction, kinetic friction, friction in bodies moving up or down on an inclined plane, wedge friction, screw friction and screw jack.

UNIT-III (14 Lectures)

CENTROIDS AND CENTERS OF GRAVITY:

Center of gravity of flat plate, centroids of areas and lines, importance of centroids of areas and lines, importance of centroids and moments of area, centroids determined by integration, centroids of composite figures, theorem of Pappus, center of gravity of bodies.

MOMENT OF INERTIA:

Definition of moment of inertia, polar moment of inertia, radius of gyration, parallel axis theorem, moments of inertia by integration, moments of inertia for composite areas.

UNIT-IV (12 Lectures)

MASS MOMENT OF INERTIA:

Introduction, radius of gyration, parallel axis theorem, mass moments of inertia by integration, moments of inertia of composite bodies.

KINEMATICS AND KINETICS OF A PARTICLE:

Motion of a particle, rectilinear motion, rectangular components of curvilinear motion, normal and tangential components of acceleration, radial and transverse components, cylindrical coordinates translation-analysis as a particle, further discussion of particle kinematics.

UNIT-V (10 Lectures)

KINEMATICS AND KINETICS OF A BODY UNDERGOING FIXED AXIS ROTATION:

Types of rigid-body motion, angular motion-fixed axis rotation, application of kinematic equations, kinetics of fixed axis rotation.

WORK-ENERGY METHOD:

Work-energy equation for translation, interpretation and computation of work, work-energy applied to particle motion, power, efficiency, applied to fixed-axis rotation, work-energy applied to connected systems, work-energy method.

TEXT BOOK:

Vijaya Kumar Reddy K and Suresh Kumar J(Adapters), "*Singer`s Engineering Mechanics : Statics and Dynamics*", Third edition (SI Units), BS Publications, Hyderabad, 2011

REFERENCES :

1. Timoshenko sp and Young DH, Rao and Pytel, "*Engineering Mechanics*", fourth edition, McGraw Hill international editions, 2013.
2. Hibbeler RC, " *Engineering Mechanics : Statics* ", low price edition, Pearson Education,2000.
3. Hibbeler RC, " *Engineering Mechanics : Dynamics* ", low price edition, Pearson Education,2000.
4. Tayal AK "*Engineering Mechanics: Statics and Dynamics*", Thirteenth edition, Umesh Publications, Delhi, 2005

BASIC NETWORK ANALYSIS

(Common to ECE & EEE)

Course Code:13EE1101

L	T	P	C
4	1	0	3

Pre requisites: Mathematics.

Course Educational Objectives:

The course objective is to teach Principles of Electrical Network Analysis which was a basic foundation course for the disciplines EEE and ECE. Hence this is introduced in I-Year so that the students feel comfortable with various other Electrical and Electronics Courses they come across.

Course Outcomes:

Student will be comfortable in handling lab classes and gets the knowledge base to analyze and design simple electrical networks.

UNIT-I **(12 Lectures)**

BASIC COMPONENTS AND ELECTRIC CIRCUITS :

Introduction, Units and scales, Charge, current, voltage and Power; Voltage and current sources - Independent and dependent sources; Networks and circuits; Ohm's Laws, power absorption, conductance; Voltage and Current Laws: Nodes, paths, loops and branches, Kirchoff's current law, Kirchoff's voltage law; The single loop circuit; The single-node-pair circuit; series and parallel connected sources; Resistors in series and parallel; Voltage and current division. Circuit Analysis: Nodal Analysis, Super node; Mesh analysis, super mesh; Nodal Vs Mesh analysis – a comparison; Linearity and superposition, The superposition principle; Source transformations; Thevenin and Norton equivalent circuits; Maximum Power Transfer Theorem; Reciprocity theorem; Delta-wye conversion.

UNIT-II (12 Lectures)

CAPACITORS, INDUCTORS AND BASIC RL & RC CIRCUITS:

Capacitor, Integral Voltage-current relationship, energy stored in a capacitor; The inductor, integral voltage-current relationship, energy stored in an inductor; Inductance and Capacitance combinations- inductors in series and parallel; Capacitors in series and parallel; Magnetically Coupled circuits – Mutual inductance - coefficient of mutual inductance, dot convention, combined mutual and self-induced voltages, Energy considerations, the coupling coefficient. Basic RL and RC circuits: The source free RL circuit – A direct approach, an alternate approach, a more general solution approach; Properties of the exponential response; The source free RC Circuit; A more general perspective – General RL circuits, distinction between 0^+ and 0^- General RC circuits; The unit-step function, Physical sources and the unit step function, the rectangular pulse function; Driven RL circuits – Natural and Forced response, determination of the complete response; Driven RC circuits.

UNIT-III (12 Lectures)

THE RLC CIRCUIT AND SINUSOIDAL STEADY-STATE ANALYSIS:

The source free parallel RLC circuit – obtaining the differential equation, solution to the differential equation; Overdamped, critically damped and the underdamped cases; The source free series RLC circuit – the complete response of the series RLC circuit; The lossless LC circuit. Characteristics of sinusoids, The Phasors – Phasor relationships for R,L and C; Kirchoff’s laws using phasors; Impedance – series and parallel combinations; Admittance; Nodal and Mesh Analysis; Superposition, Thevenin’s and Norton’s theorems, Source transformations; Phasor diagrams.Parallel Resonance – Resonant frequency, band width and quality factor; Series Resonance – Resonant frequency, band width and quality factor, Locus diagrams in RL and RC circuits.

UNIT-IV (12 Lectures)

AC CIRCUIT POWER ANALYSIS:

Introduction, Instantaneous Power, Power due to sinusoidal excitation, Average Power – Average power for periodic waveforms, average power in the sinusoidal steady state, Average power absorbed by an ideal resistor and purely reactive elements; Maximum Power Transfer; Effective values of current and voltage – effective value of a periodic waveforms, use of effective value to compute average power, effective value with multiple frequency circuits; Apparent Power and Power Factor; Complex Power – Power Triangle and Power Measurement.

UNIT-V **(12 Lectures)**

SINGLE PHASE AND THREE PHASE CIRCUITS:

Introduction, Balanced three phase voltages, Balanced Wye-Wye connection, Balanced Wye-Delta connection, Balanced Delta-Delta connection, Balanced Delta-Wye connection, power in a balanced system, Un-balanced Three phase system.

TEXT BOOKS:

1. William H.Hayt, Jr., Jack E.Kemmerly and Steven M.Durbin, *"Engineering Circuit Analysis"*, 7th Edition, McGraw Hill Publications, 2007. (Unit-I to Unit-IV).
2. Charles K. Alexander and Mathew N.O.Sadiku, *"Fundamentals of Electric Circuits"*, 4th Edition, McGraw Hill Publications, 2009. (Unit-V).

REFERENCES:

1. M.E.Van Valkenberg, *"Network Analysis"*, Prentice Hall of India, New Delhi.
2. Russell M.Kerchner, *"Alternating-current circuits"*, 4th Edition, John Wiley and sons, 1960.

PHYSICS LAB
(Common to all Branches)

Course Code: 13BP1102

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to involve the students to learn the subject and gain knowledge in handling the apparatus which will help them in designing devices and to trouble shoot the problems in their future professional work. The experiments are designed to cater to the needs of the students of all branches.

Course Outcomes:

The course will help the student in handling different apparatus for conducting various experiments in different fields which enables the student to trouble shoot the problems in their future professional work.

ANY TEN OF THE FOLLOWING 15 EXPERIMENTS

ERROR ANALYSIS AND GRAPH DRAWING (LECTURE - DEMO).

- Bending of beams – Elliptical and Hyperbolic fringes - Determination of 'Y'.
- Torsional pendulum - comparison of rigidity modulii of various wires.
- Melde's experiment – determination of frequency of electrically maintained tuning fork.
- Determination of wavelength of laser light using diffraction through a graded scale.
- Particle size determination using He-Ne laser (Lycopodium powder).
- Diffraction grating – determination of wavelengths of spectral lines of Mercury spectrum by minimum deviation method.
- Spectrometer – determination of dispersive power of the material of a prism.

8. Polarization of light – verification of Malu's law and to determine the Brewster's Angle for glass.
9. Determination of Planck's constant.
10. Solar cell characteristics – I-V characteristics, measurement of efficiency and Fill factor.
11. Stewart – Gee apparatus – study of variation of magnetic field along the axis of circular current carrying loop.
12. LCR series and parallel resonance circuit study the frequency response.
13. Familiarity of CRO – Lissajjou's figures - determination of time period, voltage, frequency and phase of a wave.
14. Newton's Rings- determination of wavelength of the source/radius of curvature of given convex lens.
15. Optical fibres- determination of Numerical aperture, acceptance angle and bending losses.

COMPUTER PROGRAMMING LAB

(Common to All Branches)

Course Code : 13CT1103

L	T	P	C
0	0	3	2

Course Educational Objectives:

The main objectives of the course are to give the basic knowledge of C Language with practical orientation of various features present in this language.

- ✤ To give exposure about RAPTOR tool to design flow charts.
- ✤ To give hands on exposure to the students in developing the programs.
- ✤ Develop programs by using simple and optimized logic.
- ✤ Maximizing the usage of various C programming features.
- ✤ To give hands on exposure to the students to work with files.

Course Outcomes:

Upon completion of the course the student will be able to

- ✤ Gets exposure on RAPTOR tool.
- ✤ Learn how to program basic mathematical operation using various loops like for, while, do while, and switch statement.
- ✤ Program various string handling functions.
- ✤ Program various file operations.
- ✤ Gets an idea on maximizing the usage of various C programming features.

LIST OF PROGRAMS:

1. Demonstration of RAPTOR Tool to generate flowcharts by considering simple algorithms. Generation of flow charts to solve problems such as Temperature Conversion, Swapping of Two numbers etc. using RAPTOR Tool.

2. Write C Programs to solve problems such as Student Grading, Income Tax Calculation, and Largest of three Numbers etc., which expose students to various categories of IF Statements. Generate flowcharts using RAPTOR Tool.

3. a) Write a C program to find the roots of a quadratic equation.

   b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

4. a) The total distance travelled by vehicle in't' seconds is given by distance = $ut+1/2at^2$

   where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write a C

   program to find the distance travelled at regular intervals of time given the values of

   'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

   b) Write a C program to determine whether a given number is an Armstrong or not.

   (If the sum of the cubes of the number is equal to the original number, then the number

   Is called Armstrong number. Eg: 371 is Armstrong number ($3^3+7^3+1^3$= 371))

5. a) Write a C program to find the sum of individual digits of a positive integer.

   b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

6. a) Write a C program to calculate the following sum:

   Sum=$1-x^2/2! +x^4/4!-x^6/6! +x^8/8! -x^{10}/10!$

b) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

7. a) Write a C program to generate Pascal's Triangle.

   b) Write a C program to construct a Pyramid of Numbers.

8. Write C programs that use both recursive and non-recursive functions for the following

   a) To find the factorial of a given integer.

   b) To find the GCD (greatest common divisor) of two given integers.

9. a) Write a C function to read in two numbers, x and n, and then compute the sum of this geometric progression:

   $1+x+x^2+x^3+\ldots\ldots\ldots\ldots + x^n$. Also perform error checking by considering negative values for n and also check for illegal values of x.

   b) Write a C function to read in two numbers, x and n (no. of terms), and then compute sin(x) and cos(x).

10. a) Write a C program to find the largest and smallest number in a list of integers.

    b) Write a C program to perform Matrix Addition & Matrix Multiplication.

    c) Write a C program to compute Transpose of a Matrix.

11. a) Write a C program to exchange value of two integers using call by value and call by reference.

    b) Write C programs to demonstrate the use of Pointers.

12. Write user defined string handling functions to implement the following standard library functions: strlen(), strcpy(), strcat(), strrev(), strcmp().

13. a) Write a C program that displays the position/ index in the string S where the string T begins, or –1 if S doesn't contain T.

    b) Write a C program to determine whether a given string is Palindrome or not.

14. Write a C program that uses functions to perform the following operations:

    a) To insert a sub-string in to given main string from a given position.

    b) To delete n Characters from a given position in a given string.

    c) To replace a character of string either from beginning or ending or at a specified location.

15. a) Write a C program to find the two's complement of a binary number.

    b) Write a C program to convert a Roman numeral to its Decimal Equivalent.

16. Write a C program that uses functions to perform the following operations using Structures:

    a) Reading a complex number.

    b) Writing a complex number.

    c) Addition of two complex numbers.

    d) Multiplication of two complex numbers.

17. a) Write a C program which copies one file to another.

    b) Write a C program to count the number of characters, lines, words, tabs and spaces in a given file.

ENGINEERING DRAWING
(Common to all Branches)

Course Code:13ME1103

L	T	P	C
1	0	3	3

Course Educational Objectives:

To make the student

- ✤ Familiar with the drawing practices and conventions.
- ✤ Familiar with projections of points, lines, planes and solids
- ✤ Familiar with isometric views

Course Outcomes:

Student will be able to

- ✤ Draw various types of engineering curves
- ✤ Draw orthographic projections of points, lines, planes and solids inclined to one plane or both the planes
- ✤ Draw isometric views of simple solids

LIST OF EXERCISES

1. Introduction to engineering drawing & basics of geometrical construction
2. Construction of parabola, ellipse, hyperbola- general method
3. Cycloid, epicycloids, hypocycloid, involutes of circle and square
4. Projections of points
5. Projections of lines inclined to one plane
6. Projections of lines inclined to both the planes
7. Projections of planes inclined to one plane
8. Projections of planes inclined to both the planes
9. Projections of solids in simple positions

10. Projections of solids inclined to both the planes

11. Isometric views

TEXT BOOK:

N.D. Bhatt and V.M. Panchal, *"Engineering Drawing"*, Charotar Publication House, 49th Edition, 2008.

ENGINEERING WORKSHOP

(Common to all branches)

Course Code :13MT1101

L	T	P	C
0	0	3	2

Course Educational Objectives:

To provide hands on experience on basic Engineering and IT related skills.

- ✤ To train the student in the basics of computer components, maintenance software(s) installation
- ✤ To train the students in office tools.
- ✤ To give the student exposure to DOS commands and LINUX commands.
- ✤ To demonstrate and train the students in basic professional trades.
- ✤ To train the students to know about different system tools in personal computer.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Identify the peripherals of a computer, components in a CPU and its function
- ✤ Work with MS-OFFICE
- ✤ Work with DOS commands
- ✤ Work with LINUX commands
- ✤ Understands different system tools in personal computer.

COMPULSORY EXERCISES:

1. Identification of the peripherals of a computer, components in a CPU and its function – Block diagram of the CPU along with the configuration of each peripheral. Disassembly and assembly of a personal computer.

2. Installation of MS windows on the personal computer.

3. One lamp controlled by a one-way switch and (b) Two-way switching for stair-case lamp.

ANY NINE EXPERIMENTS FROM THE FOLLOWING:

Carpentry: Making a Cross-half lap joint using wooden pieces.

Carpentry: Making a Mortise and Tenon joint using wooden pieces.

Fitting: Preparation of a V-fit between mild steel flat pieces.

Fitting: Preparation of a Square-fit between mild steel flat pieces.

Foundry: Preparation of a sand mould using a single piece pattern

Foundry: Preparation of a sand mould using a split piece pattern.

Tin-Smithy: Preparation of a sheet metal pipe-joint using tin-smithy tools.

Tin-Smithy: Preparation of a sheet metal funnel using tin-smithy tools.

Welding: Making a Lap joint through arc welding.

Lathe Machine: Demonstration of turning related activities on Lathe machine.

Black smithy: Demonstration of Plumbing trade.

Plumbing: Demonstration of plumbing trade

Operating System: Changing Boot Device Priority, Installation of Linux, putting passwords, Enabling and disabling external devices, Connectivity Boot Camp.

Hands on Exposure on Linux shell commands: Using man, info commands for finding information about commands. Using file processing commands (ls, cp, mv, ln, mkdir, rmdir, chmod etc..), Using text processing commands (grep, egrep, sed etc…), Using disk utility commands, mount commands (du, df, mount etc..), Vi-Editor.

MS-Word: Using Ms-Word, creating project abstract, creating newsletter, creating feedback form

MS- Excel: Excel orientation, creating scheduler, calculating CGPA, Performance Analysis

MS-PowerPoint: PPT Orientation, Slide Layouts, Custom Animation, Hyperlinks, inserting Images, Clip Art, Audio, Video, Objects, Tables, Charts.

System tools, Hardware Troubleshooting, Software Troubleshooting and Installations of Anti Virus.

Multimedia Flash (Adobe)

a. Introduction to Flash interface

b. Introducing the tools

c. Putting text into Flash

d. Smoothen/straighten drawings

e. Animation Part 1: Using layers, key frames and motion tweening

f. Animation Part 2: Shape tweening, motion guide and frame by frame animation

NOTES

SYLLABI FOR II SEMESTER

ENGLISH

(Common to all Branches)

Course Code: 13HE 1101

L	T	P	C
4	0	0	3

Course Educational Objectives:

Enabling the students to

- Understand class room lectures in different subjects
- Read technical and general materials including literary, scientific, political, economic and cultural topics of interest
- Develop effective written communication in academic, technical and professional contexts
- Develop creative and critical thinking skills necessary to become employable

Course Outcomes:

The learners will be able to show:

- Skills in reading including skimming, scanning, intensive and extensive and comprehension
- Enriched vocabulary and become better communicators
- Skills of communicating in descriptive, analytical and narrative modes with felicity
- Creative and critical thinking skills for employability

Course Work:

To achieve the above objectives, instruction will be imparted through relevant ESP materials, articles and editorials from newspapers, technical journals, magazines in classes and laboratory. Students will be given individual and integrated practice in LSRW skills.

Contents:

Reading Comprehension - Reading in various degrees of speed (slow, fast, very fast); reading different kinds of texts for different purposes (for example, for relaxation, for information, for understanding, for discussion at a later stage etc.); reading between the lines, skimming and scanning and so on.

Vocabulary –synonyms, antonyms, prefixes, suffixes, confusables, one-word substitutes, Idioms and phrases

WRITING:

- Grammar: Common errors, articles, prepositions, tenses, concord, phrasal verbs, modal verbs, conditionals, transformation of sentences, punctuation and spelling
- Selecting materials for expository, descriptive, and argumentative pieces summarizing and abstracting
- Paragraph writing with coherence, cohesiveness and clarity,
- Essay writing- variety in sentences and paragraphs, précis writing
- Business letter writing
- Reference skills; use of dictionary, library and internet sources

SYLLABUS

UNIT-I (13 Lectures)

1. Story of Insects (English Today)
2. Bringing up Boys & Girls (Academic Encounters)
3. The Lunatic, the Lover and the Poet (The Siren's Song)
4. Vocabulary Building: Prefixes, Suffixes, One-Word Substitutes etc.

UNIT-II (14 Lectures)

1. Unity of Minds by Dr. A.P.J. Kalam (English Today)
2. On His Blindness (The Siren's Song)
3. Cultural Variation & Change (Academic Encounters)
4. Grammar: Tenses & Concord

UNIT-III **(11 Lectures)**

1. Three Years She Grew in Sun and Shower (The Siren's Song)
2. Advertising in the Media (Academic Encounters)
3. Grammar: Articles & Prepositions
4. Paragraph Writing; Technical Description-Process, Object

UNIT-IV **(12 Lectures)**

1. A Special Kind of Blessing (English Today)
2. Techniques of Solving Crimes (Academic Encounters)
3. La Belle Dame Sans Merci (The Siren's Song)
4. Précis writing &Letter Writing

UNIT-V **(10 Lectures)**

1. I Have A Dream (English Today)
2. Because I Could not Stop for Death (The Siren's Song)
3. Writing: Note Taking & Note Making ,Essay writing
4. Grammar: Simple, Compound & Complex Sentences

TEXTBOOKS:

1. Kristine Brown & Susan Hood, *"Academic Encounters: Life in Society Reading, Study Skills, Writing, London"*, Cambridge University Press/ Foundation Books, 2006.
2. K Durga Bhavani, G. K. Subbarayuydu, C. Vijayasree, D. Prema Kumari & Y. L. Srinivas, *"English Today: A Course in Reading and Writing"*, Foundation Books, 2005.
3. David Murdoch, The Siren's Song, "*An Anthology of British and American Verse*", Madras, Orient Longman, 1993.

REFERENCS:

1. Alec Fisher, *"Critical Thinking An Introduction"*, New Delhi: CUP, First South Asian Edition, 2011.
2. Bikram K. Das, Kalyani Samantray, Rath Nayak, Susmita Pani & Saveeta Mohanty, "*An Introduction to Professional English and Soft Skills*", New Delhi, Foundation Books, 2009.

3. *“Regional Institute of English, English for Engineers”*, New Delhi, Foundation Books, 2006.
4. Sharon J.Gerson, Steven M.Gerson, *“Technical Writing”*, New Delhi, Pearson education, 2007.

SUGGESTED READING:

Stories of humour, adventure, mystery and autobiographies of eminent scientists.

MATHEMATICS-II
(Common to all branches)

Course Code:13BM1102

L	T	P	C
4	1	0	3

Pre requisites:

- ✤ Basic formulae of differentiation and integrations.
- ✤ Basic terminology and elementary operations on Matrices.
- ✤ Basic concept of partial differentiation.

Course Educational Objectives:

- ✤ The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- ✤ The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.
- ✤ Understand the most basic numerical methods to solve simultaneous linear equations.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- ✤ Solve simultaneous linear equations using matrix methods.
- ✤ Calculate eigenvalues and eigen vectors of matrices that are essential for vibration/design analysis.
- ✤ Understand Fourier series, integral ,transforms and they are provided with practice in their application and interpretation in a range of situations.
- ✤ Identify/classify and solve the different types of partial differential equations.

UNIT-I (12 Lectures)

MATRICES:

Rank, Normal form, Echelon form, Consistency and Solution of system of simultaneous linear homogeneous and non-homogeneous equations. Finding eigenvalues and eigen vectors, properties, Cayley-Hamilton theorem, computing inverse and powers of a matrix by applying Cayley-Hamilton theorem, Diagonalisation of matrix.
(2.7, 2.10, 2.13 -2.16)

UNIT-II (12 Lectures)

NUMERICAL METHODS IN LINEAR ALGEBRA:

Solution of linear simultaneous equations: LU decomposition, Jacobi iteration and Gauss-Seidel methods. Determination of eigenvalues and eigen vectors by iteration (Rayleigh's Power Method) .

(28.5, 28.6(3), 28.7(1)(2), 28.9)

UNIT-III (12 Lectures)

DIFFERENCE EQUATIONS AND APPLICATIONS:

Difference operators (forward, backward and shift operators), Introduction to difference equation, formation of difference equation, Linear difference equations and it's complete solution. Rules for finding the complementary function and complete integral, Deflection of a loaded string.
(29.1, 29.4, 31.1 - 31.6, 31.8)

UNIT-IV (12 Lectures)

FOURIER SERIES:

Euler's formulae, Dirichlet's Conditions for a Fourier expansion, functions having points of discontinuities, Change of interval, even and odd functions, half range series, wave forms.

FOURIER TRANSFORMS :

Fourier integral theorem, Fourier transform and inverse Fourier transform, Fourier sine and cosine integrals. – Fourier sine and cosine transforms – properties of Fourier Transforms – Finite Fourier transforms.
(10.1 – 10.9, 22.1 – 22.5)

UNIT-V **(12 Lectures)**

PARTIAL DIFFERENTIAL EQUATIONS:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – solutions of first order linear (Lagrange) equation and nonlinear first order (standard type) equations.

APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS:

Method of separation of variables, Classification of second order linear Partial Differential Equations. Solutions of one dimensional heat equation, wave equation and two-dimensional Laplace's equation under initial and boundary conditions. (17.1 – 17.3, 17.5, 17.6, 18.1-18.7)

TEXT BOOK:

Dr.B.S.Grewal *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. Kreyszig E, "*Advanced Engineering Mathematics*", 8th Edition, John Wiley, Singapore, 2001.
2. Greenberg M D, "*Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, "*Advanced Engineering Mathematics*", 7th Edition, Cengage Learning, 2011.

CHEMISTRY

(Common to all Branches)

Course Code: 13BC1101

L	T	P	C
4	0`	0	3

Course Eductational Objectives:

The course attempts impart a sound knowledge on the principles of chemistry involving different application oriented topics to requied for all engineering branches.

Course Outcomes :

The student should able to apply

- ✤ The principles involved in corrosion and its control
- ✤ Treatment of water for industrial purpose and concepts of energy storage devices.
- ✤ Utillisation of polymer engineering materials towards different applications.

UNIT-I (10 Lectures)

ELECTROCHEMICAL CELLS:

Electrode potential, Nernst equation, EMF of electrochemical cell, Reference electrodes-Standard hydrogen electrode, calomel electrode. Electrochemical series, Concentration cell, Construction of glass electrode, determination of P^H of given solution using glass electrode

Batteries-Primary cell-Dry or Lachanche cell, alkaline battery; secondary cells (storage batteries or accumulators) – Lead-acid Accumulator, Nickel-cadmium battery, Lithium ion battery (LIB) and redox flow battery.

Fuel cells - hydrogen - oxygen fuel cell, phosphoric acid fuel cell, solid oxide fuel cells

UNIT-II (12 Lectures)

CORROSION AND ITS CONTROL:

Introduction - Direct chemical corrosion and electrochemical corrosion and its mechanisms, Types of electrochemical corrosion-Differential aeration corrosion, galvanic corrosion, concentration cell corrosion, corrosion and pitting, stress corrosion, Galvanic series, passivity, factors influencing corrosion.

Corrosion control-proper designing, cathodic protection-sacrificial anodic protection and impressed current cathodic protection, modifying the environment and use of inhibitors.

Protective coatings- Anodic and cathodic coatings, Hot dipping-Galvanizing and Tinning, Metal cladding, Electroplating, Electroless plating, cementation or diffusion coatings.

UNIT-III (10 Lectures)

POLYMER TECHNOLOGY:

Polymerization, classification, degree of polymerization, functionality and tacticity of polymer, Types of polymerization-addition and condensation polymerization, Mechanism of addition polymerization, Condensation polymerization, Preparation, properties and uses of polythene, PVC, Teflon, nylons-6,6, Polyester, Bakelite and Silicones.

Plastics- Thermo plastics and thermosetting plastics, compounding of plastic.

Elastomers-Natural and synthetic rubbers, Manufacture, properties and applications of natural rubber-vulcanization, compounding of rubber, Synthetic rubbers-Preparation, properties and applications of Buna-S and Buna-N.

UNIT-IV (12 Lectures)

WATER TECHNOLOGY:

Introduction-characteristics imparted by impurities, hardness of water – Temporary and permanent hardness- units, Determination of hardness by EDTA method, Disadvantages of hard water, Chemical aspects of scale and sludge formation in boilers, caustic embrittlement,boiler corrosion, priming and foaming, Municipal water treatment-sedimentation, coagulation,

and filtration, Desalination of brackish water, Water softening methods-lime -soda method, zeolite method and ion exchange process.

UNIT-V: (16 Lectures)

ENGINEERING MATERIALS:

Fuels- classification, characteristics of fuel, calorific value –determination of calorific value by bomb calorimeter and Junkers gas calorimeter, theoretical calculation of calorific value, Types and Analysis of coal - Proximate and ultimate analysis of coal, Manufacture of coke- Petroleum-classification based on sources of petroleum, Refining of petroleum, Knocking, octane value, cetane value, Cracking -thermal cracking and catalytic cracking-fixed bed & moving bed catalytic cracking, reforming.

Cement: Classification of cement, chemical composition, functions of ingredients in Portland cement, Manufacture of Portland cement- raw materials, setting and hardening of Portland cement.

Refractories- Classification and properties of refractories, Failures of refractory materials.

Lubricants-friction, lubrication, functions of lubricants, mechanism of lubrication-thick film, thin film and extreme pressure lubrication, types of lubricants- solid, semisolid and liquid lubricants and their properties .

TEXT BOOKS:

1. Jain& Jain, *"A text book of Engineering Chemistry"*, 15th Edition, Dhanapat Roy publishing company, 2010.
2. Sasichawla, *"Engineering Chemistry"*, 3rd Edition, Dhanapat Roy publishing company, 2004.

REFERENCES:

1, S.S. Dara, *"A Text book of Engineering Chemistry"*, 11th Edition, S.Chand & Co, 2006.

2. C. Parameswara Murthy, C.V. Agarwal and Andhra Naidu, *"A Text Book of Engineering Chemistry"*, 1st Edition, B.S. Publications, 2006.

ELECTRONIC DEVICES

Course Code:13EC1101

L	T	P	C
4	1	0	3

Pre requisites: Physics

Course Educational Objectives:

- ✤ To introduce physical properties of semiconductor materials.
- ✤ To know the characteristics of various electronic devices.
- ✤ To impart the fabrication process of active devices like BJT, JFET, MOSFETS and their electrical properties, characteristics and applications.

Course Outcomes:

- ✤ Comprehends the depth of semiconductor devices like diodes, transistor, JFET, MOSFETs
- ✤ Acquire knowledge for different types of semiconductor materials and applications.
- ✤ Comprehends the knowledge PN junction diodes, tunnel diodes, & transistor and their construction, operation, configurations &characteristics.

UNIT-I **(10 Lectures)**

ENERGY BANDS AND CHARGE CARRIERS IN SEMICONDUCTORS:

Direct & Indirect Semiconductor, Variation of energy bands with alloy composition, Electrons and holes, Effective mass, Intrinsic and Extrinsic material, Fermi level, carrier concentrations at equilibrium, temperature dependence of carrier concentrations, compensation and space charge neutrality, conductivity, mobility, hall effect. Steady state carrier generation, diffusion, diffusion length, drift of carriers, continuity equation.

UNIT-II (15 Lectures)

JUNCTION DIODE:

The Contact potential, Equilibrium Fermi levels, space charges at a junction, qualitative and quantitative description of current flow at a junction, carrier injection, majority and minority carrier current. Zener & Avalanche Breakdown, time variation of stored charge, diode switching times, capacitance of PN Junction region, Ohmic contacts,V-I characteristics of diode, small signal model of diode, temperature dependence of diode, Zener diode - characteristics, Schottky diode, Tunnel diode.

UNIT-III (11 Lectures)

RECTIFIERS AND FILTERS :

Introduction to power supply, Half-wave rectifier, full-wave rectifier, Bridge rectifier, harmonic components in a rectifier circuit, inductor filter, capacitor filter, L- Section filters, multiple L- section filter, p filter, comparison of various filter circuits, Zener diode as voltage regulator, Silicon controlled rectifier(SCR)

UNIT-IV (12 Lectures)

BIPOLAR JUNCTION TRANSISTOR :

Junction transistor, transistor current components, transistor as an amplifier & switch, input and output characteristics of transistor in CB, CE, CC configurations, á , â and ã relationship, transistor switching times.

UNIT-V (12 Lectures)

FIELD EFFECT TRANSISTOR:

JFET- Construction, Drain & Transfer Characteristics, Pinch off voltage, FET small signal model, Voltage variable resistor, MOSFET characteristics- Enhancement and Depletion Type, Negative resistance, UJT characteristics and applications.

TEXT BOOKS:

1. Millman Jacob Halkias C Christos: "*Electronic Devices and Circuits*", 2nd Edition, Tata McGraw-Hill Publications, 2007.
2. B.G. Streetman: "*Solid State Electronic Devices*", 5th Edition, Prentice Hall of India Publications, 2002.

3. Boylestad.Robert: "*Electronic Devices and Circuits Theory*" PHI publications, 10th Edition, 2008.

REFERENCES:

1. B.Visweswara Rao, K.Bhaskarram Murthy, K.Raja Rajeswari, P.Chalam Raju Pantulu "*Electronic Devices and Circuits*," Pearson Publications, 2nd Edition, 2009.
2. Raju GSN, "*Electronic Devices and Circuits*": IK International Publishing House, 1st Edition, 2006.
3. Lal Kishore, "*Electronic Devices & Circuits"* Vol. I," BSP publications, 2nd Edition, 2005.

ELECTRICAL TECHNOLOGY

Course Code: 13EE1144

L	T	P	C
4	0	0	3

Pre requisites: Mathematics and Networks.

Course Eucational Objectives:

In this course the different types of Instruments, DC generators, DC motors, Induction Motors, Alternators and Single Phase Motors which are widely used in industry are covered and their performance aspects will be studied.

Course Outcomes:

After completion of this course, the students shall have knowledge about Electrical Machines (both A.C and D.C) and their performances.

UNIT-I **(12 Lectures)**

DC MACHINES:

Principle of operation of DC Machines- EMF equation – Types of generators – Magnetization and load characteristics of DC generators. DC Motors – Types of DC Motors – Characteristics of DC motors – 3-point starters for DC shunt motor – Losses and efficiency – Swinburne's test – Speed control of DC shunt motor – Flux and Armature voltage control methods.

UNIT-II **(12 Lectures)**

TRANSFORMERS:

Principle of operation of single phase transformer – types – Constructional features – Phasor diagram on No Load and Load – Equivalent circuit, Losses and Efficiency of transformer and Regulation–OC and SC tests – Predetermination of efficiency and regulation (Simple Problems).

UNIT-III (12 Lectures)

INDUCTION MOTORS:

3-Phase: Principle of operation of Three-phase Induction motors –Slip ring and Squirrel cage motors – Torque equation-Slip-Torque characteristics – Efficiency calculation – Starting methods. Single Phase: Principle of operation - Shaded pole motors – Capacitor motors, AC servomotor, AC tachometers, Synchros, Stepper Motors – Characteristics.

UNIT-IV (12 Lectures)

SYNCHRONOUS MACHINES:

Constructional features – Principle of operation – Types - EMF Equation – Distribution and Coil span factors – Armature parameters-armature resistance-synchronous reactance-phasor diagram-unity power factor-lagging power factor –leading power factor-Predetermination of regulation by Synchronous Impedance Method – OC and SC tests-principle of operation of synchronous motors.

UNIT-V (12 Lectures)

ELECTRICAL INSTRUMENTS:

Types of instruments (Indicating, integrating, Recording)- Basic Principles of indicating instruments – Moving Coil and Moving iron Instruments (Ammeters and Voltmeters) wattmeters and energy meters.

TEXT BOOKS:

1. M.S Naidu and S. Kamakshaiah, *"Introduction to Electrical Engineering"*, *Tata McGraw Hill* Publication, 4^{th} Edition, 2011.
2. Vincent Del Toro, *"Electrical Engineering Fundamentals"*, PHI Publishers 5^{th} Edition, 2009.

REFERENCES:

1. V.K Mehta *"Principles of Electrical Engineering"* S.Cand Publications, 5^{th} Edition, 2005.
2. I.J. Nagrath and D.P Kothari *"Theory and Problems of Basic Electrical Engineering"* PHI Publications, 4^{th} Edition, 2009.
3. David V. Kerns, JR. J. David Irwin, *"Essentials of Electrical and Computer Engineering"*, TMH Education Pvt. Ltd, 3^{rd} Editions, 2008.

ENGLISH LANGUAGE LAB
(Common to all Branches)

Course Code : 13HE1102	L	T	P	C
	0	0	3	2

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

Course Educational Objectives:

- To make students recognise the sounds of English and Phonemic transcription through Audio-Visual aids and Computer Software.
- To help them overcome their inhibitions and self- consciousness while communicating in English and to build their confidence.
- To enable them to speak English intelligibly with focus on Stress and Intonation.

Course Outcomes :

- Students will be able to recognise the sounds of English and Phonemic transcription, practice Stress & Intonation in speech.
- They will learn to communicate in Oral and Written English forms confidently.
- They will also be able to demonstrate skills like Publik Speaking & Oral Presentations. Students will also exhibit debating and discussion skills.

SYLLABUS:

The following course content is prescribed for the English Language Laboratory sessions:

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Listening for Comprehension

4. Situational Dialogues.
5. Oral Presentations- Prepared & Extempore
6. 'Just A Minute' Sessions (JAM)
7. Telephonic communication
8. Group Discussions
9. Debate
10. Team Presentations (PPTs).
11. Reference Skills

REFERENCES:

1. E. Suresh Kumar , P. Sreehari, *"A Handbook for English Language Laboratories"*, Foundation Books, revised edition 2009.
2. Simon Sweeny, *"English for Business Communication"*, CUP, First South Asian Edition, 2010.
3. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
4. Daniel Jones, English Pronouncing Dictionary with CD.
5. T. Balasubramanian, *"A Text book of English Phonetics for Indian Students"*, Macmillan, 1981.
6. Jeremy Comfort, Pamela Rogerson, Trish Stott & Derek Utley, *"Speaking Effectively : Developing Speaking Skills for Business English"*, Cambridge University Press, First South Asian Edition,2002.Reprint 2011.
7. T Samson, *"Innovate With English"*, New Delhi: Foundation Books, 2010.
8. Meenakshi Raman & Sangeeta Sharma, *"Technical Communication Principles & Practice"*, New Delhi: OUP, 2010.

CHEMISTRY LAB

(Common to all Branches)

Course Code: 13BC1103

L	T	P	C
0	0	3	2

Course Educational Objectives:

The course is to develop the basic experimental skills and analytical thinking.

The course attempt to provide information regarding various chemical techniques used in quantitative chemical analysis.

Course Outcomes:

The student will be able to determine the substance quantitatively and analyse the data obtained to resolve the prolem in their respective areas.

LIST OF EXPERIMENTS :

1. Determination of ferrous iron.
2. Determination of ferric iron.
3. Determination of total hardness of water.
4. Determination of carbonate and bicarbonate of water.
5. Determination of dissolved oxygen.
6. Determination of available chlorine in bleaching powder.
7. Determination of zinc by potassium ferrocyanide.
8. Determination of copper by EDTA method
9. Determination of calcium by permanganate.
10. Determination of iron-II by potentiometric method.
11. Determination of viscosity of lubricant by viscometer.
12. Determination of flash and fire points of lubricant.
13. Determination of percentage residue of carbon in oils.

14. Determination of calorific value of solid fuels.
15. Determination of fluoride by spectrophotometric method.
16. Determination of iron in cement by spectrophotometric method.

REFERENCE:

A.I.Vogel, *"A Text book of quantitive chemical analysis"*, 6th Edition, Pearson Education, Pvt. Ltd., 2002.

ELECTRONIC DEVICES LAB

Course Code: 13EC1102

L	T	P	C
0	0	3	2

Course Educational Objectives

- ✤ To impart the practical knowledge in semiconductor diodes characteristics and applications of diodes as regulators, rectifiers.
- ✤ To measure the characteristics of various devices those are used in the electronic equipment.
- ✤ Practical & functional verification through characteristics of active devices like BJT, JFET, MOSFETS and applications.

Course Outcomes

- ✤ Student comprehends the depth of semiconductor devices like diodes, transistor, JFET, MOSFETs characteristics are verified
- ✤ Gains hands on experience in handling electronic components and devices.
- ✤ Design of DC power supply

Note: Any ten of the following experiments are to be performed during the semester

LIST OF EXPERIMENTS:

1. PN Junction Diode Characteristics
2. Zener Diode Characteristics
3. Voltage Regulator using Zener Diode
4. Rectifiers without Filters(Full wave & Half wave)
5. Rectifiers with Filters(Full wave & Half wave)
6. Bipolar Junction Transistor- CB Characteristics
7. Bipolar Junction Transistor - CE Characteristics
8. Bipolar Junction Transistor - CC Characteristics

9. Transistor as a switch
10. JFET Characteristics
11. MOSFET Characteristics
12. UJT Characteristics
13. LED Characteristics
14. SCR Characteristics

PROFESSIONAL ETHICS

(Common to all Branches)

Course Code: 13NM1101

L	T	P	C
2	0	0	0

Course Educational Objectives:

- To educate and make the young generation students aware of their Social responsibilities make an Endeavour to tell them first we are humans and then we are scientists, engineers, technocrats and professionals.
- To make students accountable to whatever job they do whether it is less paid or heavily paid.
- To inculcate a spirit of togetherness, unity and team work in an organization.
- To make him reasonably a 'good' professional conscious of his duties to the society that graced this wonderful life.
- To induce the spiritual aspect of life in one's own practical and real life.
- To give an overview of a decent, dignified, humane, dedicated professional with a sense of social responsibility and security.

Course Outcomes:

By the end of this course, it is expected that the student will be able to

- Deal with complex situations while dealing with the people in the society (parents, friends, and co-professionals) in making the work environment congenial, encouraging and loving.
- Discriminate when he is forced through certain undesirable and ambiguous situations either in his day today life as a student and as a professional in his career further.
- Understand the basics regarding the leadership and to become a conscious professional.

- Be aware of codes of professional bodies.
- Implement these concepts in one's career for achieving excellent job satisfaction.

UNIT-I (6 Lectures)

BASIC HUMAN VALUES:

'Be a Human First and then one can become a good Professional'; so the basic Human Values-Truth, Right Conduct (Righteousness), Love, Non-violence and Peace, Humility and character. What is ethics? Core areas of ethics: Social ethics, personal ethics Integrity and Trustworthiness, Honesty, Loyalty, Courage, Prudence, Confidence, Confidentiality.

Character: definition, 'A bundle of Virtues and weaknesses of Head and Heart- the resulting individuality of a person from the balance sheet of 'good' and 'bad qualities' is his/her character.

TRAITS OF GOOD CHARACTER:

Honesty and integrity, sense of duties and obligations to one's own profession, Adherence to truth and principles, excellent team work with a good rapport with the subordinates and colleagues, self-discipline, Responsibilities and accountability, self-lessness. Unity in thought, word and deed (Case studies relating to these aspects can be drawn from history & epics or from one's own experience)

Human values as practiced in the Indian societal context-past and present. (Examples drawn from any standard scriptures and many other sources available may be illustrated, debated and discussed).

Spirit of Nationalism and Patriotism with examples from 'struggle for Freedom' (Case studies in the lives of Mahatma Gandhi & His team who strived for Freedom from the British, Scientists and Engineers like Bhaha, Sarabhai, Dhavan, Abdul J Kalam, and Benjamin Franklin, Martin Luther King, or any renowned personalities)

UNIT-II (6 Lectures)

What is a profession? Who is a Professional? Special criteria to meet the definition of professional, criteria to be a 'professional engineer (Pages 24-36) of Mike W Martin and Roland Schinzinger)

The 5 Ds (Discipline, Devotion, Dedication, Discrimination and

Determination) against 3 Ps (Pay-Prospects and Promotion)

Personal ethics-Social ethics and professional ethics – are they different- How would you distinguish? –A debate

General and Applied ethics, Relationship between these two in day-to-day functioning of an Engineering Professional- (Pages 10-12 of Mike W Martin and Roland Schinzinger)

PROFESSIONAL AND ENGINEERING ETHICS:

Why Engineering ethics? Moral issues encountered by professional engineers during their day-to-day operations both at home and office/workplace- Moral problems that frequently arise in ones Profession, (case studies from Chapter 1 pages 2-9, analysis of the case studies on pages 13 &14)

MORAL AUTONOMY:

Moral integrity and social and professional behavior. Different theories proposed under moral autonomy-Kohlberg's and Gilligan's Theory. Heinz's Dilemma- Motive behind aggression (16-23 Pages)

LEADERSHIP IN PROFESSIONALISM:

Characteristics of a Leader? Case studies and examples (Leadership by Dr M L Chibber)

UNIT-III (6 Lectures)

Religion and Ethics and Morals-Debate and discussion- Spirituality, social consciousness and ethics

THEORY ABOUT MORALITY:

Virtue ethics, Utilitarianism, Duty ethics, Right ethics based on the concepts of Virtues and vices, most good for most people, Duties to respect for persons, Human rights respectively (pages 53-61, Study Questions for analysis and discussion on pages 60 &61)

Engineering Profession as a social responsibility, His responsibility and accountability while dealing with public issues such as safety, risk, hazards, Risk Analysis and assessment-a brief discussion (risk assessment problem on Page (Chapter 4, specified topics and Case studies)

(Present the case studies on Challenger space shuttle(97), Chernobyl (173), Bhopal tragedy (299), Titanic disaster (p 83), SLV-3, the Indian Space Shuttle (Wings of Fire) recent nuclear holocaust in Japan recent

floods and other man-made and natural calamities or accidents we come across frequently in our society)

Environmental ethics (304-308) & Computer ethics 319-323328-330) (All Pages from Mike W Martin and Roland Schinzinger)

UNIT-IV (6 Lectures)

RESPONSIBILITIES AND RIGHTS OF ENGINEERS:

Collegiality (Ones attitude) towards other engineers working in the same Organization or outside) and Loyalty (to the Employer), obligation of Loyalty and misguided loyalty, Respect for authority and its limitations, Bootlegging, Collective bargaining, Commitments and Convictions (APJ Abdul Kalam's "Wings of Fire") Confidentiality while changing jobs, Conflicts of interests, Gifts, bribes, kickbacks -case studies related, Occupational Crime and industrial espionage

Whistle blowing and moral guide line (case studies), Discrimination, preferential treatment and harassment Rights of Engineers (page 284-286)

Selected topics from Ch 5 and 6 and case studies on pages 200-201,

UNIT-V (6 Lectures)

Engineers as Managers and leaders promoting ethical climate (350-358)

–Ethics in Engineering by Mike W Martin and Roland Schinzinger)

Why a code of Ethics for professional Engineers? ('A code of ethics is not something you post on the Bulletin board; it is something you live every day in your life and career)

Code of ethics for Engineers, Organizational Culture, and Guidelines for use with the Fundamental canons of ethics; (pages 142-162 Indian Culture and Professional Ethics by P S R Murty and 399-414 0f Mike W Martin and Roland Schinzinger)

PROFESSIONAL BODIES:

IEEE, IETE, IE, ASME, ASCE, ABET, NSPE, ISTE Etc…

{** Any topic can be discussed and debated with known live examples and illustrations we find in our day-to-day -living circumstances.}

TEXT BOOKS :

1. Mike W Martin and Ronald Schinzinger : *"Ethics Engineering"*, 3rd Edition, Tata McGraw Hill Education Pvt. Ltd., 2003.
2. P S R Murthy : *"Indian Culture Values and Professional Ethics"*, 2nd Edition, B S Publications, Hyderabad. 2013.

REFERENCES:

1. M. Govindarajan, S Natarajan and V.S. Senthil Kumar : *"Engineering Ethics and Human Values"*, 1st Edition, PHI Publications , 2013.
2. A. Alavudden, R. Kalil Rahaman & M . Jayakumaran : *"Professional Ethics & Human Values"*, 1st Edition, University Science Press (An Imprint of Laxmi Publications Pvt Ltd., Chennai, Bangalore. 2008.
3. Lieunt Gen Dr. M. L. Chibber : *"Leadership-Education in Human Values"*, Sri Sathya Sai Books and Publications Trust, Prasantinilayam, 1st Edition, 2009.
4. Kalam A P J : *"Wings of Fire"*, Universities Press Publications, 2013.
5. Charles B. Fleddermann : *"Engineering Ethics"*, 4th Edition, PHI, 2012.

SYLLABI FOR III SEMESTER

SPECIAL FUNCTIONS AND COMPLEX VARIABLES
(Common to ECE & EEE)

Course Code:13BM1104

L	T	P	C
4	1	0	3

Pre requisites

- ✤ Basic Knowledge in evaluation of definite integrals.
- ✤ Calculus of functions of real variables.

Course Educational Objectives:

- ✤ The aim of this course is to introduce the special functions, their generating functions and the algebra, geometry and calculus of functions of a complex variable.
- ✤ The emphasis will be on gaining a geometric understanding of complex analytic functions as well as developing computational skills in employing the powerful tools of complex analysis for solving theoretical and applied problems.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- ✤ Evaluate improper integrals using beta and gamma functions.
- ✤ Use elementary analytic functions like the exponential and logarithmic functions, trigonometric functions.
- ✤ Use residue calculations as integration method and find the Taylor or Laurent series of a given function.
- ✤ Determine basic mapping properties of elementary functions, including how functions transform simple shapes in the plane such as lines and circles.
- ✤ Apply mathematical reasoning and the theory of complex variables to solve theoretical and applied problems.

UNIT-I (12 Lectures)

SPECIAL FUNCTIONS-1:

(Beta, Gamma and Legendre functions)

Beta-function, Gamma function, Relation between Beta and Gamma functions, Series solution of Legendre's equation, Legendre's function, Rodrigue's formula, Legendre polynomials, Generating function, Recurrence formulae , Orthogonality of Legendre Polynomials, Fourier-Legendre expansion of $f(x)$. (7.14 - 7.16, 16.13 - 16.17)

UNIT-II (12 Lectures)

Special functions-2 (Bessel function)

Bessel's equation, Bessel's function, Recurrence formulae for Bessel function $J_n(x)$, Expansions for J_0 and J_1, value of $J_{\frac{1}{2}}(x)$, Generating function for $J_n(x)$, Orthogonality of Bessel's function, The Strum-Liouville problem: Eigen Values, Eigen functions and Orthogonality of eigen functions.

(16.5-16.9, 16.1, 16.19)

UNIT-III (12 Lectures)

FUNCTIONS OF A COMPLEX VARIABLE :

Complex function , Real and Imaginary parts of Complex function, Limit, Continuity and Derivative of complex function, Cauchy-Riemann equations, Analytic function, entire function, singular point, conjugate function, equations in polar form, Harmonic functions, Milne-Thomson method, Simple applications to flow problems, Line integral of a complex function, Cauchy's theorem(only statement) , Cauchy's Integral Formula.

(19.7, 19.12, 20.2-20.6, 20.12-20.14)

UNIT-IV (12 Lectures)

SERIES OF COMPLEX TERMS AND RESIDUES:

Absolutely convergent and uniformly convergent of series of complex terms, Radius of convergence, Taylor'series, Maclaurin's series expansion, Laurent's series. Zeros of an analytic function, Singularity, Isolated singularity, Removable singularity, Essential singularity, pole of order m, simple pole, Residues, Residue theorem, Calculation of residues, Residue at a pole of order m, Evaluation of real definite integrals: Integration around the unit circle, Integration around semi circle, Indenting the contours having poles on the real axis.

(20.16-20.19, 20.20(a),(b),(d))

UNIT-V (12 Lectures)

CONFORMAL TRANSFORMATION :

Standard transformations: Translation, Magnification and rotation, Inversion and reflection, Bilinear transformation, Properties, Conformal transformation, critical point, fixed points of a transformation, Special Conformal transformations: (20.8-20.10)

TEXT BOOK:

Dr. B.S.Grewal, *"Higher Engineering Mathematics"*, 42nd edition, Khanna publishers, 2012.

REFERENCES:

1. Kreyszig E, *"Advanced Engineering Mathematics"*, 8th Edition. John Wiley, Singapore, 2001.
2. Glyn James, *"Advanced Modern Engineering Mathematics"*, 3rd edition, Pearson, 2004.

MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTING

Course Code : 13HM1101

L	T	P	C
4	0	0	3

Course Educational Objectives :

To explain the basic principles of managerial economics, accounting practices and financial management techniques for effective business decision making and to promote entrepreneurial abilities among the budding engineers.

Course Outcomes :

To understand the economic environment and to give an idea on various accounting concepts and financial management techniques for effective utilization of economic resources.

UNIT-I (12 Lectures)

INTRODUCTION TO MANAGERIAL ECONOMICS & DEMAND:

Definition, Nature and Scope of Managerial Economics, Factors influencing managerial decision making process

Demand Analysis: Definition-types of demand - Demand Determinants, Law of Demand and its exceptions.

Elasticity of Demand: Definition, Types, Significance of Elasticity of Demand. Demand Forecasting: definition, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

UNIT-II (12 Lectures)

THEORY OF PRODUCTION AND COST ANALYSIS:

Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Types of Cost, Break-even Analysis (BEA)-Determination of Break-Even Point (Simple numerical problems) - Managerial Significance and limitations of BEA.

UNIT-III (10 Lectures)

BUSINESS & ENVIRONMENT:

Features of Business Organization, Features, Advantages & limitations of Sole Proprietorship, Partnership, and Joint Stock Company, Steps for formation and Registration of the company- Internal and External factors affecting business environment (PESTLE analysis)- Impact of environment on business

UNIT-IV (12 Lectures)

INTRODUCTION TO FINANCIAL ACCOUNTING:

Accounting Principles, Concepts & conventions, Double-Entry Book Keeping, Journal, Ledger, Trial Balance

UNIT-V (18 Lectures)

PREPARATION AND ANALYSIS OF FINANCIAL STATEMENTS:

Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments) - Financial statement Analysis (Comparative and Common Size Statements)- Ratio analysis (Liquidity Ratios, Activity ratios, Solvency and Profitability ratios)

TEXTBOOKS :

1 A R Aryasri, *"Managerial Economics and Financial Analysis"*, 2nd Edition, TMH, 2009

2 S A Siddiqui & A. S. Siddiqui, *"Managerial Economics & Financial Analysis"*, 1st Edition, New Age Publishers, 2005.

3 P Venkata Rao, J.V.Prabhakar Rao *"Managerial Economics and Financial Analysis"*, 1st Edition, Maruti Publications, 2012.

4 R.L.Varshney & K.L Maheswari, *"Managerial Economics"*, 5th Edition, S.Chand Publishers, 2005.

REFERENCES :

1 D N Dwivedi, *"Managerial Economics"*, 8th Edition, PHI, 2010.

2 S P Jain & KL Narang, *"Cost and Management Accounting"*, 3rd Edition Kalyani Publishers, 2004.

3 P.K.Sharma & Shashi K. Gupta, *"Management Accounting Principles and Practice"*, 1st Edition, Kalyani Publishers, 2004.

ELECTRONIC CIRCUITS

Course Code: 13EC1103

L	T	P	C
4	0	0	3

Pre requisites: Electronic Devices, Basic Network Analysis.

Course Educational Objectives:

- To impart the knowledge of transistor as circuit element.
- Transistor as small signal models and high frequency models.
- To design and analyze the transistor amplifiers and oscillators.
- Transistor as power amplifier.

Course Outcomes :

- Comprehends the depth of electronic circuits.
- Acquires different types and design concepts of small signal and large signal models and high frequency hybrid – model circuits.
- Acquires the knowledge about multi stage amplifiers, feedback amplifiers, & different type of oscillator circuits.
- Analyze, design, simulate and build amplifier circuits

UNIT-I (10 lectures)

BIASING AND STABILIZATION:

BJT biasing, DC equivalent model, Transistor as an amplifier, criteria for fixing operating point, methods of Bias stabilization, Thermal runaway, Thermal stability, Compensation Techniques, Biasing of JFET and MOSFET.

UNIT-II (15 lectures)

TRANSISTOR SMALL SIGNAL MODEL:

Hybrid parameter representation of BJT, Analysis of single stage amplifier using h-parameters: A_V, A_I, R_i, R_o (CB, CE & CC configurations), Small signal model of FET and MOSFET (CG, CD & CS configurations).

Hybrid-Đ Common Emitter Transconductance Model, Determination of Hybrid- Conductances, Variation of h- Parameters with $|I_C|$, $|V_{CE}|$ and Temperature,Relation between the Parameters $f_{á}$, $f_{â}$ and $f_{ô}$,Current Gain with Resistance Load, CE Short Circuit Current Gain.

UNIT-III (10 lectures)

MULTI STAGE AMPLIFIERS:

Concept of Multi Stage Amplifiers: Methods of Inter Stage Coupling, n–Stage Cascaded Amplifiers, Miller's Theorem, Frequency Effects, Cascode Configuration, Darlington pair, Frequency response of RC Coupled Amplifiers using BJT, Gain Bandwidth Product.

UNIT-IV (15 lectures)

FEEDBACK AMPLIFIERS & OSCILLATORS:

Concept of feedback, Classification offeedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on Amplifier characteristics, Analysis of negative feedback amplifiers. Barkhausen's criteria, Hartley and Colpitt's Oscillators, RC-phase shift and Wien-bridge oscillators, Frequency and Amplitude stability of oscillators, Crystal oscillators.

UNIT-V (10 lectures)

POWER AMPLIFIERS & TUNED AMPLIFIERS:

Introduction to power amplifiers and its classification, Distortion in amplifiers, Class-A Power Amplifier, Transformer Coupled Audio Amplifier, class B Push Pull Amplifiers, Complimentary Symmetry Circuits, Class AB power amplifier, Class C Power Amplifier, Heat Sinks.

Single Tuned Capacitive Coupled Amplifier, Single Tuned Transformer Coupled or Inductively Coupled Amplifier, CE Double Tuned Amplifier, Stagger Tuned amplifiers, Applications of tuned amplifiers.

TEXT BOOKS:

1. J.Millman and C.C.Halkias, "Electronic Devices and Circuits" 2nd Edition, Tata McGraw Hill, 2007.
2. R.L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits", Pearson/Prentice Hall, 10th Edition, 2008.

REFERENCES:

1. B. Visvesvara Rao, K. Raja Rajeswari, P.Chalam Raju Pantulu, K.Bhaskara Rama Murty, "Electronic circuit analysis", Pearson Education, 2012.
2. T.F. Bogart Jr., J.S.Beasley and G.Rico, "Electronic Devices and Circuits", Pearson Education, 6th edition, 2004.
3. S.Salivahanan, N.Suresh Kumar, A.Vallavaraj "Electronic Devices and Circuits", 2nd Edition, TMH, 2007.

SIGNALS AND SYSTEMS

Course Code: 13EC1104

L	T	P	C
4	1	0	3

Course Educational Objectives:

- To study and analyze characteristics of continuous and discrete time signals and systems.
- To familiarize with various signals & their transforms.

Course Outcomes:

- After completion of the course, students are able to
- Classify various signals and analyze their properties.
- Analyze various signals in time domain and frequency domain by using different transform techniques.

UNIT-I (12 lectures)

SIGNALS-SYSTEMS ANALYSIS:

Elementary signals, Classification of signals, Basic operations on signals, System definition, Systems Classification and Testing.

Analogy between vectors and signals, orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, Orthogonality in complex functions.

UNIT-II (14 lectures)

FOURIER SERIES & FOURIER TRANSFORMS:

Review of Fourier series, Representation of Continuous time periodic signals using Fourier series, Dirichlet's conditions, Properties of Fourier series, Trigonometric Fourier series and Exponential Fourier series.

Fourier transform from Fourier series, Dirichlet's conditions, Fourier transform of standard and arbitrary signals, Fourier transform of periodic signals, Properties of Fourier transforms. Inverse Fourier Transforms.

UNIT-III (10 Lectures)

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS:

System impulse response, Response of a linear system, Linear time variant and invariant system, Transfer function of a LTI system, Properties of LTI system, Causality, Filter characteristics of linear systems - Ideal LPF, HPF and BPF characteristics. Distortionless transmission through a system, Signal bandwidth, System bandwidth, relationship between bandwidth and rise time.

UNIT-IV (10 lectures)

CONVOLUTION AND CORRELATION OF SIGNALS:

Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Convolution properties, Cross correlation and Auto correlation of functions, properties of correlation function, Energy density spectrum, Power density spectrum, Parseval's theorem, Relation between auto correlation function and energy/power spectral density function, comparison between ESD and PSD.

UNIT-V (14 lectures)

LAPLACE AND Z–TRANSFORM :

Review of Laplace transforms, Concept of region of convergence (ROC), constraints on ROC for various classes of signals, Properties of Laplace transforms, Inverse Laplace transform.

Concept of Z- Transform, Distinction between Laplace, Fourier and Z transforms, Region of convergence in Z-Transform, constraints on ROC for various classes of signals, Properties of Z-transforms, Inverse Z-transform.

TEXT BOOKS:

1. B.P. Lathi, *"Signals, Systems & Communications"* BSPublications, 5th Reprint, 2008.
2. A.V. Oppenheim, A.S. Willsky and S.H.Nawab, *"Signals and Systems"*, PHI, 2nd Edition, 1997.
3. K.Raja Rajeswari, B.Visvesvara Rao, *"Signals & Systems"* –1st Edition, PHI, 2009.

REFERENCES:

1. Simon Haykin and Van Veen, *"Signals & Systems"*, Wiley, 2ndEdition, 2002.
2. Anand Kumar, *"Signals & Systems"* –2nd Edition, PHI, 2012.
3. D. Ganesh Rao, *"Signals & Systems"*, Pearson Publications, 2011
4. Charles L.Phillips, John M. Parr, Eve A. Riskin, *"Signals, Systems, and Transforms"*, Pearson Publications, 4th Edition.

SWITCHING THEORY AND LOGIC DESIGN

(Common to ECE, EEE, CSE, IT)

Course code: 13EC1105	L	T	P	C
	4	0	0	3

Course Educational Objectives:

- ✤ To familiarize students with different number systems, digital logic, simplification and minimization of Boolean functions.
- ✤ To design combinational & sequential digital circuits and state machines.
- ✤ To introduce programmable logic devices.

Course Outcomes:

Students can design optimized logic circuits through combinational and sequential logic.

UNIT-I (10 Lectures)

NUMBER SYSTEMS & CODES:

Introduction to number systems, Complement representation of negative numbers, binary arithmetic, binary codes, Error detecting & correcting codes.

UNIT-II (15 Lectures)

BOOLEAN ALGEBRA AND SWITCHING FUNCTION

Fundamental postulates of Boolean algebra, Basic theorems and properties, switching functions, Simplification of Boolean equations, Digital logic gates, properties of XOR gates, universal gates - NAND/NOR realizations. K-map method, Prime implicants, don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime –Implicant chart, simplification rules.

UNIT-III (13 Lectures)

COMBINATIONAL LOGIC DESIGN:

Adders, Subtractor, Multiplexer, De-Multiplexer, MUX Realization of

switching functions, Encoder, Decoder, Parity bit generator, Code-converters, Basic PLD's-ROM, PROM, PLA, PAL Realizations.

UNIT-IV (13 Lectures)

SEQUENTIAL CIRCUITS:

Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples) Latches and Flip-flops-Triggering and excitation tables, registers, shift registers, Steps in synchronous sequential circuit design, synchronous counters, ripple counters, Design of modulo-N Ring & Shift counters, Serial binary adder, sequence detector.

UNIT-V (9 Lectures)

FINITE STATE MACHINES:

Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified sequential machines, Partition techniques, incompletely specified sequential machines using merger table.

ALGORITHMIC STATE MACHINES:

Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.

TEXT BOOKS:

1. Morris Mano, *"Digital Design"* PHI, 3rd Edition, 2006.
2. Anand Kumar, *"Switching Theory and Logic Design"* PHI,2008

REFERENCES:

1. Zvi Kohavi, *"Switching & Finite Automata theory"* TMH, 2nd Edition,
2. R.P.Jain. *"Modern Digital Electronics",* 4th Edition., TMH, 2009.
3. John M. Yarbrough, *"Digital Logic Applications and Design"* Thomson Publications, 2006.
4. Charles H. Roth, *"Fundamentals of Logic Design"* Thomson Publications, 5th Edition, 2004.

PULSE AND DIGITAL CIRCUITS

(Common to ECE, EEE)

Course Code: 13EC1106	**L**	**T**	**P**	**C**
	4	**0**	**0**	**3**

Pre requisites:

Electronic devices Circuits, Basics of Mathematics, Physics

Course Educational Objectives:

- ✤ To understand the concepts of wave shaping.
- ✤ Study of multivibrators
- ✤ Understand the applications of analog and digital waveform generation.

Course Outcomes:

- ✤ Capability to design linear and non-linear wave shaping circuits.
- ✤ Capability to design square wave and time base generators and their applications.

UNIT-I (15 Lectures)

LINEAR AND NON-LINEAR WAVESHAPING :

Lowpass & Highpass RCcircuits, Response for sinusoidal, step, pulse, square and rampinputs, RC network as differentiator and integrator,Ringing circuit. Diode clippers, Transistor clippers, Emitter coupled clipper, clamping circuits, clamping circuit theorem.

UNIT-II (15 lectures)

MULTIVIBRATORS:

Classification of Multivibrators, Bistable multivibrator, commutating capacitors, triggering binary-symmetrical &unsymmetrical triggering, Schmitt Triggercircuit. Monostable multivibrators- collector coupled, emitter coupled, Triggering monostable. Astable Multivibrators -collector coupled and emitter coupled using transistors.

UNIT-III (12 Lectures)

TIMEBASEGENERATORS:

General features of a timebase signal, methods of generating time base wave form, Miller and Boots traptime base generators basic principles, Transistor miller time base generator, transistor Boots trap time base generator, Current time base generators.

UNIT-IV (10 Lectures)

SYNCHRONIZATION AND FREQUENCY DIVISION:

Principle of Synchronization, Frequency divisionin sweep circuit, Astable relaxation circuits, Monostable relaxation circuits, Synchronization of as weepcircuit with symmetrical signal, Sine wave frequency division with as weepcircuit.

UNIT-V (8 Lectures)

SAMPLING GATES:

Basic operating principles of sampling gates, Unidirectionaland Bi-directionalsamplinggates,Reductionofpedestal ingatecircuits, Applications of sampling gates.

Logic Gates: Logic gates usingDiodes, resistors and transistor- RTL, DTL.

TEXT BOOKS:

1. J.MillmanandH. Taub, *"Pulse,Digital and Switching Waveforms"* McGraw-Hill, 2008.
2. A.Anand Kumar, *"Pulse and Digital Circuits*" PHI,2nd Ed., 2005.

REFERENCES:

1. David A. Bell, "*Solid State Pulse circuits*"PHI,4th Edn.,2002
2. L.Strauss, *"Wave Generation andShaping*"Literary Licensing, LLC, 2012
3. Venkata Rao K,Rama Sudha K, Manmadha Rao G. "*Pulse and Digital Circuits",* Pearson Education India, 2010

ELECTRONIC CIRCUITS LAB

Course Code: 13EC1107

L	T	P	C
0	0	3	2

Course Educational Objectives:

- To gain hands on experience in various amplifiers design &verification of impedances, and band width calculations.
- To understand and practically verify various parameters of power amplifiers and frequency of oscillators, impedance Parameter verification through software simulation.

Course Outcomes:

- Student comprehends the depth of amplifiers and its frequency responses with transistor, JFET are verified.
- Student gains hands on experience in handling electronic components and devices.
- Student verifies different configurations of feedback amplifiers and measures $A_{V,}$, A_I, R_I, R_o
- Student gets the knowledge about design and analysis of RC, LC oscillator circuits.

Note: Any ten of the following experiments are to be performed.

LIST OF EXPERIMENTS

1. CE Amplifier
2. CC Amplifier (Emitter Follower).
3. Two stage R-C coupled Amplifier.
4. Feedback amplifier (Current Series).
5. Feedback amplifier (Voltage Series).
6. Feedback amplifier (Current Shunt).
7. Feedback amplifier (Voltage Shunt)

8. FET amplifier (Common Source)
9. Wien Bridge Oscillator
10. RC Phase Shift Oscillator
11. Colpitts Oscillator.
12. Class A Power Amplifier (Transformerless)
13. Class B Complementary Symmetry Amplifier
14. Voltage Digital IC Applications Series and Shunt Regulator

ELECTRICAL TECHNOLOGY LAB

Course Code: 13EE1145

L	T	P	C
0	0	3	2

Course Educational Objectives :

The Lab is intended for the students to get hands on experience in dealing with Network theory, AC and DC Machines and their performance.

Course Outcomes :

After this lab course, the student will be able to design a circuit for any kind of experiment in the syllabus and will get the confidence to understand the practical circuits and Electrical Machines in an industry.

Note: Any five experiments from **Part-A** and five experiments from **Part-B** are to be conducted

PART-A

1. Verification of Kirchhoff's laws.
2. Verification of Superposition and Reciprocity Theorems.
3. Experimental determination of Thevenin's Equivalent circuits and verification by Direct Test.
4. Verification of Maximum Power Transfer Theorem
5. Series Resonance – Resonant frequency, Bandwidth and Q-factor determination for RLC Network.
6. Time response of first order R-L and R-C network for periodic Non-sinusoidal inputs – time constant and steady state error determination.

PART-B

1. Magnetization characteristics of D.C. Shunt generator. Determination of Critical Field Resistance and Critical Speed.
2. Swinburne's Test on DC Shunt Machine.

3. Brake test on DC Shunt Motor.
4. OC & SC tests on Single-phase transformer.
5. Brake test on 3-Phase Induction Motor.
6. Regulation of Alternator by Synchronous Impedance Method.

ENVIRONMENTAL STUDIES
(Common to all Branches)

Course Code: 13NM1102

L	T	P	C
2	0	0	0

Course Educational Objectives:

This course introduces the students to the following

- Important & Scope of the Environment.
- Awareness about the resources and their limitations.
- Appreciate the variedness of nature and role of different species in nature.
- The importance of understanding the impact of any development of nature.
- Population control and its importance.

Course Outcomes:

After studying the course the student will have good understanding of

- Environment and its conservation.
- The impacts of human action on nature and remedial measures.
- Being proactive instead of reactive.

UNIT-I (8 Lectures)

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES & NATURAL RESOURCES

Definition, Scope and Importance – Need for Public Awareness.

Renewable and non-renewable resources– Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems -Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources,

case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Case studies. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT-II (7 Lectures)

ECOSYSTEMS, BIODIVERSITY AND ITS CONSERVATION:

Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Definition: genetic, species and ecosystem diversity.- Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a mega diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. - Endangered and endemic species of India Conservation of biodiversity: In-situ and Exsitu conservation of biodiversity.

UNIT-III (7 Lectures)

ENVIRONMENTAL POLLUTION:

Definition, Cause, effects and control measures of a) Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards.

SOLID WASTE MANAGEMENT:

Causes, effects and control measures of urban and industrial wastes. – Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT-IV (6 Lectures)

SOCIAL ISSUES AND THE ENVIRONMENT:

From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, and watershed management -Resettlement and rehabilitation of people; its problems and concerns. Case Studies Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. -Wasteland reclamation. -Consumerism and waste products. –Environment.

Protection Act. -Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution)

Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

UNIT-V (8 Lectures)

HUMAN POPULATION AND THE ENVIRONMENT:

Population growth, variation among nations. Population explosion - Family Welfare Programme. -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. -Women and Child Welfare. -Role of information Technology in Environment and human health. – Case Studies.

FIELD WORK:

Visit to a local area to document environmental assets

River /forest grassland/hill/mountain -Visit to a local polluted site-

Urban/ Rural/industrial/ Agricultural Study of common plants, insects, birds. - Study of simple ecosystems-pond, river, hill slopes, etc.

TEXT BOOKS:

1. Bharucha. E., "*Textbook of Environmental Studies for Undergraduate Courses*", University Press, 2005.
2. Rajagopalan. R., "*Environmental Studies*", Oxford University Press, 2005.

REFERENCE:

AnjiReddy. M., "*Textbook of Environmental Sciences and Technology*", BS Publications, 2010.

SYLLABI FOR IV SEMESTER

RANDOM VARIABLES AND NUMERICAL METHODS

(Common to ECE, EEE)

Course Code: 13BM1107	**L**	**T**	**P**	**C**
	4	**1**	**0**	**3**

Pre requisites:

- Fundamentals of Set theory.
- Basic concepts of Probability.
- Basic concepts of calculus.

Course Educational Objectives:

The objective is to equip students with the basic tools required to build and analyze probabilistic models in both the discrete and continuous context. Also to introduce Numerical techniques to solve the real world applications.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- Apply concepts of Random variables for a wide range of areas in communications, signal processing, control and other areas of engineering in which randomness has an important role.
- Solve engineering problems using Numerical techniques.

UNIT-I (12 Lectures)

The Random Variable Concept, Discrete, Continuous, Mixed random variable distribution function, Density function, The Gaussian Random variable, Conditional distribution and density Function, Expected value, Conditional expected value, Moments, Moments about the origin, Central moments,Variance and Skew, Chebychev's inequality, Markov's inequality.

Monotonic and Non monotonic transformations of a continuous random variable, Transformations of a discrete random variable.
(2.1 to 2.4, 2.6, 3.1, 3.2,3.4 of Text book [1])

UNIT-II **(12 Lectures)**

Vector random variables, Joint distribution and its properties, Joint density and its properties, Conditional distribution and density statistical independence distribution and density of a sum of random variables, Central limit theorem (without proof). Expected value of a function of random variables, Joint moments about the origin, Joint central moments.
(4.1 to 4.7, 5.1 of Text book [1])

UNIT-III **(12 Lectures)**

Jointly Gaussian random variables-two random variables, Jointly gaussian random variables-N Random variables. Transformations of multiple random variables- One function, Transformations of multiple random variables- multiple functions, Linear transformation of Gaussian random variables. The Random process concept-classification of processes Deterministic and Nondeterministic processes.
(5.3 to 5.5, 6.1 of Text book [1])

UNIT-IV **(12 Lectures)**

Introduction to Numerical Methods, Solution of algebraic and transcendental equations-Bisection method, Method of false position Newton's method.

Finite differences-Forward differences, Backward differences, Central differences, Differences of a polynomial, Other Difference operators – Shift operator, Average operator, Relations between the operators, Newton's interpolation formulae - Newton's forward interpolation formula Newton's backward interpolation formula.
(28.1 to 28.3, 29.1 to 29.5, 29.6 of Text book [2])

UNIT-V **(12 Lectures)**

INTERPOLATION WITH UNEQUAL INTERVALS:

Lagrange interpolation, Divided differences, Newton's divided difference formula Difference formula, Inverse interpolation. Numerical Integration-Trapezoidal, Simpson's one-third and Simpson's three-eighth rules.

NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS:

Euler's Method, Modified Euler's Method, Runge-Kutta method of order 4.

(29.9 - 29.13, 30.4, 30.6-30.8, 32.4, 32.5, 32.7 of Text book [2])

TEXT BOOKS:

1. Peyton Z . Peebles, Jr., "Probability, Random Variables and Random Signal Principles", Fourth Edition, TMH, 2002.
2. Dr.B.S.Grewal "Higher Engineering Mathematics", 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. Athanasios Papoulis and S.Unnikrishna Pillai, *"Probability, Random variables and Stochastic processes"*, 4th Edition, PHI, 2002.
2. M.K.Jain, S.R.K.Iyengar and R.K.Jain, *"Numerical Methods form scientific and Engineering Computation"*, 4th Edition, New age International Publishers, 2003.
3. S. S. Sastry, *"Introductory Methods of Numerical Analysis"*, 4th Edition, Prentice Hall India Pvt., Limited, 2005.

DIGITAL IC APPLICATIONS

Course Code: 13EC1108

L	T	P	C
4	1	0	3

Pre requisites:

Electronics Devices and Circuits, Switching Theory and Logic Design.

Course Educational Objectives:

- Familiarization of Digital Logic families
- Design of combinational and sequential circuits using digital ICs.
- Design of digital circuits using VHDL Programming.

Course Outcomes:

Students will be able to

- Understand digital integrated circuits design.
- Model high end designs with standard ICs using VHDL
- Represent any combinational and sequential circuits using digital ICs.
- Get exposure to VHDL programming.

UNIT-I **(12 Lectures)**

LOGIC FAMILIES:

Introduction to logic families, RTL, DCTL, DTL, TTL, Schottky TTL and Emitter coupled logic, HTL, IIL,NMOS, PMOS, CMOS logic, Comparison of logic families.

UNIT-II **(12 Lectures)**

CMOS INTERFACING :

CMOS steady state and dynamic electrical behavior, CMOS logic families, CMOS/TTL interfacing, low voltage CMOS logic and interfacing, Familiarity with standard 74xx and CMOS 40xx series ICs—specifications.

UNIT-III **(10 Lectures)**

INTRODUCTION TO VHDL:

Program structure, data types and constants, operators, data flow design elements, behavioral design elements, Structural design elements, functions and procedures, libraries and packages, simulation and synthesis.

UNIT-IV (16 Lectures)

COMBINATIONAL AND SEQUENTIAL LOGIC DESIGN:

Decoders, encoders, threestate devices, multiplexers and demultiplexers, Code Converters, Parity circuits, comparators, Adders & subtractors, Basic Concepts of ALUs, Combinational multipliers, Barrel shifter, floating-point encoder, dual priority encoder. Latches and flip-flops, PLDs,counters, shift register, and VHDL models of above ICs.

UNIT-V (10 Lectures)

MEMORIE:

ROM - Internal structure, 2D-decoding commercialtypes, timing and applications.

Static RAM - Internal structure, SRAM timing, standard SRAMS, synchronous SRAMS. Dynamic RAM - Internal structure, timing, synchronous DRAMs.

TEXT BOOKS:

1. John F.Wakerly, "Digital Design Principles & Practices", PHI/ Pearson Education Asia, 3rd Ed., 2005.
2. J.Bhasker , "VHDL Primer", Pearson Education / PHI, 3rd Edition, 1999.

REFERENCES:

1. Charles H. Roth Jr., "Digital System Design Using VHDL" PWS Publications, 2008.
2. Alan B. Marcovitz , "Introduction to Logic Design", TMH, 2nd Edition,2005.
3. Stephen Brown and Zvonko Vramesic., "Fundamentals of Digital Logic with VHDL Design"McGraw Hill, 2nd Edn.,2007.
4. R.P.Jain , "Modern Digital Electronics", Mc Graw Hill, 4th Edition, 2010.

ANALOG COMMUNICATIONS

Course Code:13EC1109

L	T	P	C
4	0	0	3

Pre requisites: Signals & systems, probability.

Course Educational Objectives:

To understand the need for modulation and basics of analog communication systems through various techniques and the performance of communication system inpresence of noise.

Course Outcomes:

- After completion of the course, student is able to
- Understand the performance of different modulation and demodulation techniques with respect to power and bandwidth
- Analyze effect of noise in channel and systems.

UNIT-I (12 Lectures)

AMPLITUDE MODULATION:

Introduction to Communication system, Need for modulation. Amplitude Modulation - single tone and multi-tone modulation, spectral analysis, power and bandwidth relatiSons, Generation: Square law modulator, switching modulator. Detection: Square law detector, Envelope detector.

DSB-SC MODULATION:

spectral analysis, Generation: Balanced Modulator, Ring Modulator. Detection: Coherent detection, Costas Loop. Quadrature-Carrier Multiplexing.

UNIT-II (12 Lectures)

SINGLE SIDE BAND MODULATION :

Time and Frequency domain description, power and bandwidth relations, Generation: Frequency and Phase discrimination method. Demodulation: Synchronous detection. Vestigial sideband modulation, transmission bandwidth, Comparison of AM Techniques.

AM TRANSMITTERS AND RECEIVERS:

AM Transmitters - low level and high level modulation, Tuned radio frequency receiver, Superhetrodyne Receiver.

UNIT-III (14 Lectures)

ANGLE MODULATION:

Phase and Frequency Modulation: Spectral Analysis of Sinusoidal FM andPM signals, Narrow band FM, Wide band FM, Transmission bandwidth,Pre-emphasis &De-emphasis. FM Transmitters - Direct and Armstrong type FM Modulators, FM Receiver block description, FM Demodulators, Threshold effect, Amplitude Limiting, Automatic Gain Control, Comparison of PM, FM & AM.

UNIT-IV (10 Lectures)

PULSE MODULATION:

Sampling theorem, sampling techniques, Time Division Multiplexing, Types of Pulse modulation, PAM – Natural sampled and Flat Top sampled, PWM and PPM Generation and Demodulation.

UNIT-V (12 Lectures)

NOISE:

Noise sources, Thermal noise, Noise Figure and Noise Temperature, Average Noise Figure and Effective Noise Temperature of cascaded networks, Noise in communication Systems: Noise in AM System, Noise in DSB and SSB Systems, Noise in Angle Modulation Systems.

TEXT BOOKS:

1. H Taub & D. Schilling, "*Principles of Communication Systems*", Gautam Sahe, TMH, 3rd Edition, 2007.
2. Simon Haykin, "*Communication Systems*", John Wiley and Sons, 2nd Edition, 2010.

REFERENCES:

1. R.P. Singh, S.D Sapre, "*Communication Systems*", 2nd Edition, TMH, 2007.
2. John G. Proakis, Masond, Salehi, "*Fundamentals of Communication Systems*", PTR, 2004.

3. B.P. Lathi, *"Communication Systems"*, BS Publication, 2006.

4. George Kennedy and Bernard Davis, *"Electronics & Communication System"*, TMH, 1999.

LINEAR IC APPLICATIONS

Course Code: 13EC1110

L	T	P	C
4	0	0	3

Pre requisites:

Electronic Circuits, Basic Network Analysis, Pulse and Digital Circuits

Course Educational Objectives:

✤ To introduce the basic building blocks of linear integrated circuits.

✤ To teach the linear and non-linear applications of operational amplifiers.

✤ To introduce the concepts of waveform generation and introduce some special function ICs.

Course Outcomes:

✤ Build different Electronic circuits.

✤ Linear IC applications help in IC based Electronic projects design.

UNIT-I **(12 Lectures)**

OPERATIONAL AMPLIFIERS:

Differential Amplifier- DC and AC analysis**.**Integrated circuits-Types, Classification of IC,Package Types and temperature ranges. Op-Amp Block Diagram, Characteristics of OP-Amps, ideal and practical Op-Amp specifications. DC and AC characteristics: 741 op-amp & its features, Op-Amp parameters & their measurements- Input & Output Offset voltages & currents, slew rate, CMRR, PSRR, Drift, Frequency Compensation techniques.

UNIT-II **(14 Lectures)**

APPLICATIONS OF OP- AMPS:

Inverting and Non-inverting amplifier, Integrator and differentiator, Difference amplifier, Instrumentation amplifier, Voltage to current and current to Voltage converters ,Comparators,Schmitt Trigger, Multivibrators, Triangular and Square wave generators, Log and Anti log amplifiers.

VOLTAGE REGULATORS:

IC723 voltage regulator, three terminal regulators (78XX and &79XX)

UNIT-III (12 Lectures)

ACTIVE FILTERS AND OSCILLATORS:

Butter worth filters– 1st order LPF, HPF filters, Band pass, Band reject andAll pass filters, Oscillators –RC and Wien bridge oscillators, VCO (566).

UNIT–IV (14 Lectures)

TIMERS & PHASE LOCKED LOOPS:

Introduction to 555 timer,functional diagram, Monostable and Astable operations and applications, 555 timer as Schmitt Trigger. PLL - introduction, block schematic, 565 PLL, Applications of PLL – frequency multiplication, frequency translation, AM, FM & FSK demodulators.

UNIT-V (8 Lectures)

D/A & A/D CONVERTERS:

Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC. DAC and ADC Specifications, IC AD574 (12 bit ADC).

TEXT BOOKS:

1. Ramakanth A. Gayakwad, *"Op-Amps & Linear ICs"*, 4th Edition, PHI, 2002.
2. D. Roy Chowdhury , *"Linear Integrated Circuits"*, New Age International (p) Ltd, 2nd Edition,2003.

REFERENCES:

1. Sergio Franco, *"Design with Operational Amplifiers & Analog Integrated Circuits"*, McGraw Hill, 1988.

2. R.F.Coughlin & Fredrick Driscoll, *"Operational Amplifiers & Linear Integrated Circuits"*, PHI, 5th Edition, 1998.
3. Millman, *"Micro Electronics"*, McGraw Hill, 1988.
4. C.G. Clayton, *"Operational Amplifiers"*, 5th Edition, Newnes Publishers, 2003.

EM WAVES AND TRANSMISSION LINES

Course Code: 13EC1111

L	T	P	C
4	0	0	3

Course Educational Objectives:

To introduce the student to the fundamental theory and concepts of electromagnetic waves and transmission lines, and their practical applications, to study the propagation, reflection, and transmission of plane waves in bounded and unbounded media

Course Outcomes:

- ✤ Able to specify the "constitutive relationships" for fields and understand why they are required.
- ✤ Able to estimate electric and magnetic fields from stationary and dynamic charge and current distributions
- ✤ Able to acquire knowledge for the measurement of basic transmission line parameters, such as the reflection coefficient, standing wave ratio, and impedance.

UNIT-I (13 Lectures)

ELECTROSTATICS :

Coulomb's Law, Electric Fields due to Different Charge Distributions, Gauss Law and Applications, Electrostatic Potential and Equipotential surfaces, Energy Density, Poisson's and Laplace's Equations; Capacitance – Parallel Plate, Coaxial, Spherical Capacitors, Method of Images. Convection and Conduction currents, Continuity Equation, Relaxation Time, Joules Law, Analogy between D and J.

UNIT-II (13 Lectures)

MAGNETOSTATICS:

Biot-Savart's Law, Ampere's Circuital Law and Applications, Magnetic Scalar and Vector Potentials,Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy.

UNIT-III (8 Lectures)

MAXWELL'S EQUATIONS (TIME VARYING FIELDS) :

Faraday's Law and Transformer emf, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in time domain and phasor domain, Boundary Conditions.

UNIT-IV (12 Lectures)

PLANE WAVE PROPAGATION:

Helmhotz Equations- Wave Equations for Conducting and Perfect Dielectric Media. Uniform Plane Waves, Uniform Plane Wave Propagation in Lossless and Lossy Media. Conductors & Dielectrics – Characterization, Polarization, Behavior of plane waves at the interface of two media: Reflection and Refraction of Plane Waves – Normal and Oblique Incidences for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem.

UNIT-V (14 Lectures)

TRANSMISSION LINES:

Transmission Line parameters and equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR, UHF Lines as Circuit Elements; ë/4, ë/2, ë/8 Lines – Impedance Transformations. Smith Chart – Configuration and Applications, Single and Double Stub Matching.

TEXT BOOKS:

1. Matthew N.O. Sadiku, *"Elements of Electromagnetics"*, Oxford Univ. Press, 3rd Ed., 2001.
2. G.S.N. Raju, *"Electromagnetic Field Theory and Transmission Lines"*, Pearson Edn., 2005.
3. G. Sasi Bhushana Rao, *"Electromagnetic Field Theory and Transmission Lines"*, Wiley India Pvt. Ltd, 2012.

REFERENCES:

1. E.C. Jordan and K.G. Balmain, *"Electromagnetic Waves and Radiating Systems"*, PHI, 2ndEd., 2000.
2. Nathan Ida, *"Engineering Electromagnetics"*, Springer (India) Pvt. Ltd., New Delhi, 2nd ed., 2005.
3. John D. Ryder, *"Networks, Lines and Fields"*, PHI, 2nd Edition., 1999.
4. William H. Hayt Jr. and John A. Buck, *"Engineering Electromagnetics"*, TMH, 7th Edition, 2006.
5. Umesh Sinha, *"Transmission Lines and Networks"*, Satya Prakashan (Tech. India Publications), New Delhi, 2001.

COMPUTER ORGANIZATION
(Common to CSE, ECE, EEE, IT)

Course Code : 13CT1105

L	T	P	C
4	0	0	3

Course Educational Objectives:

To give detailed information about the structure of computers and internal organization of different units regarding memory, I/O devices and registers.

- The internal organization of the computer system
- The internal operations.
- To know about register transfer and micro operations.
- To know about memory organization
- To know about pipeline and vector processing.

Course Outcomes:

At the end of the course student will be able to

- Get knowledge on basic structure of computers, register transfer operations.
- Get knowledge on memory organization and pipe line processing.
- Get knowledge on Arithmetic operations with float values.
- Get knowledge on input output devices organization.
- Get knowledge on vector processing.

UNIT-I (12 Lectures)

BASIC STRUCTURE OF COMPUTERS:

Organization and Architecture, Structure and Function, Computer Components, Computer Function, Bus Interconnection, Processor Organization, Register Organization.

BASIC COMPUTER ORGANIZATION AND DESIGN:

Instruction codes, Computer instructions, Memory reference instructions, Instruction Cycle.

CENTRAL PROCESSING UNIT:

Stack organization, instruction formats, addressing modes, data transfer and manipulation, program control, RISC.

UNIT-II (12 Lectures)

REGISTER TRANSFER AND MICRO OPERATIONS:

Register transfer language, Register transfer, Bus and Memory transfers, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations, Arithmetic Logic Shift Unit.

MICRO PROGRAMMED CONTROL:

Control Memory, Address Sequencing, Micro Program examples, Design of control unit, Hardwired control..

UNIT-III (12 Lectures)

COMPUTER ARITHMETIC:

Data representation- Fixed point representation, Floating point representation, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating-point Representations, Floating-point Arithmetic Operations, Decimal Arithmetic Units, Decimal Arithmetic Operations.

UNIT-IV (12 Lectures)

MEMORY ORGANIZATION:

Memory system overview, Memory Hierarchy, Semi-conductor Main Memory, Cache Memory principle, Elements of cache design, Virtual Memory, Magnetic Disk, Optical Memory, Magnetic Tape, RAID.

INPUT- OUTPUT:

External Devices, I/O modules, Interrupts, Programmed I/O, Interrupt-driven I/O, Direct Memory Access, I/O Channels and Processors, PCI.

Asynchronous Data Transfer, Priority Interrupt, Serial Communication.

UNIT-V (12 Lectures)

PIPELINE AND VECTOR PROCESSING:

Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

MULTI PROCESSORS:

Multiprocessors and Multi computers, Characteristics of Multi-processors, Multiple Processor Organizations, Symmetric Multi-Processors, Cache Coherence, Clusters, Non Uniform Memory Access (NUMA).

TEXT BOOKS:

1. William Stallings, *Computer Organization and Architecture*, 8th Edition, Pearson Education, 2010.
2. M.Moris Mano, *Computer Systems Architecture*, 3rd Edition, Pearson Education, 2007.

REFERENCES:

1. John D. Carpinelli, *Computer Systems Organization and Architecture*, 3rd Edition, Pearson Education, 2001.
2. Carl Hamacher, Zvonks Vranesic, SafeaZak , *Computer Organization* , 5th Edition, TMH,2011.

WEB REFERENCES:

http://nptel.iitm.ac.in/video.php?subjectId=106106092

PULSE AND INTEGRATED CIRCUITS LAB
(Common to ECE & EEE)

Course Code:13EC1112

L	T	P	C
0	0	3	2

Pre-requisites : Pulse and digital circuts, linear IC applications.

Course Educational Objectives:

To confirm theoretical principles in laboratory on Linear ICs& Pulse and digital circuits.

Course Outcomes:

Hands on experience for integration of pulse and digital circuits.

Note: Any TEN of the following experiments are to be conducted.

LIST OF EXPERIMENTS:

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers and Clampers.
3. Astable multivibrator.
4. Monostable multivibrator.
5. Schmitt Trigger.
6. Bootstrap sweep circuit.
7. Integrator, differentiator, Band Pass and Band stop filters using IC 741.
8. Function Generator using IC 741.
9. Astable and Monostable multivibrator using 555 Timer.
10. PLL Using IC 565.
11. Voltage regulator using IC 723.
12. Study of Logic Gates using Discrete components.
13. 4-bit D/A converter & A/D converter
14. Quadrature Oscillator

ANALOG COMMUNICATIONS LAB

Course Code: 13EC1113

L	T	P	C
0	0	3	2

Pre requisites: Analog communications

Course Educational Objectives:

To design various modulation & demodulation processes using different methods used in analog communication systems.

Course Outcomes:

After completion of the course, students are able to

- ✤ Understand and design various modulation & demodulation systems using hardware and simulation tool.
- ✤ Hands on experience on spectrum analyzer.

NOTE: Any ten of the following experiments are to be performed.

LIST OF EXPERIMENTS:

1. Amplitude modulation and demodulation.
2. DSB-SC Modulation using Balanced Modulator.
3. SSB-SC modulation and demodulation.
4. Frequency modulation and demodulation.
5. Characteristics of mixer.
6. Pre-emphasis and de-emphasis.
7. Phase locked loop.
8. Synchronous detector.
9. Squelch Circuit.
10. Frequency Synthesizer.
11. AGC Characteristics.
12. Spectral analysis of AM, DSB-SC, SSB-SC using spectrum

analyzer.

13. Spectral analysis of FM using spectrum analyzer.

14. MATLAB Simulation of

(i) AM & DSB-SC Modulation and Demodulation.

(ii) SSB-SC Modulation and Demodulation

(iii) Frequency Modulation and Demodulation

SYLLABI FOR
V SEMESTER

NETWORK ANALYSIS AND SYNTHESIS

(Common to ECE, EEE)

Course Code:13EE1104

L	T	P	C
4	1	0	3

Pre requisites:

Knowledge of Mathematics and Basic Network Analysis.

Course Educational Objectives:

This course trains the student to think deep into the subject for analyzing the time – domain and frequency domain analysis of systems in general and prepares the student for advanced learning and research.

Course Outcomes:

Students will be able to solve the Network problems using differential equation approach and transform methods. They will also able to synthesize LC, RC & RL networks.

UNIT-I **(12 Lectures)**

NETWORK TOPOLOGY:

Linear Graphs in Electrical Networks, Basic Definitions, Incidence, Loop and cut-set matrices, Fundamental Loop and Fundamental Cut-Set Matrices, Graph Theoretic version of KCL and KVL, Loop Impedance and Node Admittance Matrices, Duality in Electrical Networks.

UNIT-II **(12 Lectures)**

NETWORK ANALYSIS - I (DIFFERENTIAL EQUATION APPROACH):

Network elements, Initial and final conditions (Constant flux linkage and Charge theorems), Step and Impulse response of RC & RL Circuits (Concept of time constant), Solution of RLC- Series & Parallel circuits for the step and impulse excitations, Analysis of Transformer (Mutual Inductance).

UNIT-III (12 Lectures)

NETWORK ANALYSIS USING LAPLACE TRANSFORMS:

The Transformed Circuit, Thevenin's and Norton's Theorems, The system function (with poles and zeros), the step and impulse responses, the convolution Integral, The Duhamel Superposition Integral.

UNIT-IV (12 Lectures)

NETWORK ANALYSIS – II (TWO- PORTS :

Network functions, Two Port Networks: Z, Y, h and T (ABCD) Parameters, Relationship between Two Port parameters, Transfer function using two port parameters, inter connection of two port networks, Analysis of Ladder networks.

UNIT-V (12 Lectures)

SYNTHESIS OF NETWORKS:

Causality and stability, Hurwitz polynomials, Positive Real Functions, Elementary Synthesis procedure, Properties of LC Immittance functions, Synthesis of LC driving point function by Foster's and Cauer Forms, Properties of RC & RL driving Point Function, Synthesis of RC & RL functions Foster's and Cauer Forms.

TEXT BOOKS:

1. N.C. Jagan and C. Lakshmi Narayana, *"Network Analysis"*, B.S. Publications, 2nd Edition, 2008. (Unit-I).
2. Franklin F.Kuo, *"Network Analysis and Synthesis"*, Wiley International, 5th Edition, 2012. (Unit-II to Unit-V).

REFERENCES:

1. M.E. Van Valkenburg, *"Network Analysis",* Prentice Hall of India Pvt. Ltd., 2000.
2. M.E. Van Valkenburg, *"Introduction to Modern Network Synthesis"*, Wiley Eastern Limited, 1993.
3. Charles K. Alexander, Mathew N.O Sadiku, *"Fundamentals of Electric Circuits"* TMH Education Pvt. Ltd, 3rd Editions, 2008.

CONTROL SYSTEMS

(Common to EEE, ECE)

Course Code:13EE1105

L	T	P	C
4	0	0	3

Pre requisites: Mathematics and Networks.

Course Educational Objectives:

In this course, it is aimed to introduce to the students the principles and applications of Control Systems in everyday life.

- ✤ To teach students the concepts of block diagrams and transfer functions
- ✤ To teach students the characteristics of closed-loop control systems including steady-state and transient response, parametric sensitivity, disturbances, error, and stability
- ✤ To teach students basic performance criteria for first and second order systems
- ✤ To teach students basic control system design methods, including root locus diagrams and frequency response methods.
- ✤ Introduce students to the basic concepts of Proportional, Integral and Derivative (PID) control, State Space.

Course Outcomes:

- ✤ Operate and troubleshoot open loop and closed loop control systems. Use transfer functions to predict the correct operation of control systems. Measure and evaluate the performance of basic open loop and closed loop control systems.
- ✤ Identify the basic elements and structures of feedback control systems.
- ✤ Construct and recognize the properties of root-locus for feedback control systems with a single variable parameter.

- ✤ Specify control system performance in the frequency-domain in terms of gain and phase margins, and design compensators to achieve the desired performance.
- ✤ Analyze control systems using state-space methods.

UNIT-I (12 Lectures)

MATHEMATICAL MODELING AND TRANSFER FUNCTION REPRESENTATION:

Introduction: Basic concept of simple control system – open loop – closed loop control systems. Effect of feedback on overall gain – stability sensitivity and external noise. Types of feedback control systems – Liner time invariant, time variant systems and non linear control systems

Mathematical models and Transfer functions of Physical systems: Differential equations – impulse response and transfer functions – translational and rotational mechanical systems. Transfer functions and open loop and closed loop systems. Block diagram representation of control systems – block diagram algebra – signal flow graph – Mason's gain formula

Components of control systems: DC servo motor – AC servo motor – synchro transmitter & receiver.

UNIT-II (12 Lectures)

TIME DOMAIN ANALYSIS AND STABILITY:

Time domain analysis: Standard test signals – step, ramp, parabolic and impulse response function – characteristic polynomial and characteristic equations of feedback systems – transient response of first order and second order systems to standard test signals. Time domain specifications - steady state response – steady state error and error constants. Effect of adding poles and zeros on over shoot, rise time, band width – dominant poles of transfer functions.

Stability analysis in the complex plane: Absolute, relative, conditional, bounded input –bounded output, zero input stability, conditions for stability, Routh –Hurwitz criterion.

UNIT-III (12 Lectures)

FREQUENCY DOMAIN ANALYSIS:

Introduction – correlation between time and frequency responses – polar plots – Bode plots – Nyquist stability criterion – Nyquist plots. Assessment of relative stability using Nyquist criterion – closed loop frequency response.

UNIT-IV (12 LECTURES)

ROOT LOCUS AND COMPENSATION TECHNIQUES:

Root locus Technique: Introduction – Construction of Root Loci

Introduction to Compensation Techniques- Lead, Lag, Lead Lag and Lag Lead,

Controllers- P, I, D, PD, PI, PID.

UNIT-V (12 Lectures)

STATE SPACE ANALYSIS:

Concepts of state, state variables and state models – diagonalisation – solution of state equations – state models for LTI systems-State Transition Matrix and it's properties. Concepts of Controllability and Observability.

TEXT BOOKS:

1. I.J.Nagrath & M Gopal, *"Control Systems Engineering"*, 5th Edition, New Age International.2012.
2. Norman S.Nise, *"Control Systems Engineering"*, 4th Edition, Wiley & Sons, 2009.

REFERENCES:

1. B.C. Kuo,"Automatic control systems", 7th edition, PHI, 2004.
2. M.Gopal,"Control Systems Principles and Design", 4th Edition, TMH, 2012.
3. K. Ogata, "Modern Control Engineering", 4th Edition, PHI, 2002.

DIGITAL COMMUNICATIONS

Course Code: 13EC1114

L	T	P	C
4	0	0	3

Prerequisites: Communication system basics

Course Educational Objectives:

- To familiarize with Digital modulation and demodulation techniques in communication systems.

Course Outcomes:

- Student will understand the importance of modulations for various applications.
- Estimates the system performance from parameters.
- Applies channel coding for detection and correction of errors.

UNIT-I (14 Lectures)

PULSE DIGITAL MODULATION:

Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Companding in PCM systems. Differential PCM systems (DPCM).

DELTA MODULATION:

Delta modulation, adaptive delta modulation, comparison of PCM and DM systems, noise in PCM and DM systems, Line coding.

UNIT-II (12 Lectures)

DIGITAL CARRIER MODULATION TECHNIQUES:

Introduction, ASK, FSK, PSK, DPSK, QPSK, M-ary PSK, ASK, FSK, similarity of BFSK and BPSK.

UNIT-III (10 Lectures)

DIGITAL DATA TRANSMISSION:

Base band signal receiver, probability of error, the optimum filter, matched filter, probability of error using matched filter, coherent reception, non-coherent detection of FSK, calculation of error probability of ASK, BPSK, BFSK,QPSK.

UNIT-IV (12 Lectures)

INFORMATION THEORY:

Discrete messages, concept of amount of information and its properties, Average information, Entropy and its properties. Information rate, joint and conditional entropy and its properties, Mutual information and its properties

SOURCE CODING:

Introduction, Advantages, Shannon's theorem, Shanon-Fano coding, Huffman coding, efficiency calculations, channel capacity of discrete and analog Channels, capacity of a Gaussian channel, bandwidth –S/N trade off.

UNIT-V (12 Lectures)

ERROR CONTROLLING TECHNIQUES:

Forward Error control codes (FEC), Automatic repeat request codes (ARQ), Linear Block Codes, Error detection and error Correction, capabilities of Linear block codes, cyclic codes, Convolution Codes, Comparison between Linear codes and convolution codes.

TEXT BOOKS:

1. Simon Haykin, "*Digital communications*" John Wiley, 1st edn.2005.
2. W. Tomasi, *"Advanced Electronic Communications Systems"*, PHI. 4th edition.

REFERENCES:

1. H. Taub and D. Schilling, *"Principles of Communication Systems"*, TMH, 3rd ed. 2003.ssss

2. John Proakis, Masoud Salehi *"Digital Communications"*, TMH, 5th ed., 2008.
3. R.Singh and S.Sapre, *"Communication Systems-Analog & Digital"*, TMH, 2nd ed., 2004.
4. B.P.Lathi, *"Modern Analog and Digital Communication"*, Oxford reprint, 3rd edition, 2004.
5. Bernard Sklar and Pabitra Kumar Ray, "*Digial Communications – Fundamentals and Applications"*, Pearson, 2nd Ed., 2001.

MICROPROCESSORS AND MICROCONTROLLERS

Course Code: 13EC1115

L	T	P	C
4	0	0	3

Pre requisites: Digital Logic Design, Computer Organization

Course Educational Objectives:

- To describe the architecture of 8086 and its programming in assembly language
- To present interrupt structures in microprocessors
- To elaborate interfacing of peripheral devices like I/O ports, keyboards, displays, ADCS, DACs, stepper motor
- To discuss architecture of 8051 and its features

Course Outcomes:

Student will be able to

- Understand the architectures and instruction sets of microprocessors and microcontrollers
- Develop applications which involve interfacing of peripherals to microprocessors
- Develop logical programming skills in 8086 assembly language
- Understand the programming of 8051 on-chip peripherals like timers, serial port

UNIT-I (10 Lectures)

INTEL 8086 MICROPROCESSOR:

8086 internal architecture, addressing modes, pin diagram, Minimum mode and maximum mode of operation, timing diagrams, Memory interfacing to 8086 (Static RAM & EPROM), 8086 interrupts and interrupt responses

UNIT-II (14 Lectures)

8086 PROGRAMMING:

Instruction set of 8086, assembler directives, program development Steps, constructing the machine course Codes for 8086 instructions, writing programs for Use with an assembler, writing and using procedures and assembler macros.

UNIT-III (11 Lectures)

PROGRAMMABLE DEVICES AND INTERFACING OF I/O:

Priority interrupt controller Intel 8259A, programmable peripheral interface 8255A, Interfacing of A/D and D/A converters to 8086 microprocessor, interfacing a microprocessor to keyboards, 7-segment display unit, stepper motor.

UNIT-IV (11 Lectures)

USART, KEYBOARD/ DISPLAY CONTROLLER AND DMA INTERFACING:

Serial data transfer scheme, asynchronous and synchronous data transfer schemes, serial I/O 8251 USART architecture and interfacing, Sample program of serial data transfer, Need for DMA, 8257 DMA controller,8279keyboard/display controller.

UNIT-V (14 Lectures)

8051 MICRO CONTROLLER:

Overview of 8051 family, Pin description of the 8051, 256-byte on-chip RAM, 8051 flag bits and PSW register, 8051 register banks and stack, instruction set, Programming 8051 timers, counter programming, Basics of serial communication, 8051 serial port programming in Assembly.

TEXT BOOKS:

1. A.K.Ray and K.M.Bhurchandi, "*Advanced Microprocessors and Peripherals*", 2nd Edn, TMH, 2006.
2. Mazidi and Mazidi, *"The 8051 Microcontroller and Embedded Systems"*, 2nd Edn, PHI, 2004.

REFERENCES:

1. Barry B. Brey, *"The Intel Microprocessors-Architecture, Programming & Interfacing"*, 6th Edn., Pearson Education, 2004.
2. Liu and GA Gibson, *"Micro Computer System 8086/8088 Family Architecture, Programming and Design"*, 2nd Edn., PHI, 2006.
3. Douglas V. Hall, *"Micro Processors & Interfacing*", 2nd Edn., 2007.
4. Raj Kamal *"Microcontrollers Architecture*, *Programming, Interfacing and System Design",* 1st Edn., Pearson Education, 2005.

ANTENNAS AND WAVE PROPAGATION

Course Code: 13EC1116

L	T	P	C
4	0	0	3

Pre requisites: EM waves and Transmission lines.

Course Educational Objectives:

- To introduce the fundamental principles of antenna theory and to apply them to the analysis, design and measurements of antennas
- To study various types of antennas
- To introduce the influence of earth's atmosphere on radio waves.

Course Outcomes:

The student will be able to

- Identify the importance of antenna parameters for applications in various spectral bands.
- use Maxwell's equations to calculate fields from dynamic charge/ current distributions
- Identify the characteristics of radio wave propagation

UNIT-I (15 Lectures)

ANTENNA BASICS:

Introduction, Radiation Mechanism, Antenna Parameters-Radiation Patterns, Patterns in Principle Planes, Main Lobe and Side Lobes, Beam widths, Beam Area, Radiation Intensity, Beam Efficiency, Directivity, Gain and Resolution, Antenna Apertures, Aperture Efficiency, Effective Height, Antenna Theorems- Applicability and Proofs for equivalence of directional characteristics.

RADIATION FROM WIRES:

Retarded Potentials, Small Electric Dipole, Quarter wave Monopole and Half wave Dipole Radiation characteristics

UNIT-II (10 Lectures)

ANTENNA ARRAYS:

Two element array, Principle of Pattern Multiplication, N element Uniform Linear Arrays - Broadside, End fire Arrays, EFA with Increased directivity, Binomial Arrays, Methods of Array synthesis- Tchebyscheff Distribution and Fourier Transform Method.

UNIT-III (9 Lectures)

HF, VHF AND UHF ANTENNAS:

Traveling wave radiators –basic concepts, Long wire antennas-field strength calculations and patterns, V-antennas, Rhombic Antennas and Design Relations, Small Loop antennas- Concept of short magnetic dipole, Helical Antennas, Yagi-Uda Arrays, Log periodic antennas.

UNIT-IV (11 Lectures)

MICROWAVE ANTENNAS:

Reflector Antennas: Flat Sheet and Corner Reflectors, Paraboloidal Reflectors, Cassegrain Feeds.

Slot antennas-Babinets principle, Microstrip antennas, Horn antennas, Lens antennas (Qualitative treatment only)

ANTENNA MEASUREMENT THEORY:

Antenna Measurements-Patterns Required, Set Up, Distance Criterion, Directivity and Gain Measurements (Comparison, Absolute and 3 Antenna Methods).

UNIT-V (15 Lectures)

WAVE PROPAGATION:

Concepts of Propagation- frequency ranges and types of propagations. Ground Wave propagation - characteristics, Parameters, Wave Tilt, Flat and Spherical Earth Considerations, Sky Wave Propagation-Formation of Ionospheric Layers and their characteristics, Mechanism of Reflection and Refraction, Critical Frequency, MUF & Skip Distance Calculations for flat and spherical earth cases, Optimum Frequency, Virtual Height, Ionospheric Abnormalities, Ionospheric Absorption, Fundamental Equation for Free-Space Propagation, Basic Transmission Loss Calculations, Space

Wave Propagation - Mechanism, LOS and Radio Horizon, Tropospheric Wave Propagation- Radius of Curvature of path, Effective Earth's Radius, Effect of Earth's Curvature, Field Strength Calculations, M-Curves and Duct Propagation, Tropospheric Scattering.

TEXT BOOKS:

1. G.S.N Raju, *"Antennas and Wave Propagation"*, 1st Edition Pearson Education, 2004.
2. K.D.Prasad, Satya Prakashan, *"Antennas and Wave Propagation"*, Tech Publications, 3rd Edition, 2001.

REFERENCES:

1. C.A. Balanis, *"Antenna Theory"*, 3rd Edition, John Wiley & Sons, 2012.
2. E. C. Jordan and K. G. Balmain, *"Electromagnetic Waves and Radiating Systems"*, PHI, 2nd edition, 2000.
3. John D. Kraus and Ronald J. Marhefka, *"Antennas and Wave propagation"*, TMH, 4rd Edition, 2010.

VLSI DESIGN

(Common to ECE and EEE)

Course Code: 13EC1117

L	T	P	C
4	0	0	3

Pre requisites: Electronics Devices and Circuits, Switching Theory and Logic Design.

Course Educational Objectives:

✤ To acquire knowledge of fabrication process involved in MOS Devices and to introduce the basic electrical properties of MOS devices and VLSI Circuit Design Processes.

Course Outcomes:

✤ Different IC technologies.

✤ Students know chip designing, synthesizing and testing.

UNIT-I (15 Lectures)

INTRODUCTION TO MOS TECHNOLOGIES:

VLSI Design Flow, Introduction to IC Technology–MOS, PMOS, NMOS, CMOS & Bi-CMOS technologies.

BASIC ELECTRICAL PROPERTIES:

Basic Electrical Properties of MOS and Bi-CMOS Circuits: I_{ds}-V_{ds} relationships, MOS transistor threshold Voltage, g_m, g_{ds}, figure of merit, Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT-II (12 Lectures)

VLSI CIRCUIT DESIGN PROCESSES:

MOSLayers, Stick Diagrams, Design Rules and Layout, CMOS Design rules for wires, Contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.

UNIT-III (14 Lectures)

GATE LEVEL DESIGN:

Transmission Gates, Alternate gate circuits, Basic circuit concepts: Sheet Resistance R_S and its concept to MOS, Area Capacitance Units, Calculations, Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers.

SUBSYSTEM DESIGN:

Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, High Density Memory Elements.

UNIT-IV (9 Lectures)

SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN:

FPGAs (Xilinx 4000series), CPLDs (Xilinx 9500series), Standard Cells, Design Approach.

UNIT-V (10 Lectures)

DESIGN METHODS AND TESTING:

Design methods, Design capture tools, Design Verification Tools, CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chip level Test Techniques, System-level Test Techniques, Layout Design for Improved Testability.

TEXT BOOKS:

1. Kamran Eshraghian, Eshraghian Dougles and A.Pucknell, *"Essentials of VLSI circuits and systems"*, 3rd Edn, PHI, 2005.
2. Weste and Eshraghian, *"Principles of CMOS VLSI Design"*, Pearson Education, 3rd edn 1999.

REFERENCES:

1. John .P. Uyemura, *"Introduction to VLSI Circuits and Systems"*, John Wiley, 1st Edition. 2009.
2. Sabastian smith, *"Application Specific Integrated Circuits"*, Addison Wesley Publishing Company Incorporated, 2008
3 John F.Wakerly, *"Digital Design Principles & Practices"*, PHI/ Pearson Education Asia, 3rd Edition, 2005.

4. John M. Rabaey, *"Digital Integrated Circuits"*, PHI, EEE, 2*nd* Edition 2003.
5. Wayne Wolf, *"Modern VLSI Design"*, Pearson Education, 3rd Edition, 2008.
6. Behzad Razavi, *"Design of Analog CMOS Integrated Circuits"*, The McGraw Hill, 2001.

DIGITAL COMMUNICATION LAB

Course Code: 13EC1118

L	T	P	C
0	0	3	2

Prerequisites: Digital Communications Theory

Course Educational Objectives:

Hands on experience of theoretical concepts and to design and compare the Modulation and De-modulation schemes of Digital Carrier Modulation techniques and multiplexing techniques.

Course Outcomes:

After completing the course students will be familiar with various digital modulation techniques and multiplexing techniques.

LIST OF EXPERIMENTS:

1. Pulse Amplitude Modulation and Demodulation
2. Pulse Width Modulation and Demodulation
3. Pulse Position Modulation and Demodulation
4. Sampling Theorem
5. Time Division Multiplexing
6. Pulse Code Modulation
7. Delta Modulation
8. Amplitude Shift Keying
9. Frequency Shift Keying
10. Phase Shift Keying
11. Differential Phase Shift Keying
12. Simulation of Pulse Modulation
13. Simulation of Passband modulation Techniques
14. Simulation of Multiplexing Techniques

Note: Any **TEN** of the above experiments are to be conducted.

VLSI DESIGN LAB

Course Code: 13EC1119

L	T	P	C
0	0	3	2

Pre requisites:

Digital IC Applications, VLSI Design

Course Educational Objectives:

- To model a digital system using Hardware Description Language.
- Implementation of digital circuits using programmable devices.

Course Outcomes:

- Students will be able to design, simulate and synthesize combinational and sequential circuits using VHDL.
- Students will get hands on experience on XILINX Platform.
- Students will get hands on experience on FPGA/CPLD.

LIST OF EXPERIMENTS:

CYCLE-1 (HARDWARE LAB)

1. Design of Combinational circuits
2. Design of 4 to 16 Decoder using 74X138 ICs
3. Design of 8-Bit Comparator using 74X85 ICs
4. Realization of Flip-flops
5. Serial in parallel out Shift Register
6. Decade Counter
7. Design of 16:1 MUX

CYCLE-2(USING XILINX SOFTWARE)

1 4 to 16 Decoder

2 8-Bit Comparator

3 16X 1 Multiplexer

4 Serial in parallel out Shift Register

5 Decade Counter

6 Universal Shift Register

7 Arithmetic & Logic Unit

Note: Any TEN of the above experiments are to be conducted.

INTELLECTUAL PROPERTY RIGHTS AND PATENTS

(Common to all Branches)

Course Code: 13NM1103

L	T	P	C
2	0	0	0

Course Educational Objectives:

- To acquaint the learners with the basic concepts of Intellectual Property Rights.
- To develop expertise in the learners in IPR related issues and sensitize the learners with the emerging issues in IPR and the rationale for the protection of IPR.

Course Outcomes:

At the end of this course, the student will be able to

- Gain knowledge on Intellectual Property assets and generate economic wealth
- Assist individuals and organizations in capacity building and work as a platform for development, promotion, protection, compliance, and enforcement of Intellectual Property & knowledge.

UNIT-I **(7 Lectures)**

Introduction to intellectual property Act and Law-the evolutionary past-the IPR tool kit- legal tasks in intellectual property law-ethical obligations in Para legal tasks in intellectual property law

UNIT-II **(8 Lectures)**

Introduction to trade mark – Trade mark registration process-Post registration procedures-Trade mark maintenance – transfer of rights- inter party's proceeding – Infringement-Dilution ownership of trade mark-likelihood of confusion – trademark claims- trademark litigations

UNIT-III **(6 Lectures)**

Introduction to copy rights- principles of copyright – subjects matter of copy right- rights afforded by copyright law- copyright ownership- transfer and duration – right to prepare derivative works- right of distribution- right to perform the work publicity- copyright formalities and registrations

UNIT-IV **(7 Lectures)**

Introduction to patent law- Rights and limitations- Rights under patent law- patent requirements- ownership – transfer- patent application process- patent infringement- patent litigation

UNIT-V **(6 Lectures)**

Introduction to transactional law- creating wealth and managing risk – employment relationship in the Internet and technologic cal sector- contact for internet and technological sector

TEXT BOOKS:

1 Kompal Bansal and Praishit Bansal, "Fundamentals of IPR for Engineers", 1st Edition, BS Publications, 2012.

2 Prabhuddha Ganguli, *"Intellectual Property Rights"*, 1st Edition, TMH, 2012.

REFERENCES:

1 R Radha Krishnan & S Balasubramanian, *"Intellectual Property Rights"*, 1st Edition, Excel Books, 2012.

2 M Ashok Kumar & mohd Iqbal Ali, *"Intellectual Property Rights"*, 2nd Edition, Serial publications, 2011.

SYLLABI FOR VI SEMESTER

MANAGEMENT SCIENCE

(Common to Chemical, CSE, IT, ECE, EEE)

Course Code: 13HM1102

L	T	P	C
4	0	0	3

Course Educational Objectives:

To familiarize with the process of management and to provide basic insights into to select contemporary management practices.

Course Outcomes :

To understand the management processes and evolve management levels for effective decision making

UNIT-I (16 Lectures)

INTRODUCTION TO MANAGEMENT:

Concept-nature and importance of management- functions of management- evolution of management thought- decision making process- designing organization structure- principles of organization – types of organization structure

UNIT-II (12 Lectures)

OPERATIONS MANAGEMENT:

Principles and types of plant layout- work study- statistical quality control- control charts(R Chart, P Chart & C Chart- Simple numerical problems) – materials management- Need for Inventory Control- EOQ, ABC Analysis(Simple numerical Analysis)- Types of Inventory Analysis(HML. SDE, VED, FSN Analysis)

UNIT-III (10 Lectures)

HUMAN RESOURCE MANAGEMENT:

Concept of HRM, HRD and PMIR- Functions of HR Manager- theories of motivation and leadership styles- Job Evaluation and Merit Rating,

Welfare measures-statutory and non statutory compliance – grievance handling

UNIT-IV **(12 Lectures)**

MARKETING MANAGEMENT:

Marketing Management- Functions of Marketing Management- Marketing mix-Market segmentation - Marketing strategies based on product life cycle- Channels of Distribution- Consumer Behavior and marketing research

UNIT-V **(14 Lectures)**

PROJECT MANAGEMENT:

Project planning and control- Project life cycle- Development of network- Difference between PERT and CPM- Identifying critical path- probability of completing the project within the given time, cost analysis, - project crashing(simple numerical problems)

TEXT BOOKS :

1 Ramanujam Naidu & Sastry, *"Management Science"*, 1st Himalaya Publisher, 2012.

2 Vijaya Kumar & Appa Rao, *"Management Science"*, 1st Cengage Publishers, 2012.

3 AR Aryasri, *"Management Science"*, 4th Edition, Tata McGraw-Hill, 2009.

REFERENCES :

1 O P Khanna, *"Industrial Engineering & Management"*, 2nd Edition, Dhanpat Rai, 2004.

2 Martand Telsang, *"Industrial Engineering & Production Management"*, 2nd Edition, S. Chand & Company, 2008.

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Course Code:13EC1120

L	T	P	C
4	1	0	3

Course Educational Objectives:

- ✤ To learn about measurements and its relation with instrumentation system.
- ✤ To familiarize with the concepts of electronic measurements.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Illustrate the concepts of indicating instruments for voltage and current measurements.
- ✤ Analyze various measuring techniques for both electrical and non-electrical quantities
- ✤ Compare different types of bridge circuits
- ✤ Use oscilloscope to determine frequency and phase of a sinusoidal signal.

UNIT-I (14 Lectures)

MEASUREMENT SYSTEMS:

Performance characteristics of instruments, Static characteristics, Accuracy, Resolution, Precision, Expected value, Error, Sensitivity. Errors in Measurement, Dynamic Characteristics-speed of response, Fidelity, Lag and Dynamic error, DC Voltmeters, Ammeters- Multi-range, Range extension, AC voltmeters-multi-range, range extension,-shunt. Thermocouple type RF ammeter, Ohm meters series type, shunt type, Voltage, Current, Resistance measurement using DMM, Auto zeroing, Auto ranging.

UNIT-II (12 Lectures)

CATHODE RAY OSCILLOSCOPE:

Oscilloscopes CRT features, vertical amplifiers, horizontal deflection system, sweep, trigger pulse, delay line, sync selector circuits, simple CRO, triggered sweep CRO, Dual beam CRO. Dual trace oscilloscope, sampling oscilloscope, storage oscilloscope, digital readout oscilloscope, digital storage oscilloscope, Lissajous method of phase measurement, standard specifications of CRO, probes for CRO-Active & Passive, attenuator types.

UNIT-III (12 Lectures)

TIME AND FREQUENCY MEASUREMENTS:

Phase and Magnitude Measurement at high frequency using vector voltmeter, Frequency, Time and Period measurements.

ANALYZERS:

Wave Analyzers, Harmonic Distortion Analyzers, Spectrum Analyzer - FFT analyzer, Logic analyzer, Digital signal analyzer, Digital Fourier analyzer.

UNIT-IV (10 Lectures)

BRIDGES:

DC Bridges- Wheatstone bridge, Kelvin's bridge, AC Bridges Measurement of inductance- Maxwell's bridge, Anderson bridge, Measurement of capacitance -Schering Bridge, Wien Bridge, Errors and precautions in using bridges. LCR-Q meter - principle of digital LCR-Q meter, specifications & applications.

UNIT-V (12 Lectures)

TRANSDUCERS:

Transducers- active & passive transducers : Resistance, Capacitance, inductance; Strain gauges, LVDT, Piezoelectric transducers, Acoustic Transducers ,Resistance Thermometers, Thermocouples, Measurement of physical parameters: force, humidity, speed.

TEXT BOOKS:

1. H.S.Kalsi, *"Electronic instrumentation"*, 3rd Edition - Tata McGraw Hill, 2010.

2. A.D. Helfrick and W.D. Cooper, *"Modern Electronic Instrumentation and Measurement Techniques"*, PHI, 5th Edition, 2002.

REFERENCES:

1 David A. Bell, *"Electronic Instrumentation & Measurements"* - PHI, 2nd Edition, 2003.

2. Robert A. Witte, *"Electronic Test Instruments, Analog and Digital Measurements"*, Pearson Education, 2nd Ed., 2004.

3. K. Lal Kishore, *"Electronic Measurements & Instrumentations"*, Pearson Education - 1st Edn, 2005.

MICROWAVE ENGINEERING

Course Code:13EC1121

L	T	P	C
4	0	0	3

Pre requisites: Electromagnetic Field Waves and Transmission lines.

Course Educational Objectives:

To familiarize concepts Microwave components, terminology, tubes &Solid state Microwave Devices

Course Outcomes:

After the course students should be able to:

- Apply electromagnetic theory to calculations regarding waveguides.
- Describe and analyze simple microwave circuits and devices e.g. matching circuits, couplers.
- To understand microwave devices such as microwave vacuum tubes and ferrite devices.
- Handle microwave equipment and be able to make measurements.

UNIT-I **(12 Lectures)**

WAVEGUIDES:

Introduction, Microwave Spectrum and Bands, Applications of Microwaves, Guided waves-parallel plane , TE, TM, TEM modes, Rectangular Waveguides, Circular Waveguides, Cavity resonators.

UNIT-II **(12 Lectures)**

MICROWAVE COMPONENTS:

Coupling Mechanisms – Probe, Loop, Aperture types, joints, bends, corners, transitions, twists, irises, Tuning Screws and Posts, Matched Loads, Attenuators and phaseshifters.

MICROWAVE JUNCTIONS:

Multiport Junctions – E plane and H plane Tees, Magic Tee, Hybrid Ring;

Directional Couplers, Faraday Rotation, Ferrite Devices – Gyrator, Isolator, Circulator, Scattering Matrix, S Matrix Calculations for Multi-port Junctions.

UNIT-III (15 Lectures)

MICROWAVE TUBES:

High frequency limitations of conventional tubes, Reentrant cavities, Klystrons, velocity modulation process, bunching process, output power and beam loading. Multicavity Klystron amplifiers. Applications. Reflex Klystron: Velocity modulation, power output and efficiency, electronic admittance, mode patterns. Slow wave structures, Traveling wave tube, amplification process, wave modes, gain considerations. Principle of operation, Magnetron - types, principle of operation of cylindrical magnetron, cavity magnetron, theory of oscillations, Hartee resonance condition: Pi-mode separation, Backward wave crossed field amplifier.

UNIT-IV (10 Lectures)

MICROWAVE SOLID STATE DEVICES:

Introduction, Classification, Applications, Varactor Diodes, Parametric Amplifiers, PIN Diode, Tunnel Diode –Principle, Characteristics, Applications. TEDs – Introduction, Gunn Diode – Principle, Characteristics, Basic Modes of Operation, Oscillation Modes. Avalanche Transit Time Devices – Introduction, IMPATT and TRAPATT Diodes – Principle of Operation and Characteristics.

UNIT-V (12 Lectures)

MICROWAVE MEASUREMENTS:

Description of Microwave Bench – Different Blocks and their Features, Precautions; Microwave Power Measurement – Bolometer Method, Measurement of Attenuation, Frequency, VSWR, Impedance Measurements.

TEXT BOOKS:

1. Samuel Y. Liao, *"Microwave Devices and Circuits"*, PHI, 3rd Edition, 1996.
2. Peter A. Rizzi, *"Microwave Engineering Passive Circuits"*, PHI, 1999.

REFERENCES:

1. R.E. Collin, *"Foundations for Microwave Engineering"*, IEEE Press, John Wiley, 2nd Edition, 2002.
2. M.Kulkarni, *"Micro Wave and Radar Engineering"*, Umesh Publications, 3rdEdn.,2003
3. Annapurna Das and Sisir K Das, *"Microwave Engineering"*, TMH, 2nd ed., 2008.
4. M.L. Sisodia and G.S.Raghuvanshi, *"Microwave Circuits and Passive Devices"*, Wiley Eastern Ltd., New Age International Publishers Ltd., 1995.

DIGITAL SIGNAL PROCESSING

Course Code: 13EC1122

L	T	P	C
4	1	0	3

Pre requisites: Signals and Systems

Course Educational Objectives:

- To have an overview of signals and systems.
- To study DFS, DTFT, DFT & FFT.
- To understand the design techniques for digital IIR and FIR filters.
- To study Multirate DSP & the applications of DSP.

Course Outcomes:

At the end of this course, the student should be able to know

- How to represent discrete time signals and systems.
- The basic principles of digital signal processing.
- Frequency response and design of FIR and IIR filters.
- The concept of Multirate DSP and applications of DSP.

UNIT-I (12 Lectures)

INTRODUCTION:

Introduction to Digital Signal Processing, Reviewof discrete-time signals and systems, analysis of discrete-time linear time invariant systems, Frequency domain representation of discrete time signals and systems.

DISCRETE CONVOLUTION:

Introduction, Impulse Response and Convolution Sum, Convolution of Infinite sequences, Circular shift and Circular Symmetry, Periodic and Circular Convolution, Methods of obtaining Circular Convolution.

UNIT-II (12 Lectures)

DISCRETE FOURIER SERIES AND DISCRETE TIME FOURIER TRANSFORM:

Introduction, Discrete Fourier Series, Properties of DFS, Introduction to

Discrete time Fourier transform, Inverse DTFT, Properties of DTFT, Relation between Z-Transform and DTFT, Frequency Response of Discrete Time Systems, Transfer Functions.

UNIT-III (14 Lectures)

DISCRETE FOURIER TRANSFORM:

Introduction, Discrete Fourier Transform, Inverse DFT, Properties of DFT, Linear Convolution and Circular Convolution using DFT.

FAST FOURIER TRANSFORM:

Introduction, Fast Fourier Transform, Radix-2 Decimation in time FFT, Radix-2 Decimation in frequency FFT, Inverse FFT.

UNIT-IV (15 Lectures)

DESIGN OF DIGITAL FILTERS:

IIR FILTERS: Introduction, Analog filter approximations – Butterworth and Chebyshev, Design of IIR Digital filters from analog filters by Impulse invariant and bilinear transformation methods, Frequency transformations, Basic structures of IIR Filters.

FIR FILTERS: Introduction, Characteristics of FIR filters with linear phase, Frequency response of linear phase FIR filters, Design of FIR filters using windows (Rectangular, Triangular, Raised Cosine, Hanning, Hamming, Blackman and Kaiser), Comparison of IIR & FIR filters,Basic structures of FIR Filters.

UNIT-V (12 Lectures)

MULTIRATE DIGITAL SIGNAL PROCESSING:

Decimation, interpolation, sampling rate conversion, Implementation of sampling rate conversion.

APPLICATIONS OF DSP: Voice Synthesizers, Vocoders, Image Processing (Qualitative Treatment Only), Radar Signal Processing.

TEXT BOOKS:

1. John G.Proakis, Dimitris G.Manolakis, *"Digital Signal Processing, Principles, Algorithms and Applications"*, Pearson Education / PHI, 4th Edition, 2013.

2. A.V.Oppenheim and R.W.Schaffer, *"Discrete – Time Signal Processing"*, PHI, 4th Edition, 2007

REFERENCES:

1. S.K.Mitra, *"Digital Signal Processing – A practical approach"*, Pearson Education, New Delhi, 2003.
2. M.H.Hayes, *"Digital signal processing: Schaum's Outlines"*, Tata Mc-Graw Hill, 2nd Edition, 2009
3. Robert J.Schilling, Sandra L.Harris, *"Fundamentals of Digital Signal Processing using Matlab"*, Thomson, 2007.
4. Ramesh Babu, *"Digital Signal Processing"*, SCITECH Publications, 4th Edition, 2009.
5. A.Anandkumar, *"Digital Signal Processing"*, PHI, Eastern Economy Edition, 2013.

INFORMATION THEORY AND CODING
(ELECTIVE-I)

Course Code: 13EC1123

L	T	P	C
4	0	0	3

Pre requisites:

Probability Theory, Digital Communications

Course Educational Objectives:

- To *develop* learners' knowledge in the fundamental limits of information theory.
- To understand the efficiency of the source coding and channel coding
- To study techniques which permit the detection of errors and provide methods to reconstruct the original message.

Course Outcomes:

After completion of the course students are able to analyze and compare error detecting/correcting facilities of simple linear and cyclic codes.

UNIT-I (12 Lectures)

INFORMATION THEORY:

Entropy, Information rate, source coding: Shannon-Fano and Huffman coding techniques, Mutual Information, Channel capacity of Discrete Channel, Shannon- Hartley law, Trade-off between bandwidth and SNR.

UNIT-II (14 Lectures)

ERROR CONTROL CODES:

Examples of the use of error control codes, basic notions, coding gain, Characterization of Error control codes performance of error control codes, comparison of uncoded and coded systems.

UNIT-III (12 Lectures)

LINEAR BLOCK CODES:

Linear block codes and their properties, standard arrays, syndromes, weight distribution. Error detection/correction properties, modified linear block codes.

UNIT-IV (12 Lectures)

CONVOLUTION CODES:

Convolution encoders, structural properties of convolution codes, trellis diagrams, viterbi algorithm, and performance analysis.

CYCLIC CODES:

General theory, Shift Register Implementations, Shortened Cyclic codes, CRCs for Error Detection.

UNIT-V (12 Lectures)

BCH AND RS CODES:

Algebraic Description, Frequency Domain Description, Decoding Algorithms for BCH and RS Codes.

TEXT BOOKS:

1. Stephen B.Wicker, *"Error Control Systems for Digital Communication and Storage"*, Prentice Hall, 1995.
2. Kennedy, "Electronic Communication systems", Mc Graw Hill, 4th Edition., 1999.

REFERENCES:

1. John Proakis, *"Digital Communications"*, TMH, 5th Edition 2008.
2. Simon Haykin, *"Communication System"*, Wiley, 2008.

DATA STRUCTURES
(Common to CSE, IT, ECE & EEE)

Course Code : 13CT1106

L	T	P	C
4	0	0	3

Course Educational Objectives:

Student will be able to

- ✤ Analyze algorithms.
- ✤ Develop software applications which are efficient in terms of space time complexity.
- ✤ Choose suitable Data Structures for different real world applications.
- ✤ Apply best algorithm to sort set of elements.
- ✤ Employ a structured methodology while providing a software solution to an engineering problem.

Course Outcomes:

At the end of the course student will be able to

- ✤ Get knowledge on how to develop algorithms, operations on queues and stacks.
- ✤ Work on different searching methods and graphs.
- ✤ Get knowledge on trees and binary trees.
- ✤ Work on different sorting methods.
- ✤ Get knowledge on different types of linked operations.

UNIT-I (12 Lectures)

ANALYSIS OF ALGORITHMS:

Efficiency of algorithms, apriori analysis, asymptotic notations, time complexity of an algorithm using O notation, polynomial Vs exponential algorithms, average, best and worst case complexities, analyzing recursive programs.

STACKS: Introduction, stack operations, applications.

QUEUES: Introduction, Operations on queues, circular queues, other types of queues, applications.

UNIT-II (12 Lectures)

LINKED LISTS:

Introduction, Singly linked lists, circularly linked lists, doubly linked lists, multiply linked lists, applications.

LINKED STACKS AND LINKED QUEUES:

Introduction, operations on linked stacks and linked queues, dynamic memory management and linked stacks, implementation of linked representations, applications.

UNIT-III (12 Lectures)

SEARCHING:

Introduction, linear search, transpose sequential search, interpolation search, binary search, Fibonacci search.

INTERNAL SORTING:

Introduction, bubble sort, insertion sort, selection sort, merge sort, quick sort.

UNIT-IV (12 Lectures)

TREES AND BINARY TREES:

Introduction, Trees: definition and basic terminologies, representation of trees, binary trees: basic terminologies and types, representation of binary trees, binary tree traversals, threaded binary trees, applications.

BINARY SEARCH TREES AND AVL TREES:

Introduction, binary search trees: definition and operations, AVL Trees: definition and operations, applications.

UNIT-V (12 Lectures)

GRAPHS:

Introduction, definitions and basic terminologies, representations of graphs, graph traversals and applications.

TEXT BOOKS:

1. G A V PAI, *Data Structures and Algorithms, Concepts, Techniques and Applications*, Volume 1, 1st Edition, Tata McGraw-Hill, 2008.
2. Richard F. Gilberg & Behrouz A. Forouzan, *Data Structures, A Pseudo code Approach with C*, 2nd Edition, Cengage Learning India Edition, 2007.

REFERENCES:

1. Langsam ,M. J. Augenstein, A. M. Tanenbaum ,*Data structures using C and C++*, 2ndEdition, PHI Education,2008.
2. Sartaj Sahni, Ellis Horowitz ,*Fundamentals of Data Structures in C*, 2ndEdition, Orient blackswan , 2010.

WEB REFERENCES:

http://nptel.iitm.ac.in/video.php?subjectId=106105085

MICROCONTROLLERS AND APPLICATIONS
(ELECTIVE-I)

Course Code: 13EC1124

L	T	P	C
4	0	0	3

Prerequisites:

Requires pre-knowledge of switching theory and logic design, microprocessors and interfacing

Course Educational Objectives:

- ✤ To describe the instruction set of 8051
- ✤ To present interrupt structures in microprocessors and MCUs
- ✤ To explain the interfacing of peripherals with the MCUs
- ✤ To discuss advanced microcontrollers like 80196, ARM MCU

Course Outcomes:

Student will be able to

- ✤ Identify the differences between microprocessor and micro controller instruction set.
- ✤ Understand how real time control is achieved using interrupts, timers
- ✤ Interpret the applications of microcontroller which includes interfacing to high power devices, ADCs, DACs etc.,
- ✤ Understand the various microcontroller architectures ie.,8-bit, 16-bit, 32-bit architectures

UNIT-I (14 Lectures)

8051 FAMILY MICROCONTROLLERS INSTRUCTION SET:

Architecture of 8051microcontroller-internal and external memories, Basic assembly language programming – Data transfer instructions –Data and Bit manipulation instructions – Arithmetic instructions –Instructions for Logical operations on the Bytes among the Registers, Internal RAM, and SFRs – Program flow control instructions – Interrupt control flow

UNIT-II **(12 Lectures)**

REAL TIME CONTROL: INTERRUPTS:

Interrupt handling structure of an MCU – Interrupt Latency and Interrupt deadline – Multiple sources of the interrupts – Non-maskable interrupt sources – Enabling or Disabling of the sources – Polling to determine the Interrupt source and assignment of the priorities among them –Interrupt structure in Intel 8051.

REAL TIME CONTROL: TIMERS:

Programmable Timers in the MCUs – Free running counter and real timecontrol – Interrupt interval and density constraints.

UNIT-III **(12 Lectures)**

SYSTEMS DESIGN:

Synchronous serial-cum-asynchronous serial communication – ADC Circuit Interfacing – DAC Circuit Interfacing – stepper motor - Digital and Analog Interfacing Methods, Switch, Keypad and Keyboard interfacings – LED and Array of LEDs – LCD interface – Programmable instruments interface using IEEE 488 Bus – Interfacing with the Flash Memory – Interfaces –Interfacing to High Power Devices – Analog input interfacing – Analog output interfacing.

UNIT-IV **(10 Lectures)**

REAL TIME OPERATING SYSTEM FOR MICRO CONTROLLERS:

Real Time operating system – RTOS of Keil (RTX51) – Use of RTOS in Design – Software development tools for Microcontrollers.

Microcontroller Based Industrial Applications

Optical motor shaft encoders – Industrial control – Industrial process control system – Prototype MCU based Measuring instruments

UNIT-V **(12 Lectures)**

16/32 - BIT MICROCONTROLLERS:

8096/80196 Family: Hardware – Memory map in Intel 80196 family MCU system – I/O ports – Programmable Timers and High-speed outputs and input captures – Interrupts

ARM 32 Bit MCUs: Introduction to 16/32 Bit processors – ARM architecture and organization – ARM / Thumb programming model – ARM / Thumb instruction set

TEXT BOOKS:

1. Raj Kamal, *"Microcontrollers Architecture, Programming, Interfacing and System Design"*, 2nd Edition, Pearson Education, 2005.
2. Mazidi and Mazidi, *"The 8051 Microcontroller and EmbeddedSystems"*, 4*th* Impression, PHI, 2000.

REFERENCES:

1. Kenneth J. Ayala, *"The 8051 Microcontroller"*, 3rd Edition, Cengage Learning, 2007.
2. A.V. Deshmukh, *"Microcontrollers (Theory & Applications)"*, 6th Reprint, TMH, 2007.
3. John B. Peatman, *"Design with PIC Microcontrollers"*, 2nd Edition, Pearson Education, 2005.

DIGITAL IC DESIGN
(ELECTIVE-II)

Course Code: 13EC1125	L	T	P	C
	4	0	0	3

Pre requisites: VLSI Technology, logic design.

Course Educational Objectives:

- IC design using various CMOS logic styles.
- Device characteristics and modeling.
- To extract parasitics from layout.
- To calculate power, delay etc.
- To design combinational and sequential logic circuits

Course Outcomes:

- Capable to design a Digital IC and use the concept of logical effort for transistor sizing.
- Proficiency in modeling of circuits.
- Able to make tradeoff between various design entities.
- Distinguish Static CMOS design and Dynamic CMOS design.
- Design of Logic gates, Flip-flops, Adders, Registers and RAM etc.

UNIT-I **(8 Lectures)**

INTRODUCTION:

Historical Perspective, Issues in Digital Integrated Circuit Design, Quality Metrics of a Digital Design: Cost of an Integrated Circuit, Functionality and Robustness, Performance, Power and Energy Consumption.

UNIT-II **(12 Lectures)**

MOS TRANSISTOR:

The MOS Transistor under Static Conditions, Dynamic Behavior, The Actual MOS Transistor—Some Secondary Effects, SPICE Models for the MOS Transistor, Method of Logical Effort for transistor sizing.

WIRE:

Introduction, A First Glance, Interconnect Parameters - Capacitance, Resistance, and Inductance, Electrical wire models, SPICE wire models.

UNIT-III (11 Lectures)

THE CMOS INVERTER:

Introduction, The Static CMOS Inverter — An Intuitive Perspective, Evaluating the Robustness of the CMOS Inverter: The Static Behavior, Switching Threshold, Noise Margins, Robustness Revisited, Performance of CMOS Inverter: The Dynamic Behavior, Computing the Capacitances, Propagation Delay: First-Order Analysis, Propagation Delay from a Design Perspective, Power, Energy, and Energy-Delay: Dynamic Power Consumption, Static Consumption, Perspective: Technology Scaling and its Impact on the Inverter Metrics.

UNIT-IV (12 Lectures)

DESIGNING COMBINATIONAL LOGIC GATES IN CMOS:

Introduction, Static CMOS Design: Complementary CMOS, Ratioed Logic, Pass-Transistor Logic, Dynamic CMOS Design: Dynamic Logic-Basic Principles, Speed and Power Dissipation of Dynamic Logic, Issues in Dynamic Design, Cascading Dynamic Gates, Perspectives: How to Choose a Logic Style, Designing Logic for Reduced Supply Voltages

UNIT-V (17 Lectures)

DESIGNING SEQUENTIAL LOGIC CIRCUITS:

Introduction, Timing Metrics for Sequential Circuits, Classification of Memory Elements, Static Latches and Registers: The Bistability Principle, Multiplexer-Based Latches Master-Slave Edge-Triggered Register, Low-Voltage Static Latches, Static SR Flip-Flops—Writing Data by Pure Force, Dynamic Latches and Registers: Dynamic Transmission-Gate Edge-triggered Registers ,C^2MOS—A Clock-Skew Insensitive Approach, True Single-Phase Clocked Register (TSPCR).Pipelining: An approach to optimize sequential circuits, Latch- vs. Register-Based Pipelines, NOR - CMOS - A Logic Style for Pipelined Structures, Non-Bistable Sequential Circuits: The Schmitt Trigger, Monostable Sequential Circuits, Astable Circuits, Perspective: Choosing a Clocking Strategy.

TEXT BOOKS:

1. Jan M. Rabaey, Anantha Chandrakasan, Borivoje Nikolic, *"Digital Integrated Circuits – A design perspective"*, 2nd Edition, PHI, 2003
2. S. M. Kang & Y. Leblebici, *"CMOS Digital Integrated Circuits"*, 3rd Edition, McGraw Hill, 2003.

REFERENCES:

1. Jackson & Hodges, *"Analysis and Design of Digital Integrated circuits"*, 3rd Edition, TMH Publication, 2005.
2. Ken Martin, *"Digital Integrated Circuit Design"*, Oxford Publications, 2001.
3. Sedra and Smith, *"Microelectronic Circuits",* 5th Edition, Oxford Publications, 2005.

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

(Common to CSE, IT & ECE)

Course Code :13CT1111

L	T	P	C
4	0	0	3

Course Educational Objectives:

The main objective of the course is to expose the students to object oriented programming principles and how these principles can be applied with JAVA programming language. Upon completion of the course, the student should be able to:

- Understand fundamentals of programming such as variables, conditional and
- iterative execution, methods, etc.
- Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Have the ability to write a computer program using JAVA to solve specified problems.
- Have the ability to write multithread programs.
- Develop GUI based applications.
- Write small network based programs.

Course Outcomes:

At the end of the course the student will be able to

- Learn a new way of approaching the job of programming.
- Employ techniques for developing robust, reusable software.
- Learn the concept of algorithm design and implementation.
- Write Java codes using both console or command-line and dialog box or graphical user interface styles.
- Write, compile, execute, and debug their Java programs.

UNIT-I (12 Lectures)

FUNDAMENTALS OF OBJECT-ORIENTED PROGRAMMING:

Introduction, Object-Oriented Paradigm, Basic concepts of Object-Oriented Programming, Benefits of Object-Oriented Programming, Applications of Object-Oriented Programming

THE HISTORY AND EVOLUTION OF JAVA:

creation of Java, Java's Bytecode, Javas buzzwords, evolution of Java. An overview of Java- Simple Java Program. Date types, variables, automatic type conversion, Arrays, operators,expressions, control statements.

UNIT-II (12 Lectures)

INTRODUCING CLASSES:

Class fundamentals, declaring objects, assigning object reference variables, introducing methods- overloading methods,argument passing,recursion, access control,static keyword, final keyword, using command line arguments, variable length arguments.

Constructors, this keyword, garbage collection, finalize() method.

STRING HANDLING:

String class, String Buffer class, StringBuilder class.

INHERITANCE:

Inheritance basics, using super, creating a multilevel hierarchy, how constructors are called, Method overriding, dynamic method dispatch, using abstract classes, using final with inheritance, the Object class.

UNIT-III (14 Lectures)

PACKAGES AND INTERFACES: Packages, access protection, importing packages, interfaces.

Exploring java.lang package: Wrapper classes, Math class.

Exploring java.util package: Vector, Scanner, Date, Calendar, StringTokenizer, Random.

Exploring java.io package: Byte streams, Character streams, File, RandomAccessFile.

EXCEPTION HANDLING:

Exception-handling fundamentals, Exception types, uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws, finally, Java's built-in exceptions, creating your exception subclasses, using exceptions.

MULTITHREADING:

Java thread model, Main thread, creating a thread, creating multiple threads, using isAlive() and join(), thread priorities, synchronization, Interthread communication, suspending, resuming and stopping threads, using multithreading.

UNIT-IV (12 Lectures)

APPLETS:

Applet basics, architecture, skeleton, simple applet display methods, repainting, status window, HTML applet tag, passing parameters to applets.

AWT:

AWT classes, window fundamentals, working with frame windows, creating a frame window in an applet, creating a windowed program, displaying information within a window, working with graphics, working with color, working with fonts, AWT control fundamentals, Labels, using buttons, applying checkboxes, checkboxgroup, choice controls, using lists, scrollbars, textfield, text area, using layout managers, Menu bars and menus, dialog boxes.

UNIT-V (10 Lectures)

EVENT HANDLING:

Two event handling mechanisms, delegation event model, event classes, sources of events, event listeners interfaces, using the delegation event model, adapter classes, inner classes, handling events by extending AWT components.

SWINGS:

origin of swings, swings built on AWT, two key swing features, MVC architecture, components and containers, swing packages, simple swing application, event handling, painting in swing, JLabel, JTextField, JTabbedPane, JScrollPane,JList,JComboBox,Trees,JTable.

NETWORKING:

Basics,networking classes and interfaces,InetAddress,TCP/IP,URL

TEXT BOOKS:

1. E.Balaguruswamy, *"Programming with Java A Primer"*, 4th Edition, TataMcGraw-Hill, 2009.
2. Herbert Schildt, *"Java The complete reference"*, 8th Edition, McGrawHill, 2011.

REFERENCES:

1 Timothy budd, *"An introduction to object-oriented programming"*, 3rd Edition, Pearson Education, 2009.

2. Y. Daniel Liang, "*Introduction to Java programming*", 9th Edition, Pearson education, 2012.
3. Ivor Horton, *"Beginning Java"*, 7th Edition, Wrox Publications, 2011.
4. Cay.S.Horstmann and Gary Cornell "*Core Java 2, Vol I, Fundamentals*", 9th Edition, Pearson Education, 2012.
5. Cay.S.Horstmann and Gary Cornell, "*Core Java 2, Vol II, Fundamentals*", 9th Edition, Pearson Education, 2012.

DATA COMMUNICATIONS
(Elective-II)

Course Code:13EC1126

L	T	P	C
4	0	0	3

Pre requisites: Digital Communications

Course Educational Objectives:

- ✤ To analyze modulation techniques,various protocols and formats
- ✤ To understand digital multiplexing techniques.

Course Outcomes:

The students get ability to analyze various protocols and understand the importance of data communication networks performance with respect to various network parameters.

UNIT-I (12 Lectures)

MODULATION TECHNIQUES:

Baseband, Baseband pulse shaping, Review of Digital Modulation techniques, Band width efficiency, carrier recovery, clock recovery, Bit recovery, Probability of error, Inter Symbol Interference (ISI), Performance Analysis and Comparison.

UNIT-II (14 Lectures)

ERROR CONTROL CODES:

Error detection and correction codes(ARQ, FEC), Character Codes, Bar Codes, Character Synchronization.

PROTOCOLS & FORMATS:

Data Link Protocol Functions, Character and Bit - Oriented Protocols, Transmission Modes, Data Link Protocols- Synchronous & Asynchronous, Synchronous Data Link Control, High Level Data Link Control.

UNIT-III (10 Lectures)

DIGITAL MULTIPLEXING:

Time Division Multiplexing, CODECS, COMBO CHIPS,Line Encoding, Frame Synchronization, Frequency Division Multiplexing ,Wave length Division Multiplexing, T1 Carrier .

UNIT-IV (14 Lectures)

COMMUNICATION EQUIPMENT:

Serial and Parallel Interfaces, Voice Networks and Circuits, Digital Service Unit and Channel Service Unit, LCU, Voice- Band Data Communication Modems, Asynchronous & Synchronous Voice-Band Modems, Modem Synchronization, Cable Modems, Wireless Local loops.

UNIT-V (10 Lectures)

NETWORKS:

Topologies, Ethernet- Traditional, Fast and GIGA bit Ethernet, FDDI Public Data Networks, ISDN, B-ISDN.

MULTI MEDIA:

Digitization of Video and Audio, Compression, Streaming, Stored and Live Video and Audio, Real Time Interactive Video and Audio, VOD.

TEXT BOOKS:

1. Wayne Tomasi, *"Electronic communication systems, fundamentals through advanced",* Pearson 5th Edition, 2004.
2. William Stallings, *"Data and computer communications"* Pearson Education India, 8th edition 2007.

REFERENCES:

1. N B Chakrabarti, *"An Introduction to The Principles of Digital Communication"*, New Age International, 2007.
2. Behrouz A Forouzan, *"Data Communication & Networking"*, Tata McGraw-Hill Education4thEd., 2007
3. Taub and schilling, *"Principles of Communication Systems"*, 3rd Edition McGraw-Hill, 2008.
4. Simon Haykin, *"Digital Communications"*, Reprint-2009 John Wiley & Sons, 1988.

MICROPROCESSOR AND MICROCONTROLLER LAB

Course Code: 13EC1127

L	T	P	C
0	0	3	2

Pre requisites: Microprocessors and microcontrollers

Course Educational Objectives:

- To make the students understand the basic programming of Microprocessor and microcontroller.
- To interface the microprocessor / microcontroller with various peripherals for various applications

Course Outcomes:

At the end of the course the student will gain the logical development of programs on the 8086 and 8051 processors and understand how to interface 8086/8051 processor for various simple applications.

I. EXPERIMENTS BASED ON 8086 ALP:

1. Programs on Data Transfer Instructions of 8086
2. Programs on Arithmetic and Logical Instructions of 8086
3. Programs on String instructions of 8086
4. Programs on Subroutines of 8086
5. Sorting of an Array
6. DOS/BIOS Programming, reading keyboard (buffered with and without echo) -Display characters

II. MICROCONTROLLER 8051:

7. Reading and Writing data on a parallel port.
8. Timer in different modes.
9. Serial communication implementation.

III. EXPERIMENTS BASED ON INTERFACING

10. DAC Interface-Waveform generation
11. Stepper Motor Control
12. Keyboard Interface
13. ADC Interface
14. LCD Interface

BASIC COMPUTATIONS LAB

Course Code: 13ES11BC

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to enable the student to learn the basics of MATLAB Toolbox and to solve general mathematical problems.

Course Outcomes :

- ✤ Student will able to solve mathematical problems numerically.
- ✤ The student able to solve ODE-IVP, ODE-BVP, Regression using MAT LAB.

LIST OF EXERCISES:

1. Basic commands like representing arrays, matrices, reading elements of a matrix, row and columns of matrices, random numbers.
2. Round, floor ceil, fix commands.
3. Eigen values and Eigen vectors of a matrix.
4. Plotting tools for 2-D and 3-D plots, putting legends, texts, using subplot tool for multiple plots, log-log and semilog plots.
5. Linear Regression and polynomial regression, Interpolation.
6. Non linear regression.
7. Solving non linear algebraic equations.
8. ODE IVP problems using Runge - Kutta method.
9. Using quadrature to evaluate integrals (1-D, 2-D and 3-D cases).
10. Control statements like switch, if else statement etc.
11. Generation and Detection of error detecting and error correcting codes.
12. Radiation patterns for array antenna.

TECHNICAL COMMUNICATION AND SOFT SKILLS LAB

Course Code : 13HE1103

L	T	P	C
0	0	3	2

Introduction

The introduction of the Advanced English Communication skills Lab is considered essential at B.Tech. level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context. The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

- Gathering ideas and information: organizing ideas relevantly and coherently
- Engaging in debates
- Participating in group discussions
- Facing interviews
- Writing project proposals / technical reports
- Making oral presentations
- Writing formal letters and essays
- Transferring information from non-verbal to verbal texts and vice versa
- Taking part in social and professional communication

Objectives

The Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the students' accuracy and fluency in English through a well-developed vocabulary, and enable them to listen to English

spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.

- ✤ To enable students face competitive exams such as, GRE, TOEFL, IELTS, UPSC and other Bank examinations.
- ✤ To enable them communicate their ideas relevantly and coherently in writing.

Course Outcomes:

- ✤ Students will be able to use language accurately, fluently and appropriately.
- ✤ They will be able to show their skills of listening, understanding and interpreting.
- ✤ They will be able to write project reports, reviews and resumes.
- ✤ They will be able to express their ideas relevant to given topics.
- ✤ Students will also exhibit advanced skills of interview, debating and discussion.

LIST OF TASKS :

1. Listening comprehension – Achieving ability to comprehend material delivered at relatively fast speed; comprehending spoken material in Standard Indian English, British English, and American English; intelligent listening in situations such as interview in which one is a candidate.
2. Vocabulary building, Creativity, using Advertisements, Case Studies etc.
3. Personality Development: Decision-Making, Problem Solving, Goal Setting, Time Management & Positive Thinking
4. Cross-Cultural Communication : Role-Play/ Non-Verbal Communication.
5. Meetings- making meeting effective, chairing a meeting, decision-making, seeking opinions , interrupting and handling interruptions, clarifications, closure- Agenda, Minute writing

6. Group Discussion – dynamics of group discussion, Lateral thinking, Brainstorming and Negotiation skills
7. Resume writing – CV – structural differences, structure and presentation, planning, defining the career objective
8. Interview Skills – formal & informal interviews,concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing
9. Writing Skills - Business Communication, Essays for competitive examinations.
10. Technical Report Writing/ Project Proposals – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.- Feasibility, Progress and Project Reports.

REFERENCES:

1. Simon Sweeny, *"English for Business Communication"*, CUP, First South Asian Edition, 2010.
2. M. Ashraf Rizvi, *"Effective Technical Communication"*, Tata McGraw-Hill Publishing Company Ltd. 2005.
3. Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, *"English Language Communication: A Reader cum Lab Manual"*, Anuradha Publications, Chennai, 2006.
4. Dr. Shalini Verma, *"Body Language- Your Success Mantra"*, S. Chand, 2006.
5. Andrea J. Rutherford, *"Basic Communication Skills for Technology"*, 2nd Edition, Pearson Education, 2007.
6. Sunita Mishra & C. Muralikrishna, *"Communication Skills for Engineers"*, Pearson Education, 2007.
7. Jolene Gear & Robert Gear, *"Cambridge Preparation for the TOEFL Test"*, 2010.
8. Meenakshi Raman & Sangeeta Sharma, *"Technical Communication"*, Oxford University Press, 2011.

9. Nick Ceremilla & Elizabeth Lee- Cambridge *"English for the Media"* CUP, 2010.

10. R.C. Sharma, Krishna Mohan, *"Business Correspondence and Report writing"*, 4th Edition, Tata Mcgraw-Hill Publishing Co. Ltd., 2010.

11. DELTA's key to the Next Generation TOEFL Test: *"Advanced Skill Practice,"* New Age International (P) Ltd., Publishers, New Delhi. 2010.

12. Books on TOEFL/GRE/GMAT/CAT by Barron's/ CUP, 2011.

13. IELTS series with CDs by Cambridge University Press, 2010.

NOTES

SYLLABI FOR
VII SEMESTER

TV & SATELLITE COMMUNICATIONS

Course Code:13EC1128

L	T	P	C
4	1	0	3

Pre requisites:

Analog Signal Characteristics, Communication Principles, Digital Modulation Techniques, Orbital Mechanics and Geography.

Course Educational Objectives:

- Study of TV Principles and Broadcasting Requirements
- Overview of satellite systems in relation to other terrestrial systems.
- Study of satellite orbits and launching.
- Study of earth segment and space segment components
- Study of DTH and compression standards

Course Outcomes:

- Understand the existing Satellite Communication Applications
- Undertake Projects based on GPS and TV Broadcasting.

UNIT-I (12 Lectures)

PRINCIPLES OF TV & BROADCASTING:

Gross Structure, Image Continuity, Scanning, Flicker, Interlaced Scanning, Number Of Scanning Lines, Fine Structure, Tonal Gradation. Video Signal Dimensions, Horizontal Synchronization Details, Vertical Synchronization Details, Scanning Sequence Details, Functions Of Vertical Pulse Train, Channel Bandwidth, Vestigial Side Band Transmission, Bandwidth Allocations For Colour Transmission.

UNIT-II (10 Lectures)

SATELLITE ORBITS:

Kepler's Laws, Newton's Law, Orbital Parameters, Orbital Perturbations, Station Keeping, Geo Stationary And Non Geo-Stationary Orbits, Look

Angle Determination, Limits Of Visibility, Eclipse, Sub Satellite Point, Sun Transit Outage, Launching Procedures, Launch Vehicles And Propulsion.

UNIT-III (14 Lectures)

SPACE SEGMENT AND SATELLITE LINK DESIGN:

Spacecraft Structure, Primary Power, Attitude and Orbit Control, ThermalControl and Propulsion, Communication Payload and Supporting Subsystems, Telemetry,Tracking andCommand, Satellite Uplink and Downlink Analysis and Design, Link Budget,E_b/N_oCalculation, Performance Impairments, System Noise, Intermodulation And Interference, Propagation Characteristics And Frequency Considerations-System Reliability And Design Lifetime.

UNIT-IV (12 Lectures)

SATELLITE ACCESS:

Modulation and Multiplexing: Voice, Data, Video, Analog – Digital Transmission Systems, Digital Video Broadcast, Multiple Access: FDMA, TDMA, CDMA, Assignment Methods, Spread Spectrum Communication, Compression – Encryption.

EARTH SEGMENT:

Earth Station Technology— Terrestrial Interface, Transmitter and Receiver, Antenna Systems TVRO, MATV, CATV, Test Equipment Measurements on G/T, C/No, EIRP, Antenna Gain.

UNIT-V (12 Lectures)

SATELLITE APPLICATIONS:

INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSA, LEO, MEO, Satellite Navigational System. Direct Broadcast satellites (DBS) - Direct to home Broadcast (DTH), Digital audio broadcast (DAB)- World space services, Business TV(BTV), GRAMSAT, Specialized services – E –mail, Video conferencing, Internet.

TEXT BOOKS:

1. R R Gulati, *"Monochrome and Colour Television"*, New Age International, 2007
2. Dennis Roddy, *'Satellite Communication'*, McGraw Hill International, 4th Edition, 2006.

REFERENCES:

1. Bruce R. Elbert, *"The Satellite Communication Applications"* Hand Book, Artech House, London, 1997.
2. Tri T. Ha, *"Digital Satellite Communication"*, IInd Edition, 1990.
3. C. Dharma Raj, *"Satellite Communication"*, I.K International Publishing House Pvt. Ltd.
4. Brian Ackroyd, *'World Satellite Communication and earth station Design'*, BSP professional Books, 1990.
5. M. Richharia, *"Satellite Communication Systems-Design Principles"*, Macmillan 2003
6. Wilbur L. Pritchard, Hendri G. Suyderhoud, Robert A. Nelson, *"Satellite Communication Systems Engineering"*, Prentice Hall/Pearson, 2007.

RADAR ENGINEERING

Course Code:13EC1129 **L T P C**
4 1 0 3

Pre requisites: Electromagnetic waves and transmission lines, Analog communication,

Course Educational Objectives:

To familiarize with basic principles of Radar Engineering that is essential for defence and core industry.

Course Outcomes:

Students can understand

- Basic principles of radars.
- Moving target detection
- Different kinds of target tracking techniques
- Radar receiver system.

UNIT-I (12 Lectures)

INTRODUCTION:

Nature of Radar, Maximum Unambiguous Range, Radar Waveforms, Simple form of Radar Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications

RADAR EQUATION:

Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise and SNR, Integration of Radar Pulses, Radar Cross Section of Targets (simple targets - sphere, cone-sphere), Transmitter Power, PRF and Range Ambiguities, System Losses.

UNIT-II (14 Lectures)

CW AND FREQUENCY MODULATED RADAR:

Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar, FM-CW Radar, Range and Doppler Measurement, Block Diagram and Characteristics (Approaching/ Receding Targets), FM-CW altimeter, Measurement Errors, Multiple Frequency CW Radar.

MTI AND PULSE DOPPLER RADAR:

Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers – Filter Characteristics, Blind Speeds, Double Cancellation, Staggered PRFs. Range Gated Doppler Filters. MTI Radar Parameters, Limitations to MTI Performance, Non-coherent MTI, MTI versus Pulse Doppler Radar.

UNIT-III (10 Lectures)

TRACKING RADAR:

Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar – Amplitude Comparison Monopulse (one&two coordinates), Phase Comparison Monopulse, Target Reflection Characteristics and Angular Accuracy, Tracking in Range, Acquisition and Scanning Patterns. Comparison of Trackers.

UNIT-IV (12 Lectures)

DETECTION OF RADAR SIGNALS IN NOISE:

Introduction, Matched Filter Receiver – Response Characteristics and Derivation, Correlation Function and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise.Noise Figure and Noise Temperature.

UNIT-V (12 Lectures)

RADAR RECEIVERS:

Displays – types, Duplexers – Branch type and Balanced type, Circulators as Duplexers.

PHASED ARRAY ANTENNAS

Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Series versus Parallel Feeds, Applications, Advantages and Limitations.

RADAR STUDIES OF ATMOSPHERE:

MST radar, meteor wind radar, other radar studies of the atmosphere

TEXT BOOKS:

1. Merrill I. Skolnik, *"Introduction to Radar Systems"*, 3rd Ed., McGraw-Hill, 2003.
2. Simion. Kingsley, *"Understanding Radar Systems"*, Standard Publishing, 1999.

REFERENCES:

1. Byron. Edde, *"Radar Principles, Technology, Applications"*, Pearson education, 2007.
2. G.Sasi Bhushana Rao, *"Microwave and Radar Engineering"*, Pearson education, 2013.

OPTICAL COMMUNICATIONS

Course Code: 13EC1130

L	T	P	C
4	0	0	3

Pre requisites: Basics of Digital and Analog communications.

Course Educational Objectives:

- To teach basic concepts of Fiber Optic Communications
- To teach basics of optical connectors and splicing
- To teach basics of simple analog and digital link design

Course Outcomes:

- Able to understand characteristics of optical fibers
- Able to understand Analog and digital design for optical communication links
- Able to understand the basics of optical measurements

UNIT-I **(12 Lectures)**

OVERVIEW OF FIBER OPTIC COMMUNICATIONS AND FIBER MATERIALS:

Historical Development, The General System, Advantages of Fiber Optic communications, Total Internal Reflection, Acceptance Angle, Numerical Aperture, Skew rays. Modes, V number, Step index, Graded index Fibers. Cutoff Wave length, Mode Field Diameter, Effective Refractive Index. Glass, Halide, Plastic Optical fibers, Characteristics of Optical Cable.

UNIT-II **(12 Lectures)**

TRANSMISSION CHARACTERISTICS OF OPTICAL FIBERS AND OPTICAL FIBER CONNECTION:

Attenuation, Material Absorption Losses, Linear Scattering losses-Rayleigh, Mie, Non Linear Scattering losses- SBS, SRS, Fiber Bend losses, Group delay, Dispersion- Intermodal dispersion, Material dispersion, Waveguide dispersion, Polarization mode dispersion. Fiber

Splices – Fusion Splices, Mechanical Splices, Optical Fiber connectors – connector types, Single Mode Fiber Connectors, Connector Return loss. Lensing schemes for coupling improvement

UNIT-III **(14 Lectures)**

OPTICAL SOURCES AND DETECTORS:

LED structures- Surface Emitter LED, Edge Emitter LED, Quantum Efficiency, LED characteristics- output power, Modulation. Lasers – The Einstein relations, Population Inversion, Threshold condition for Laser oscillation, Laser diode modes, External Quantum Efficiency, Resonant frequencies, Single mode Lasers, modulation of Lasers, Temperature Effects, Reliability considerations of LED and LD

Physical principles of Photodiodes, Detector response tme, Structure of InGaAs APD, Temperature effect on Avalanche Gain, Comparison of Photodetectors

UNIT-IV **(12 Lectures)**

OPTICAL RECEIVER OPERATION AND SYSTEM DESIGN:

Fundamental receiver operation – Digital signal transmission, Quantum limit, Error sources, Eye diagrams, Point to Point Links –System considerations, Link Power Budget, Rise Time Budget

UNIT-V **(10 Lectures)**

MEASUREMENTS AND SDH/SONET:

Measurements of Attenuation and Dispersion, Basics of WDM, DWDM, PDH, SDH.

TEXT BOOKS:

1. John M Senior, *“Optical Fiber Communications”*, PHI, 2nd Edition, 2002
2. Gerd Keiser, *“Optical Fiber Communications”*, Mc Graw-Hill International edition, 4th Edition, 2000

REFERENCES:

1. Joseph C.Palias, *“Fiber Optical Communications”* 5th Edition, Pearson Education, 2004

DIGITAL IMAGE PROCESSING

Course Code:13EC1131

L	T	P	C
4	0	0	3

Pre requisites: Signals and Systems, Digital Signal Processing.

Course Educational Objectives:

- To understand theoretical foundations of digital image processing;
- To appreciate modern applications; and,
- To study various techniques of image enhancement, restoration, compression and segmentation.

Course Outcomes:

At the end of this course, the student should be able to know

- The fundamentals of image processing.
- Various transforms used in image processing.
- About the various techniques of image enhancement, restoration, compression and segmentation.

UNIT-I **(12 Lectures)**

INTRODUCTION:

Digital image fundamentals, Concept of gray levels, Applications of image processing, Image Sensing and Acquisition, Image Sampling and Quantization, Gray level to binary image conversion, Relationships between pixels.

UNIT-II **(12 Lectures)**

IMAGE TRANSFORMS:

2-D DFT, Properties, Walsh transform, Hadamard Transform, Discrete Cosine Transform, Haar transform, Slant transform, Hotelling transform, Discrete wavelet transform.

UNIT-III **(15 Lectures)**

IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN :

Point processing, Histogram processing, Spatial filtering.

IMAGE ENHANCEMENT IN THE FREQUENCY DOMAIN:

Image smoothing, Image sharpening, Homomorphic Filtering.

UNIT-IV (12 Lectures)

COLOR IMAGE PROCESSING:

Color models, Pseudo color image processing, full color image processing.

IMAGE RESTORATION:

Degradation model, Algebraic approach to restoration, Inverse filtering, Least mean square filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT-V (15 Lectures)

IMAGE COMPRESSION:

Redundancies and their removal methods, Fidelity criteria, Image compression models, Source encoder and decoder, Error free compression, Lossy compression.

IMAGE SEGMENTATION:

Detection of discontinuities, Edge linking and boundary detection, Thresholding, Region oriented segmentation.

TEXT BOOKS:

1. R.C. Gonzalez & R.E. Woods, *"Digital Image processing"* Addison Wesley/ Pearson Prentice Hall, 2nd Education, 2007.
2. Anil K. Jain, *"Fundamentals of Digital Image Processing"*, Pearson Education, 2003.

REFERENCES:

1. Rafael C. Gonzalez, Richard E Woods and Steven L. Eddins, *"Digital Image processing using MAT LAB"* , Pearson Edu., 2004.
2. William K. Pratt, *"Digital Image Processing",* John Wilely, 3rd Edition, 2004.
3. Jagadeesh Bandi, *"Optimization between Image Quality and Compression Ratio"*, LAP LAMBERT Academic Publishing, Germany, 2012.

COMPUTER NETWORKS

(Common to CSE, IT & ECE)

Course Code :13CT1124

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student learn the design of computer networks.

- ✤ Basics of Computer Networks and different Transmission Media.
- ✤ Giving idea about Design issues in framing.
- ✤ Giving idea about Design issues in Routing Algorithms.
- ✤ Giving idea about Design issues in transport protocols.
- ✤ Giving idea about Design issues in Domain Name Systems and SNMP.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Understand the Network Models and Physical Layer.
- ✤ Understand the data link layer and medium access sub layer.
- ✤ Understand the Network Layer and Congestion Control.
- ✤ Understand the Transport Layer.
- ✤ Understand the concepts and their implementation in Application Layer.

UNIT-I (12 Lectures)

NETWORK MODELS:

Layered Tasks, WAN, LAN, MAN, OSI model, TCP/ IP protocol stack, addressing (Text book 2), Novell Networks Arpanet, Internet.(Text book 1).

PHYSICAL LAYER:

Transmission media: copper, twisted pair, wireless; switching and encoding asynchronous communications; Narrow band ISDN, broad band ISDN and ATM. (Text book 1)

UNIT-II (12 Lectures)

DATA LINK LAYER:

Design issues, framing, error detection and correction, CRC, Elementary data link protocols, Sliding Window Protocol, Slip, HDLC, Internet, and ATM.

MEDIUM ACCESS SUB LAYER:

Random access, Controlled access, Channelization, IEEE 802.X Standards, Ethernet, wireless LANS, Bridges. (Text book 2)

UNIT-III (12 Lectures)

NETWORK LAYER:

Network Layer Design Issues, Routing Algorithms, Internetworking, Network Layer in Internet.(Text book-1)

CONGESTION CONTROL:

General Principles, policies, traffic shaping, flow specifications,

Congestion control in virtual subnets, choke packets, loads shedding, jitter control.(Text book-2)

UNIT-IV (13 Lectures)

TRANSPORT LAYER: Transport Services, Elements of Transport Protocols, Internet Transport Protocols (TCP & UDP); ATM AAL Layer Protocol.(Text book-1)

UNIT-V (11 Lectures)

APPLICATION LAYER:

Network Security, Domain name system, SNMP, Electronic Mail: the World WEB, Multi Media.

TEXT BOOKS:

1. Andrew S Tanenbaum , *"Computer Networks"*, 6^{th} Edition. Pearson Education/PI, 2012.
2. Behrouz A. Forouzan , *"Data Communications and Networking"*, 4^{th} Edition TMH, 2012.

REFERENCES:

1. S.Keshav, *"An Engineering Approach to Computer Networks"*, 2nd Edition, Pearson Education, 2001.
2. William, A. Shay , *"Understanding communications and Networks"*, 3rd Edition, Thomson Publication, 2006

WEB REFERENCES:

1. http://nptel.iitm.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Computer%20networks/New_index1.html
2. http://nptel.iitm.ac.in/courses/IIT-MADRAS/Computer_Networks/index.php

DIGITAL DESIGN THROUGH VERILOG
(Elective-III)

Course Code:13EC1132	L	T	P	C
	4	0	0	3

Pre requisites: Switching Theory and Logic Design.

Course Educational Objectives:

To learn the concepts of modeling a digital system using Verilog hardware description Language.

Course Outcomes:

- Students can model digital circuits using Verilog.
- Student can represent Function of any digital system using hardware description language

UNIT-I **(10 Lectures)**

INTRODUCTION TO VERILOG:

Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Functional Verification, System Tasks, Programming Language Interface (PLI), Module, Simulation and Synthesis Tools, Test Benches.

LANGUAGE CONSTRUCTS AND CONVENTIONS:

Introduction, Keywords, Identifiers, White Space Characters, Comments, Numbers, Strings, Logic Values, Strengths, Data Types, Scalars and Vectors, Parameters, Memory, Operators, System Tasks.

UNIT-II **(14 Lectures)**

GATE LEVEL MODELING:

Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Tri-State Gates, Array of Instances of Primitives, Additional Examples, Design of Flipflops with Gate Primitives, Delays, Strengths and Contention Resolution, Net Types, Design of Basic Circuits.

DATA FLOW LEVEL MODELING:

Introduction, Continuous Assignment Structures, Delays and Continuous Assignments, Assignment to Vectors, Operators.

UNIT-III (14 Lectures)

BEHAVIORAL MODELING:

Introduction, Operations and Assignments, Functional Bifurcation, *Initial* Construct, *Always* Construct, Examples, Assignments with Delays, *Wait* construct, Multiple Always Blocks, Designs at Behavioral Level, Blocking and Non-blocking Assignments, The case statement, Simulation Flow. *if* and *if*-else constructs, assign-deassign construct, repeat construct, for loop, the disable construct, whileloop, forever loop, parallel blocks, force-release construct, Event.

SWITCH LEVEL MODELING:

Introduction, Basic Transistor Switches, CMOS Switch, Bi-directional Gates, Time Delays with Switch Primitives, Instantiations with Strengths and Delays, Strength Contention with Tri-reg Nets.

UNIT-IV (12 Lectures)

FUNCTIONS, TASKS, AND U SER-DEFINED PRIMITIVES:

Introduction, Function, Tasks, User- Defined Primitives (UDP), FSM Design (Moore and Mealy Machines).

SYSTEM TASKS, FUNCTIONS AND COMPILER DIRECTIVES:

Introduction, Parameters, Path Delays, Module Parameters, System Tasks and Functions, File-Based Tasks and Functions, Compiler Directives, Hierarchical Access, General Observations.

VERILOG MODELS FOR MEMORIES AND BUSES:

Static RAM Memory, A simplified 486 Bus Model, UART Design.

UNIT-V (10 Lectures)

DESIGNING WITH FIELD PROGRAMMABLE GATE ARRAYS AND COMPLEX PROGRAMMABLE LOGIC DEVICES:

Xilinx 3000 Series FPGAs, Designing with FPGAs, Using a One-Hot State Assignment, Altera Complex Programmable Logic Devices (CPLDs), Altera FLEX 10K Series CPLDs.

TEXT BOOKS:

1. T.R. Padmanabhan and B. Bala Tripura Sundari, "*Design through Verilog HDL",* WSE, IEEE Press 2008.
2. J. Bhaskar, *"A Verilog Primer"*, BSP, 2nd edition 2003.

REFERENCES:

1. Samir Palnitkar, "Verilog HDL", Pearson Education, 2nd Edition,2003.
2. Thomas and Moorby, *"The Verilog Hardware Description Language"*, kluwer academic publishers, 5th edition, 2002.
3. Stephen Brown and Zvonko Vranesic, *"Fundamentals of Logic Design with Verilog"*, TMH publications, 2007.
4. Charles.H.Roth,Jr., Lizy Kurian John *"Digital System Design using VHDL"* , Thomson, 2nd Edition, 2008

EMBEDDED SYSTEMS
(Elective-III)

Course Code: 13EC1133

L	T	P	C
4	0	0	3

Pre requisites: Digital logic design, computer organization.

Course Educational Objectives:

- To familiarize student with the various technologies used in embedded system design
- To learn about advanced models used in describing embedded systems,
- To understand the need for communication interfaces,

4. To gain knowledge of hardware – software co-design.

Course Outcomes:

Student will be able to

- differentiate between embedded system and desktop system and the design challenges posed to the designer, optimize design metrics which compete with each other
- identify the best technology suitable for an application
- improve productivity through an unified view of software and hardware design

UNIT-I **(10 Lectures)**

INTRODUCTION:

Embedded systems overview, design challenge, processor technology, IC technology, Design Technology, Trade-offs. Single purpose processors RT-level combinational logic, sequential logic (RTlevel), custom single purpose processor design (RT-level), optimizing custom single purpose processors.

UNIT-II (12 Lectures)

GENERAL PURPOSE PROCESSORS:

Basic architecture, operation, Pipelining, Programmer's view, development environment, Application Specific Instruction-Set Processors (ASIPs) – Micro Controllers and Digital Signal Processors.

UNIT-III (12 Lectures)

STATE MACHINE AND CONCURRENT PROCESS MODELS:

Introduction, Models vs. Languages, finite state machines with data path model (fsmd), using state machines, program state machine model (psm), concurrent process model, concurrent processes, communication among processes, synchronization among processes, implementation, data flow model, real-time systems.

UNIT-IV (12 Lectures)

COMMUNICATION INTERFACE:

Need for communication interfaces, RS232 / UART, RS422 / RS485, USB,Infrared, IEEE 1394 Firewire, Ethernet, IEEE 802.11, Blue tooth.

UNIT-V (14 Lectures)

DESIGN TECHNOLOGY:

Introduction, Automation, Synthesis, Parallel evolution of compilation and synthesis, Logic Synthesis, RT synthesis, Behavioral Synthesis, Systems Synthesis and Hardware/ Software Co-Design, Verification, Hardware/ Software co-simulation, Reuse of intellectual property cores.

Text BOOKS:

1. Frank Vahid, Tony D. Givargis, *"Embedded System Design – A Unified Hardware/Software Introduction"* John Wiley, 2002.
2. KVKK Prasad, *"Embedded / Real Time Systems"* Dreamtech Press, 2005.

REFERENCES:

1. Jonathan W. Valvano, *"Embedded Microcomputer Systems"*, 3rd. edition, Cengage Learning, 2011.

2. Lyla B.Das, *"Embedded Systems an Integrated Approach"*, First Impression, Pearson, 2013.
3. David E. Simon, *"An Embedded Software Primer"* Pearson Ed., 2005.
4. Raj Kamal, *"Introduction to Embedded Systems"* TMH, 2002.
5. Sri Ram V Iyer, Pankaj Gupta, "Embedded Real Time Systems Programming" TMH, 2004.

ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY

(Elective-III)

Course Code: 13EC1134

L	T	P	C
4	0	0	3

Pre requisites: EM Waves & Transmission Lines , Wave Propagation, Antennas.

Course Educational Objectives:

- ✤ To familiarize with the fundamentals that are essential for electronics industry in the field of EMI / EMC
- ✤ To understand EMI sources and its measurements.
- ✤ To understand the various techniques for electromagnetic compatibility.

Course Outcomes:

At the end of the course the student able to learn the concepts of

- ✤ Real-world EMC design constraints and make appropriate trade-offs to achieve the most cost-effective design that meets all requirements.
- ✤ Designing electronic systems that function without errors or problems related to electromagnetic compatibility
- ✤ Diagnose and solve basic electromagnetic compatibility problems.

UNIT-I (12 Lectures)

INTRODUCTION:

History and concept of EMI, Definitions of EMI/EMC, Electromagnetic environment, Practical experiences and concerns, frequency spectrum conservation, mechanisms of EMI generation, EMI testing, Methods of elimination of EMI and Biological effects of EMI

UNIT-II (12 Lectures)

SOURCES OF EMI/EMC:

Sources of Electromagnetic noise, typical noise paths, modes of noise coupling, designing for EM compatibility, lightening discharge, electro static discharge (ESD), electromagnetic pulse (EMP). Electromagnetic emissions, noise form relays and switches, non-linearity in circuits, passive inter modulation, transients in power supply lines, EMI from power electronic equipment, EMI as combination of radiation and conduction. Open area test sites: OATS measurements, measurement precautions.

UNIT-III (12 Lectures)

RADIATED/CONDUCTED INTERFERENCE MEASUREMENTS:

Anechoic chamber, TEM cell, reverberating chamber, GTEM cell, comparison of test facilities. Characterization of conduction currents / voltages, conducted EM noise and power line, conducted EMI from equipment, immunity to conducted EMI, characteristics of EMI filters and power line filter design.

UNIT-IV (14 Lectures)

GROUNDING AND CABLING:

Safety and signal grounds, low and high frequency grounding methods, grounding of amplifiers and cable shields, isolation, neutralizing transformers, shield grounding at high frequencies, digital grounding, types of cables, mechanism of EMI emission / coupling in cables. effectiveness of shielding, near and far fields / impedances, methods of analysis, total loss due to absorption and reflection effects, composite absorption and reflection losses for electric fields / magnetic fields, magnetic materials as a shield, shield discontinuities, slots and holes, seams and joints, conductive gaskets Electrical Bonding, Shape and Material for Bond straps, General Characteristics of goodbonds.

UNIT-V (10 Lectures)

COMPONENTS FOR EMI/EMC STANDARDS:

Choice of capacitors, inductors, transformers and resistors, EMC design components National / International EMC standards, military and civilian standards.

TEXT BOOKS:

1. Dr. V.P. Kodali, *"Engineering Electromagnetic Compatibility"*, IEEE Publication, S. Chand & Co. Ltd., New Delhi, 2000.
2. *"Electromagnetic Interference and Compatibility"*, IMPACT series, IIT-Delhi, Modules1-9.

REFERENCES:

1. C.R. Pal, *"Introduction to Electromagnetic Compatibility"*, Ny, John Wiley, 1992.

MICROWAVE AND OPTICAL COMMUNICATION LAB

Course Code: 13EC1135

L	T	P	C
0	0	3	2

Pre requisites: Microwave Engineering and Optical Communications

Course Educational Objectives:

The main objective of this lab is to gain the practical hands on experience by exposing the students to various microwave components and optical fibres.

Course Outcomes:

The students will have an understanding of the concepts involved in transmission and reception of the microwave signals, characteristics of components.

NOTE:Minimum Ten Experiments to be conducted:

LIST OF EXPERIMENTS:

1. To verify Reflex Klystron Characteristics and to determine the frequency and tuning range of reflex klystron.
2. To verify Gunn Diode Characteristics.
3. To analyze the fixed and variable attenuator and plot the micrometer reading Vs attenuation.
4. To determine the coupling factors and directivity of directional coupler.
5. To measure the power distribution of various wave guide Tee i.e. E plane, H plane.
6. To measure the power distribution in Magic Tee.
7. VSWR Measurement and load impedance calculations using smith chart.

8. Scattering parameters of Circulator.
9. Characterization of LED.
10. Characterization of Laser Diode.
11. Intensity modulation of Laser output through an optical fiber.
12. Measurement of Data rate for Digital Optical link.
13. Measurement of Numerical Aperture of fiber cable.
14. Measurement of losses for Analog Optical link.

DIGITAL SIGNAL PROCESSING LAB

Course Code:13EC1136

L	T	P	C
0	0	3	2

Pre requisites:

Digital Signal Processing Theory, C and MATLAB Programming

Course Educational Objectives:

✤ To perform DSP algorithms like convolution, correlation, DFT, FFT in software using a computer language such as C with TMS320C6713 floating point Processor.

✤ To design and simulate various discrete time signals and digital filter types like IIR-Butterworth, Chebyshev and FIR using window techniques.

Course Outcomes:

✤ To develop DSP algorithms like convolution, correlation, DFT, FFT in software using a computer language such as C with TMS320C6713 floating point Processor.

✤ To Analyze and Observe Magnitude and phase characteristics (Frequency response Characteristics) of digital filter types like IIR-Butterworth, Chebyshev and FIR window-design.

*Note: Any **TEN** of the following experiments are to be conducted.*

LIST OF EXPERIMENTS :

1. To study the features and architecture of DSP chips – TMS 320C6713 DSK.
2. To verify linear convolution between two sequences.
3. To verify the circular convolution between two sequences.
4. To verify correlation and autocorrelation between two sequences.
5. To compute the DFT of a sequence.

6. Implementation of 4-point and 8-point FFT.
7. Implementation of 4-point and 8-point IFFT.
8. To generate various discrete time signals.
9. To generate sum of sinusoidal signals and to find the frequency response.
10. To find the FFT of given 1-D signal and plot.
11. To design IIR Butterworth and Chebyshev filters (LP/HP).
12. To design FIR filter (LP/HP) using windowing technique.
    a) Using rectangular window
    b) Using triangular window
    c) Using hamming window
13. Filter Design and Analysis using FDA Tool.
14. To compute power density spectrum of a sequence.

SYLLABI FOR VIII SEMESTER

WIRELESS COMMUNICATIONS

Course Code:13EC1137

L	T	P	C
4	0	0	3

Pre requisites:

Principles of Analog and Digital Communications

Course Educational Objectives:

- To introduce the concepts of wireless/ mobile communication using cellular environment.
- To introduce various modulation techniques, propagation methods, coding and multi access techniques used in the mobile communication.
- Various wireless network systems and standards are to be introduced.

Course Outcomes:

- This course results in understanding design concepts for a cellular mobile networks
- Propagation analysis that leads to research concepts of modeling Radio environment
- Application orientation towards coding for Speech and Data
- It deals with advanced transceiver schemes and second generation and third generation wireless networks.

UNIT-I (12 Lectures)

History of wireless communication, and future trends,Wireless Generations and Standards, Mobile Radio signal propagation, path loss and channel models, Large Scale Path Loss, Small Scale Path Loss - Rayleigh and Rician Fading

UNIT-II (10 Lectures)

Cellular Concept and Cellular System Fundamentals,Frequency Reuse, Channel Assignment Strategies,Handoff Strategies, Interference and

System Capacity, Trunking andGrade of Service, Improving Coverage & Capacity in Cellular Systems.

UNIT-III **(12 Lectures)**

Analog Modulation Schemes for Wireless Communication. Diversity, Coding and Interleaving, Source and Channel Coding, Speech Coding for Wireless Communications, Adaptive Equalization, Multipath Propagation, Doppler frequency shift.

UNIT-IV **(14 Lectures)**

Multiplexing and Multiple Access techniques, TDMA,FDMA, ALOHA - Packet Radio, Spread Spectrum-CDMA, Frequency Hopped Spread Spectrum, Inter-Symbol Interference (ISI), ISI mitigation; Equalization, Random Access Protocols

UNIT-V **(12 Lectures)**

Wireless Networking,Third generation systems and advanced topics, Wideband-CDMA, OFDM Principles, Comparision of OFDM and CDMA, WLAN and Bluetooth.

TEXT BOOKS:

1. Theodore S.Rappaport, *"Wireless Communications"* Pearson education, 2nd Edition, 2002.
2. G. Sasibhushana Rao, *"Mobile Cellular Communications"*, Pearson Education, 1st Edition, 2012.

REFERENCES:

1. Tri T. Ha, *"Digital Satellite Communication"*, McGraw-Hill, 2nd Edition, 1990.
2. Sklar, *"Digital Communications: Fundamentals & Applications"*, Pearson Education India, 2nd Edition, 2009

DSP PROCESSORS & ARCHITECTURE
(Elective-IV)

Course Code:13EC1138

L	T	P	C
4	0	0	3

Pre requisites:

Knowledge of signals and systems, convolution methods, digital signal processing concepts must be known.

Course Educational Objectives:

✤ To impart the knowledge of basic DSP filters and number systems to be used, different types of A/D,D/A conversion errors.

✤ To gain concepts of digital signal processing techniques, implementation of DSP & FFT algorithms and also to learn about interfacing of serial & parallel communication devices to the processor.

Course Outcomes :

✤ Comprehends the knowledge & concepts of digital signal processing techniques, basic building blocks, implementation of DSP & FFT algorithms.

✤ Programming the DSP TMS320C54XX PROCESSOR and decimation interpolation filters, adaptive filters.

✤ Learn about interfacing of serial & parallel communication devices to the processor.

UNIT-I (13 lectures)

INTRODUCTION :

Introduction, Digital signal-processing system, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation,Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors.

UNIT-II (12 lectures)

ARCHITECTURES FOR PROGRAMMABLE DSP DEVICES:

Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Hardware looping, Interrupts, Stacks, Relative Branch support, Pipelining and Performance, Pipeline Depth, Interlocking, Branching effects, Interrupt effects, Pipeline Programming models.

UNIT-III (11 lectures)

PROGRAMMABLE DIGITAL SIGNAL PROCESSORS :

Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

UNIT-IV (11 lectures)

IMPLEMENTATIONS OF BASIC DSP ALGORITHMS :

The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters, PID Controller, Adaptive Filters, An FFT Algorithm for DFT Computation, A Butterfly Computation, Overflow and scaling, Bit-Reversed index generation, An 8-Point FFT implementation on the TMS320C54XX, Computation of the signal spectrum.

UNIT-V (13 lectures)

INTERFACING MEMORY AND I/O PERIPHERALS TO PROGRAMMABLE DSP DEVICES:

Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

A Multichannel buffered serial port (McBSP), McBSP Programming, a CODEC interface circuit, CODEC programming, A CODEC-DSP interface example.

TEXT BOOKS:

1. Avtar Singh and S. Srinivasan, *"Digital Signal Processing"* Thomson Publications, 2004.
2. Lapsley et al., *"DSP Processor Fundamentals, Architectures & Features"*, S. Chand & Co, 2000.

REFERENCES:

1. B. Venkata Ramani and M. Bhaskar, *"Digital Signal Processors, Architecture, Programming and Applications"*, TMH, 2004.
2. Jonatham Stein, *"Digital Signal Processing"*, John Wiley, 2000

REAL TIME OPERATING SYSTEMS

(Elective-IV)

Course Code:13EC1139

L	T	P	C
4	0	0	3

Course Educational Objectives:

The objective of the course is to introduce the principles shared by many real-time operating systems, and their use in the development of embedded multitasking application software.

Course Outcomes:

After completing the course students will understand the fundamental concepts of real-time operating systems.

UNIT-I (10 Lectures)

INTRODUCTION:

Introduction to Operating System: Computer Hardware Organization, BIOS and Boot Process, Multi-threading concepts, Processes, Threads, Scheduling

UNIT-II (13 Lectures)

BASICS OF REAL-TIME CONCEPTS:

Terminology: RTOS concepts and definitions, real-time design issues, examples, Hardware Considerations: logic states, CPU, memory, I/O, Architectures, RTOS building blocks, Real-Time Kernel

UNIT-III (13 Lectures)

PROCESS MANAGEMENT:

Concepts, scheduling, IPC, RPC, CPU Scheduling, scheduling criteria, scheduling algorithms Threads: Multi-threading models, threading issues, thread libraries, synchronization Mutex: creating, deleting, prioritizing mutex, mutex internals

UNIT-IV (12 Lectures)

INTER-PROCESS COMMUNICATION:

Messages, Buffers, mailboxes, queues, semaphores, deadlock, priority inversion,

PIPES MEMORY MANAGEMENT:-

Process stack management, run-time buffer size, swapping, overlays, block/page management, replacement algorithms, real-time garbage collection

UNIT-V (12 Lectures)

CASE STUDIES:

Case study Linux POSIX system, RTLinux / RTAI, Windows system, Vxworks, uItron Kernel Design Issues: structure, process states, data structures, inter-task communication mechanism, Linux Scheduling

TEXT BOOKS:

1. J. J Labrosse, *"MicroC/OS-II: The Real –Time Kernel"*, Newnes, 2002.
2. Jane W. S. Liu, *"Real-time systems"*, Prentice Hall, 2000.

REFERENCES:

1. W. Richard Stevens, *"Advanced Programming in the UNIX® Environment"*, 2nd Edition, Pearson Education India, 2011.
2. Philips A. Laplante, *"Real-Time System Design and Analysis"*, 3rd Edition, John Wley& Sons, 2004
3. Doug Abbott, *"Linux for Embedded and Real-Time Applications"*, Newnes, 2nd Edition, 2011.

POWER ELECTRONICS

(Common to EEE & ECE)

Course Code:13EE1113

L	T	P	C
4	0	0	3

Pre requisites:

Basic Network Analysis, Electronic Devices and Electronic Circuits

Course Educational Objectives:

To familiarize the students with different power semiconductor devices, converter circuits that find wide application in industry.

Course Outcomes:

After completion of this course the students get familiarized with different power semiconductor devices, converter circuits, their analysis and applications.

UNIT-I **(12 Lectures)**

POWER SEMICONDUCTOR DEVICES:

Power BJTs, Power MOSFETs, Power IGBTs, GTOs and their characteristics. Basic principle of operation of SCR, Static characteristics, Two transistor model of SCR, SCR Turn on and SCR turn off characteristics, Comparison of various Power Electronic (PE) - devices.

TRIGGERING CIRCUITS:

Series and parallel connections of Thyristors, di/dt protection, dv/dt protection of SCRs, MOSFET gate drive circuit, BJT base drive circuit, Isolation of gate and base drive, Thyristor firing circuits.

UNIT-II **(12 Lectures)**

1- PHASE, PHASE- ANGLE CONTROLLED THYRISTOR CONVERTERS:

Principle of phase angle control: Single phase full converter with R-L load, Single phase dual converter, Single phase semi-controlled converter with R-L load.

3- PHASE, PHASE- ANGLE CONTROLLED THYRISTOR CONVERTERS:

Three phase half wave converter with R-L load, Three phase Full wave converter with R-L load, Three phase dual converter, Three phase semi converter with R-L load.

UNIT-III (12 Lectures)

AC VOLTAGE CONTROLLERS & CYCLO CONVERTERS:

Principle of on-off control, Principle of phase control, Single phase bidirectional controllers with resistive load, Single phase controllers with inductive load, 1-phase / 3-phase cyclo-converters.

UNIT-IV (12 Lectures)

DC-DC CONVERTERS:

Principle of step down chopper, Generation of duty cycle, Step down converters with and without back e.m.f load, Principle of step up chopper, Performance of step down/ up choppers, Converter classifications.

UNIT-V (12 Lectures)

INVERTERS:

Single phase half bridge inverter, Single phase full bridge inverter, Three phase voltage source inverters (180 and 120 degree modes).

VOLTAGE CONTROL TECHNIQUES OF INVERTERS:

Single Pulse Width Modulation, Multiple Pulse-width Modulation, Sinusoidal Pulse width Modulation, Modified Sinusoidal Pulse Width Modulation.

TEXT BOOKS:

M. H. Rashid, *"Power Electronics: Circuits, Devices and Applications"*, Prentice Hall of India 3rd Edition, 2011

REFERENCES:

1. P.C.Sen, *"Power Electronics"*, Tata McGraw-Hill, 1st Edition, 2001.

2. Ned Mohan, Tore M. Undeland, *"Power Electronics - Converters, Applications and Design"*, Wiley India Edition, 3rd Edition.

3. M. D. Singh & K. B. Kanchandhani, *"Power Electronics"*, Tata McGraw – Hill Publishing company, 2nd Edition, 2010.

SEMESTER - I

Code	COURSE TITLE	L	T	P	C
13HE1101	English	4	0	0	3
13BM1101	Mathematics-I	4	1	0	3
13BP1101	Physics	4	0	0	3
13ME1102	Engineering Mechanics	4	1	0	3
13CT1102	Computer Programming through C	4	0	0	3
13HE1102	English Language Lab	0	0	3	2
13BP1102	Physics Lab	0	0	3	2
13CT1103	Computer Programming Lab	0	0	3	2
13NM1101	Professional Ethics	2	0	0	0
	TOTAL	**22**	**2**	**9**	**21**

SEMESTER - II

Code	COURSE TITLE	L	T	P	C
13BM1102	Mathematics-II	4	0	0	3
13BM1104	Special functions and complex variables	4	1	0	3
13BC1101	Chemistry	4	0	0	3
13EC1142	Electronic Devices and Circuits	4	0	0	3
13EE1101	Basic Network Analysis	4	1	0	3
13BC1103	Chemistry Lab	0	0	3	2
13EC1144	Electronic Devices and Circuits Lab	0	0	3	2
13ME1103	Engineering Drawing	1	0	3	3
13MT1101	Engineering Workshop	0	0	3	2
	TOTAL	**21**	**2**	**12**	**24**

SEMESTER - III

Code	COURSE TITLE	L	T	P	C
13CE1157	Fluid Mechanics and Hydraulic Machines	4	0	0	3
13EE1102	Electrical Machines-I	4	0	0	3
13EE1103	Electromagnetics	4	1	0	3
13EE1104	Network Analysis and Synthesis	4	1	0	3
13EE1105	Control Systems	4	0	0	3
13EC1105	Switching Theory and Logic Design	4	0	0	3
13EE1106	Networks and Simulation Lab	0	0	3	2
13CE1117	Fluid Mechanics and Hydraulic Machines lab	0	0	3	2
13NM1102	Environmental Studies	2	0	0	0
	TOTAL	**26**	**2**	**6**	**22**

SEMESTER - IV

Code	COURSE TITLE	L	T	P	C
13BM1107	Random Variables and Numerical Methods	4	1	0	3
13HM1101	Managerial Economics and Financial Accounting	4	0	0	3
13EE1107	Introduction to Signals and Systems	4	0	0	3
13EE1108	Electrical Machines-II	4	1	0	3
13EC1106	Pulse and Digital Circuits	4	0	0	3
13EE1109	Power Generation Engineering	4	0	0	3
13EE1110	Control Systems and Simulation Lab	0	0	3	2
13EE1111	Electrical Machines lab-I	0	0	3	2
	TOTAL	**24**	**2**	**6**	**22**

SEMESTER - V

Code	COURSE TITLE	L	T	P	C
13EE1112	Power Transmission Engineering	4	1	0	3
13EE1113	Power Electronics	4	1	0	3
13EC1145	Communication Systems	4	0	0	3
13EE1114	Electrical Measurements & Instrumentation	4	0	0	3
13CT1105	Computer Organization	4	0	0	3
13EC1146	Linear and Digital IC Applications	4	0	0	3
13EE1115	Electrical Machines Lab-II	0	0	3	2
13HE1103	Technical Communication and Soft Skills	0	0	3	2
13ES11BC	Basic Computations lab	0	0	3	2
	TOTAL	**24**	**2**	**9**	**24**

SEMESTER - VI

Code	COURSE TITLE	L	T	P	C
13EE1116	Introduction to Digital Signal Processing	4	1	0	3
13EE1117	Power Electronic Converter Fed Drives	4	1	0	3
13EE1118	Embedded Processors	4	0	0	3
13EE1119	Switchgear and Protection	4	0	0	3
	ELECTIVE - I	4	0	0	3
13EE1120	Programmable Logic Controllers				
13EE1121	Power System Deregulation				
13EE1122	Electrical Engineering Materials				
	ELECTIVE - II	4	0	0	3
13CT1106	Data Structures				
13EE1123	Power Distribution Engineering				
13EE1124	Electrical Power Quality				
13EC1112	Pulse and Integrated Circuits Lab	0	0	3	2
13EE1125	Electrical Measurements Lab	0	0	3	2
13NM1103	Intellectual Property Rights and Patents	2	0	0	0
	TOTAL	**26**	**2**	**6**	**22**

SEMESTER - VII

Code	COURSE TITLE	L	T	P	C
13HM1102	Management Science	4	0	0	3
13EE1126	Power System Analysis	4	1	0	3
13EE1127	Power System Operation and Control	4	1	0	3
13EE1128	Optimization Techniques	4	0	0	3
13EE1129	High Voltage Engineering	4	0	0	3
	ELECTIVE - III	4	0	0	3
13EE1130	Electric Power Distribution Automation				
13EE1131	Advanced Embedded Processors				
13EE1132	Power Electronics Applications to Power Systems				
13EE1133	Power Electronics & Simulation Lab	0	0	3	2
13EE1134	Embedded Processors Lab	0	0	3	2
13EE11MP	Industry Oriented Mini-project	0	0	0	2
	TOTAL	**24**	**2**	**6**	**24**

SEMESTER - VIII

Code	COURSE TITLE	L	T	P	C
13EE1135	Utilization Of Electrical Energy	4	0	0	3
	ELECTIVE - IV	4	0	0	3
13EC1117	VLSI Design				
13EE1136	Digital Control Systems				
13EE1137	Smart Grid				
	OPEN ELECTIVE	4	0	0	3
13EE11SM	SEMINAR	0	0	3	3
13EE11CV	COMPREHENSIVE VIVA	0	0	0	3
13EE11PW	PROJECT WORK	0	0	16	12
	TOTAL	**12**	**0**	**19**	**27**

LIST OF OPEN ELECTIVES

CODE	COURSE TITLE	OFFERING DEPARTMENT
13CH1128	Design and Analysis of Experiments*	Chemical Engineering
13CE1155	Green Buildings and Infrastructure	Civil Engineering
13CE1156	Disaster Management	Civil Engineering
13CS1113	E-Commerce	Computer Science and Engineering
13CT1132	Software Project Management*	Computer Science and Engineering
13EC1140	Bio-Medical Instrumentation	Electronics and Communications Engineering
13EE1138	Electrical Safety Management	Electrical and Electronics Engineering
13EE1139	Reliability Evaluation of Engineering Systems	Electrical and Electronics Engineering
13EE1140	Design Concepts for Engineers	Electrical and Electronics Engineering
13EE1141	Special Electrical Machines for Industrial Applications	Electrical and Electronics Engineering
13IT1113	Neural Networks	InformationTechnology
13IT1114	Biometrics	InformationTechnology
13ME1143	Renewable Sources Of Energy*	Mechanical Engineering
13ME1153	Project Management*	Mechanical Engineering
13BP1103	Nano Technology	Physics
13HM 1104	Entrepreneurship and Small Business Management	Management Studies
13HM 1105	Financial Management	Management Studies
13HM 1106	Indian and International Business Environment	Management Studies

*These courses can be taken by the students of respective departments if they are not offered /opted earlier in the structure.

SYLLABI FOR
I SEMESTER

ENGLISH
(Common to all Branches)

Course Code: 13HE1101

L	T	P	C
4	0	0	3

Course Educational Objectives:

Enabling the students to

- Understand class room lectures in different subjects
- Read technical and general materials including literary, scientific, political, economic and cultural topics of interest
- Develop effective written communication in academic, technical and professional contexts
- Develop creative and critical thinking skills necessary to become employable

Course Outcomes:

The learners will be able to show:

- Skills in reading including skimming, scanning, intensive and extensive and comprehension
- Enriched vocabulary and become better communicators
- Skills of communicating in descriptive, analytical and narrative modes with felicity
- Creative and critical thinking skills for employability

Course Work:

To achieve the above objectives, instruction will be imparted through relevant ESP materials, articles and editorials from newspapers, technical journals, magazines in classes and laboratory. Students will be given individual and integrated practice in LSRW skills.

Contents:

Reading Comprehension - Reading in various degrees of speed (slow, fast, very fast); reading different kinds of texts for different purposes (for example, for relaxation, for information, for understanding, for discussion at a later stage etc.); reading between the lines, skimming and scanning and so on.

Vocabulary –synonyms, antonyms, prefixes, suffixes, confusables, one-word substitutes, Idioms and phrases

WRITING:

- ✤ Grammar: Common errors, articles, prepositions, tenses, concord, phrasal verbs, modal verbs, conditionals, transformation of sentences, punctuation and spelling
- ✤ Selecting materials for expository, descriptive, and argumentative pieces summarizing and abstracting
- ✤ Paragraph writing with coherence, cohesiveness and clarity,
- ✤ Essay writing- variety in sentences and paragraphs, précis writing
- ✤ Business letter writing
- ✤ Reference skills; use of dictionary, library and internet sources

SYLLABUS

UNIT-I (13 Lectures)

1. Story of Insects (English Today)
2. Bringing up Boys & Girls (Academic Encounters)
3. The Lunatic, the Lover and the Poet (The Siren's Song)
4. Vocabulary Building: Prefixes, Suffixes, One-Word Substitutes etc.

UNIT-II (14 Lectures)

1. Unity of Minds by Dr. A.P.J. Kalam (English Today)
2. On His Blindness (The Siren's Song)
3. Cultural Variation & Change (Academic Encounters)
4. Grammar: Tenses & Concord

UNIT-III (11 Lectures)

1. Three Years She Grew in Sun and Shower (The Siren's Song)
2. Advertising in the Media (Academic Encounters)
3. Grammar: Articles & Prepositions
4. Paragraph Writing; Technical Description-Process, Object

UNIT-IV (12 Lectures)

1. A Special Kind of Blessing (English Today)
2. Techniques of Solving Crimes (Academic Encounters)
3. La Belle Dame Sans Merci (The Siren's Song)
4. Précis writing &Letter Writing

UNIT-V (10 Lectures)

1. I Have A Dream (English Today)
2. Because I Could not Stop for Death (The Siren's Song)
3. Writing: Note Taking & Note Making ,Essay writing
4. Grammar: Simple, Compound & Complex Sentences

TEXTBOOKS:

1. Kristine Brown & Susan Hood, *"Academic Encounters: Life in Society Reading, Study Skills, Writing, London"*, Cambridge University Press/ Foundation Books, 2006.
2. K Durga Bhavani, G. K. Subbarayuydu, C. Vijayasree, D. Prema Kumari & Y. L. Srinivas, *"English Today: A Course in Reading and Writing"*, Foundation Books, 2005.
3. David Murdoch, The Siren's Song, "*An Anthology of British and American Verse*", Madras, Orient Longman, 1993.

REFERENCS:

1. Alec Fisher, *"Critical Thinking An Introduction"*, New Delhi: CUP, First South Asian Edition, 2011.
2. Bikram K. Das, Kalyani Samantray, Rath Nayak, Susmita Pani & Saveeta Mohanty, "*An Introduction to Professional English and Soft Skills*", New Delhi, Foundation Books, 2009.

3. *"Regional Institute of English, English for Engineers"*, New Delhi, Foundation Books, 2006.
4. Sharon J.Gerson, Steven M.Gerson, *"Technical Writing"*, New Delhi, Pearson Education, 2007.

SUGGESTED READING:

Stories of humour, adventure, mystery and autobiographies of eminent scientists.

MATHEMATICS-I
(Common to all branches)

Course Code: 13BM1101

L	T	P	C
4	1	0	3

Pre requisites:

- Basic formulae of differentiation, product rule, and quotient rule.
- Basic Integration formulae, integration by parts, definite integrals and properties.
- Basic concept of partial differentiation.

Course Educational Objectives:

- The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- Solve ordinary differential equations of first, second and higher order.
- Learn the technique of Laplace transform and apply it to solve differential equations.
- Understand the concept of Double and Triple integrals and their applications to calculation of areas, volumes .
- Extend the concept of integration to vector functions, understand the significance of the operators, gradient, divergence and curl.
- Find surface areas and volumes of certain solids using Green, Stokes and Gauss divergence theorems.

UNIT-I (12 Lectures)

ORDINARY DIFFERENTIAL EQUATIONS:

Linear equations of first order, Bernoulli differential equation, Linear differential equations of higher order with constant coefficients, Method of Variation of parameters, Linear differential equations with variable coefficients (Cauchy's homogeneous linear equation, Legendre's linear equation).

APPLICATIONS OF LINEAR DIFFERENTIAL EQUATIONS:

Orthogonal trajectories, Models on R-L-C circuits, Newton's law of cooling.
(11.9, 11.10, 13.1—13.7, 13.8(1), 13.9, 12.3, 12.5, 12.6)

UNIT-II (12 Lectures)

LAPLACE TRANSFORMS:

Laplace transform of elementary functions, properties, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, division by t, evolution of integrals by Laplace transforms.

INVERSE TRANSFORM:

Introduction, Finding inverse transforms by the method of partial fractions, other methods of finding Inverse Transform, Convolution theorem, Unit step function, and Unit impulse function.

APPLICATION OF LAPLACE TRANSFORMS:

Initial and Boundary Value Problems.
(21.1-21.5, 21.7-21.15, 21.17, 21.18

UNIT-III (12 Lectures)

PARTIAL DIFFERENTIATION:

Total derivative, change of variables, Jacobians, Tangent Plane and Normal to the Surface, Taylor's theorem for functions of two variables.

APPLICATIONS OF PARTIAL DIFFERENTIATION:

Maxima and Minima of functions of two variables, Lagrange method of undetermined multipliers.
(5.5 – 5.9, 5.11, 5.12)

UNIT-IV (12 Lectures)

MULTIPLE INTEGRALS:

Introduction to Non-Cartesian Coordinates, Double integrals, Change of order of integration, Double integral in polar co-ordinates, Triple integrals, Change of variables in double integrals, Change of variables in triple integrals. Simple Applications of Multiple Integrals: Area enclosed by plane curves, Volumes of solids.
(8.19, 8.21, 7.1, 7.7,)

UNIT-V (12 Lectures)

VECTOR DIFFERENTIATION:

Differentiation of vectors, curves in space, velocity, acceleration, Scalar and Vector point functions. Gradient of a scalar field and directional derivatives- Divergence and curl of a Vector field and it's physical interpretation.

VECTOR INTEGRATION:

Line integral, Circulation, work done, surface and volume integrals.

Vector integral theorems: Green's, Stoke's and Gauss Divergence theorems (without proofs) and related problems.
(8.1- 8.16)

TEXT BOOK:

Dr.B.S.Grewal *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. Kreyszig E, "*Advanced Engineering Mathematics*", 8th Edition, John Wiley, Singapore, 2001.
2. Greenberg M D, "*Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, "*Advanced Engineering Mathematics*", 7th Edition, Cengage Learning, 2011.

PHYSICS

(Common to all branches)

Course Code:: 13BP1101

L	T	P	C
4	0	0	3

Course Educational Objectives:

The aim and objective of the course curriculum is to impart learners the basic knowledge that enables effective understanding of various core subjects of engineering branches through principles of physics such as architectural acoustics, wave mechanics, dielectrics, fiber optics, Electromagnetism and so on.

Course Outcomes:

- ✤ Students will acquire knowledge of basic physical principles and they can correlate the same to natural environment and social concern.
- ✤ Students will be able to apply the knowledge in the selection of materials for various engineering applications.
- ✤ Enables students to learn the characteristics and applications of laser devices and enhances information levels on fiber optic communications.
- ✤ Enables the students gain a research orientation and innovative spirit.

UNIT-I (10 Lectures)

ELASTIC PROPERTIES OF MATERIALS & ARCHITECTURAL ACOUSTICS:

Introduction – classification of stress, strain and Hooke's law – Elastic behavior of materials – Poisson's ratio and relationship between modulus of elasticity – Twisting couple on a solid shaft – bending of beams – bending moment - Y by cantilever – Uniform bending - Reverberation and reverberation time – absorption coefficient – Sabine's law (quantitative treatment) – Factors affecting the acoustics of buildings and their remedies – Acoustical design of a hall.

UNIT-II (15 Lectures)

ELECTROSTATICS AND DIELECTRICS:

Vectors - unit vectors - Gradient of a scalar field – divergence & curl of a vector field – Coulombs law - Electric flux - Gauss law in electrostatics – differential form of Gauss law – derivation of Coulombs law from Gauss Law – Applications of Gauss Law (Electric Field due to a solid charged sphere and thin sheet of charge) - Gauss law in dielectric medium - Dipole - Electric displacement vector - Dielectric permittivity and susceptibility- Dielectric constant and dielectric polarization in materials - Types of polarizabilities - Electronic polarizability derivation - Internal fields in solids and Claussius - Mosotti equation - frequency dependence of dielectric constant - Dielectric loss - Dielectric Strength and dielectric breakdown - important dielectric materials in electrical engineering.

UNIT-III (10 Lectures)

ELECTROMAGNETICS:

Biot-Savart Law - Magnetic flux – Magnetic scalar potential - Magnetic Vector Potential - Ampere's law – Force and torque on a magnetic dipole due to external magnetic field, Magnetization - Bound volume and surface current densities - auxiliary field H (Ampere's law in magnetized materials) - Magnetic susceptibility and permeability - Force on charged particle under electric and magnetic fields - Faraday's law of electromagnetic induction - Self and mutual Inductances - Displacement current density - Maxwell's equations – Physical Significance of Maxwell's equations.

UNIT-IV (10 Lectures)

WAVE MECHANICS & BAND THEORY OF SOLIDS:

Introduction to wave mechanics – wave particle duality – de-Broglie matter waves – Wave function characteristics and significance – Schrodinger's time independent wave equation – particle in one dimensional rigid box - Fermi-Dirac distribution function – Fermi level - Effect of temperature on Fermi function - Bloch theorem (Qualitative), Kronig - Penny model (Qualitative treatment) – Concept of effective mass, Origin of energy band formation in solids – Classification of materials in to conductors, semi-conductors and insulators based on number of effective electrons.

UNIT-V (15 Lectures)

OPTICS & LASERS:

Introduction to optics – Interference phenomenon - interference through thin films in reflected light – Newton's rings – determination of wave length of a source – Diffraction due to single slit – intensity pattern discussion – Diffraction grating – Resolving Power of grating (qualitative) - Polarization – Law of Malus - Brewster's law – double refraction – Nicol prism - Basic principle of a LASER – Induced absorption, spontaneous and stimulated emissions – Einstein's coefficients – Population inversion – Ruby laser, CO_2 laser and Semiconductor laser – Laser Applications – Introduction to optical fibers – Classification of fibers on the basis of refractive index profile – Acceptance angle and numerical aperture definitions and expression for Numerical aperture – Applications relating to communication and sensors (force and temperature).

TEXT BOOKS:

1. D.J. Griffiths, *"Introduction to Electrodynamics"*, 3rd Edition, PHI (EEE series), 2009.
2. M.N. Avadhanulu, P.G. Kshirasagar, *"A Text book of Engineering Physics"*, 10th Edition, S. Chand & Company Limited, 2013.
3. V. Rajendran, *"Engineering Physics"*. 2011 Edition, TMH Publishing Company, 2011.

REFERENCES:

1. A.J. Dekker, *"Electrical Engineering Materials"*, 1st Edition, Macmillan Publishers, 2007.
2. C. Kittel, *"Introduction to Solid State Physics"*, John Wiley Publishers, 2007.
3. M.N.Sadiku, *"Elements of Electromagnetics"*, 4th Edition, Oxford University Press, 2007.
4. V. Raghavan, *"Materials Science"*, 5th Edition, PHI Publishers, 2007.
5. R.K. Gaur, S.L. Gupta, *"Engineering Physics"*, 8th Edition, Dhanapat Rai Publishers, 2003.

6. P.K. Palanisamy, *"Applied Physics"*, 2nd Edition, Scitech Publishers, 2010.

7. M. R. Srinivasan, *"Engineering Physics"*, New Age Publishers, 2012.

ENGINEERING MECHANICS

(Common to all Branches)

Course Code: 13ME1102

L	T	P	C
4	1	0	3

Course Educational Objectives:

To develop

- The skill of converting a physical problem into a suitable mathematical model
- Analytical skills of solving the mathematical model
- The skill of interpreting the results in terms of the given physical situation
- The skills of optimization

Course Outcomes:

The student will be able to

- Identify and list , for a given physical problem, all known's, intermediate unknowns, and final results
- Formulate suitable mathematical equations and the constraints.
- Resolve a given force into rectangular components, find the moment of a force about a given point and find the resultant of a set of forces
- Solve problems involving static and dynamic friction
- Locate the centroid and calculate the moments of inertia of a given plane area
- Find the resulting acceleration of a body subjected to a set of forces and moments
- Calculate the work done, energy, power and efficiency

UNIT-I (13 Lectures)

RESULTANTS OF FORCE SYSTEM:

Parallelogram law, forces and components, resultant of coplanar concurrent forces, components of forces in space, moment of force, principle of moments, coplanar applications, couples, resultant of any force system (coplanar concurrent cases only).

Equilibrium of force systems: Free body diagram, equations of equilibrium, equilibrium of planar systems, further discussion of planar equilibrium.

UNIT-II (09 Lectures)

FRICTION:

Theory of friction, angle of friction, laws of friction, static friction, kinetic friction, friction in bodies moving up or down on an inclined plane, wedge friction, screw friction and screw jack.

UNIT-III (14 Lectures)

CENTROIDS AND CENTERS OF GRAVITY:

Center of gravity of flat plate, centroids of areas and lines, importance of centroids of areas and lines, importance of centroids and moments of area, centroids determined by integration, centroids of composite figures, theorem of Pappus, center of gravity of bodies.

MOMENT OF INERTIA:

Definition of moment of inertia, polar moment of inertia, radius of gyration, parallel axis theorem, moments of inertia by integration, moments of inertia for composite areas.

UNIT-IV (12 Lectures)

MASS MOMENT OF INERTIA:

Introduction, radius of gyration, parallel axis theorem, mass moments of inertia by integration, moments of inertia of composite bodies.

KINEMATICS AND KINETICS OF A PARTICLE:

Motion of a particle, rectilinear motion, rectangular components of curvilinear motion, normal and tangential components of acceleration, radial and transverse components, cylindrical coordinates translation-analysis as a particle, further discussion of particle kinematics.

UNIT-V (10 Lectures)

KINEMATICS AND KINETICS OF A BODY UNDERGOING FIXED AXIS ROTATION:

Types of rigid-body motion, angular motion-fixed axis rotation, application of kinematic equations, kinetics of fixed axis rotation.

WORK-ENERGY METHOD:

Work-energy equation for translation, interpretation and computation of work, work-energy applied to particle motion, power, efficiency, applied to fixed-axis rotation, work-energy applied to connected systems, work-energy method.

TEXT BOOK:

Vijaya Kumar Reddy K and Suresh Kumar J(Adapters), "*Singer`s Engineering Mechanics : Statics and Dynamics*", 3rd Edition (SI Units), BS Publications, Hyderabad, 2011

REFERENCES :

1. Timoshenko sp and Young DH, Rao and Pytel, "*Engineering Mechanics*", 4th Edition, McGraw Hill International Editions, 2013.
2. Hibbeler RC, " *Engineering Mechanics : Statics* ", Low Price Edition, Pearson Education, 2000.
3. Hibbeler RC, " *Engineering Mechanics : Dynamics* ", Low Price Edition, Pearson Education, 2000.
4. Tayal AK "*Engineering Mechanics: Statics and Dynamics*", 13th Edition, Umesh Publications, Delhi, 2005

COMPUTER PROGRAMMING THROUGH C

(Common to all Branches)

Course Code : 13CT1102

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course helps the student in understanding Computer Programming concepts. An individual will have ability to:

- ✤ Design Algorithmic solution for various problems and convert algorithms to C programs
- ✤ Design programs with Interactive Input and Output
- ✤ Design programs utilizing arithmetic expressions
- ✤ Design programs utilizing repetition and decision making
- ✤ Design programs utilizing arrays and structures
- ✤ Design programs using file Input and Output
- ✤ Test and verifying programs

Course Outcomes:

At the end of the course the student will be able to

- ✤ Know how to write algorithms and draw flowcharts and develop programs
- ✤ Write programs using sequential, condition, iterative control statements
- ✤ Write programs using derived data types like arrays, functions, pointers, strings, structures, unions
- ✤ Define user defined data types like type- def, enum
- ✤ Learn about files, their creation, and various operations that can be performed on files

UNIT-I (12 Lectures)

Introduction to Computers , Algorithm/ Pseudo code, Flow chart, Program Development steps, Basic structure of C Program, Input and Output statements (printf() & scanf()), A Simple C Program, Identifiers, Basic data types and sizes, Constants, Variables, Operators, Type Conversion, Expression Evaluation, Precedence & Associativity of operators.

CONTROL STATEMENTS:

If, switch, for, while and do- while statements, break, continue and goto statements.Sample programs covering all the above topics.

UNIT-II (12 Lectures)

FUNCTIONS:

Definition, Advantages, types of functions- user defined and standard library functions, categories of functions , scope rules, recursion, storage classes. Sample programs covering all the above topics.

UNIT-III (12 Lectures)

ARRAYS:

Introduction to arrays, 1 D Arrays: Definition, Declaration, Initialization, Accessing & storing the elements, 2 D Arrays: Definition, Declaration, Initialization, Accessing & storing the elements C Pre processors.

STRINGS:

String- Declaration, Initialization, pointers and strings, standard library string functions, array of pointers to strings. Sample programs covering all the above topics.

UNIT-IV (12 Lectures)

POINTERS:

Definition, Declaration of Pointer variables, the & and * operators, Pointer Expressions, Char, int, and float pointers, Pointer arithmetic, Passing addresses to functions, Functions returning pointers, Pointers & Arrays: Passing array elements to functions, pointer to pointer, array of pointers, Dynamic memory allocation functions, Sample programs covering all the above topics

UNIT-V (12 Lectures)

STRUCTURES & UNIONS:

Structures: Definition, Initialization, Accessing structures, nested structures, array of structures, additional features of structures, self referential structures, unions, type-def, bit fields, enum data type.

FILES:

Concept of a file, Text and Binary files, file I/O operations, Command line arguments. (Let Us C, Yashavant Kanetkar)

Sample programs covering all the above topics.

TEXT BOOKS:

1. B.A Forouzan and R.F. Gilberg, *"Computer science, A structured programming approach using C"*, 3rd Edition, Cengage Learning.
2. Yashavant Kanetkar, *"Let Us C"*, 12th Edition, BPB Publications, 2012.
3. Yashavant Kanetkar, *"Understanding pointers in C"*, 4th Edition, BPB Publications, 2009.

REFERENCES:

1. N. B. Venkateswarlu, E.V. Prasad, *"C & Data Structures"*, 1st Edition, S. Chand Publications, 2010.
2. K.R.Venugopal, S.R.Prasad, *"Mastering C"*, 1st Edition, TMH, 2007.

ENGLISH LANGUAGE LAB
(Common to all Branches)

Course Code : 13HE1102	L	T	P	C
	0	0	3	2

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

Course Educational Objectives:

- To make students recognise the sounds of English and Phonemic transcription through Audio-Visual aids and Computer Software.
- To help them overcome their inhibitions and self- consciousness while communicating in English and to build their confidence.
- To enable them to speak English intelligibly with focus on Stress and Intonation.

Course Outcomes :

- Students will be able to recognise the sounds of English and Phonemic transcription, practice Stress & Intonation in speech.
- They will learn to communicate in Oral and Written English forms confidently.
- They will also be able to demonstrate skills like Publik Speaking & Oral Presentations. Students will also exhibit debating and discussion skills.

SYLLABUS:

The following course content is prescribed for the English Language Laboratory sessions:

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Listening for Comprehension

4. Situational Dialogues.
5. Oral Presentations- Prepared & Extempore
6. 'Just A Minute' Sessions (JAM)
7. Telephonic communication
8. Group Discussions
9. Debate
10. Team Presentations (PPTs).
11. Reference Skills

REFERENCES:

1. E. Suresh Kumar , P. Sreehari, *"A Handbook for English Language Laboratories"*, Foundation Books, Revised Edition 2009.
2. Simon Sweeny, *"English for Business Communication"*, CUP, First South Asian Edition, 2010.
3. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
4. Daniel Jones, English Pronouncing Dictionary with CD.
5. T. Balasubramanian, *"A Text book of English Phonetics for Indian Students"*, Macmillan, 1981.
6. Jeremy Comfort, Pamela Rogerson, Trish Stott & Derek Utley, *"Speaking Effectively : Developing Speaking Skills for Business English"*, Cambridge University Press, First South Asian Edition,2002.Reprint 2011.
7. T Samson, *"Innovate With English"*, New Delhi: Foundation Books, 2010.
8. Meenakshi Raman & Sangeeta Sharma, *"Technical Communication Principles & Practice"*, New Delhi: OUP, 2010.

PHYSICS LAB
(Common to all Branches)

Course Code: 13BP1102

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to involve the students to learn the subject and gain knowledge in handling the apparatus which will help them in designing devices and to trouble shoot the problems in their future professional work. The experiments are designed to cater to the needs of the students of all branches.

Course Outcomes:

The course will help the student in handling different apparatus for conducting various experiments in different fields which enables the student to trouble shoot the problems in their future professional work.

ANY TEN OF THE FOLLOWING 15 EXPERIMENTS

ERROR ANALYSIS AND GRAPH DRAWING (LECTURE - DEMO).

1. Bending of beams – Elliptical and Hyperbolic fringes - Determination of 'Y'.
2. Torsional pendulum - comparison of rigidity modulii of various wires.
3. Melde's experiment – determination of frequency of electrically maintained tuning fork.
4. Determination of wavelength of laser light using diffraction through a graded scale.
5. Particle size determination using He-Ne laser (Lycopodium powder).
6. Diffraction grating – determination of wavelengths of spectral lines of Mercury spectrum by minimum deviation method.
7. Spectrometer – determination of dispersive power of the material of a prism.

8. Polarization of light – verification of Malu's law and to determine the Brewster's Angle for glass.
9. Determination of Planck's constant.
10. Solar cell characteristics – I-V characteristics, measurement of efficiency and Fill factor.
11. Stewart – Gee apparatus – study of variation of magnetic field along the axis of circular current carrying loop.
12. LCR series and parallel resonance circuit study the frequency response.
13. Familiarity of CRO – Lissajjou's figures - determination of time period, voltage, frequency and phase of a wave.
14. Newton's Rings- determination of wavelength of the source/radius of curvature of given convex lens.
15. Optical fibres- determination of Numerical aperture, acceptance angle and bending losses.

COMPUTER PROGRAMMING LAB

(Common to All Branches)

Course Code : 13CT1103

L	T	P	C
0	0	3	2

Course Educational Objectives:

The main objectives of the course are to give the basic knowledge of C Language with practical orientation of various features present in this language.

- ✤ To give exposure about RAPTOR tool to design flow charts.
- ✤ To give hands on exposure to the students in developing the programs.
- ✤ Develop programs by using simple and optimized logic.
- ✤ Maximizing the usage of various C programming features.
- ✤ To give hands on exposure to the students to work with files.

Course Outcomes:

Upon completion of the course the student will be able to

- ✤ Gets exposure on RAPTOR tool.
- ✤ Learn how to program basic mathematical operation using various loops like for, while, do while, and switch statement.
- ✤ Program various string handling functions.
- ✤ Program various file operations.
- ✤ Gets an idea on maximizing the usage of various C programming features?

LIST OF PROGRAMS:

1. Demonstration of RAPTOR Tool to generate flowcharts by considering simple algorithms. Generation of flow charts to solve problems such as Temperature Conversion, Swapping of Two numbers etc. using RAPTOR Tool.

2. Write C Programs to solve problems such as Student Grading, Income Tax Calculation, and Largest of three Numbers etc., which expose students to various categories of IF Statements. Generate flowcharts using RAPTOR Tool.

3. a) Write a C program to find the roots of a quadratic equation.

   b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

4. a) The total distance travelled by vehicle in 't' seconds is given by distance = $ut+1/2at^2$

   where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write a C

   program to find the distance travelled at regular intervals of time given the values of

   'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

   b) Write a C program to determine whether a given number is an Armstrong or not.

   (If the sum of the cubes of the number is equal to the original number, then the number

   Is called Armstrong number. Eg: 371 is Armstrong number ($3^3+7^3+1^3= 371$))

5. a) Write a C program to find the sum of individual digits of a positive integer.

   b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

6. a) Write a C program to calculate the following sum:

   Sum=$1-x^2/2! +x^4/4!-x^6/6! +x^8/8! -x^{10}/10!$

b) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

7. a) Write a C program to generate Pascal's Triangle.

   b) Write a C program to construct a Pyramid of Numbers.

8. Write C programs that use both recursive and non-recursive functions for the following

   a) To find the factorial of a given integer.

   b) To find the GCD (greatest common divisor) of two given integers.

9. a) Write a C function to read in two numbers, x and n, and then compute the sum of this geometric progression:

   $1+x+x^2+x^3+\ldots\ldots\ldots\ldots + x^n$. Also perform error checking by considering negative values for n and also check for illegal values of x.

   b) Write a C function to read in two numbers, x and n (no. of terms), and then compute sin(x) and cos(x).

10. a) Write a C program to find the largest and smallest number in a list of integers.

    b) Write a C program to perform Matrix Addition & Matrix Multiplication.

    c) Write a C program to compute Transpose of a Matrix.

11. a) Write a C program to exchange value of two integers using call by value and call by reference.

    b) Write C programs to demonstrate the use of Pointers.

12. Write user defined string handling functions to implement the following standard library functions: strlen(), strcpy(), strcat(), strrev(), strcmp().

13. a) Write a C program that displays the position/ index in the string S where the string T begins, or –1 if S doesn't contain T.

    c) Write a C program to determine whether a given string is Palindrome or not.

14. Write a C program that uses functions to perform the following operations:

    a) To insert a sub-string in to given main string from a given position.

    b) To delete n Characters from a given position in a given string.

    c) To replace a character of string either from beginning or ending or at a specified location.

15. a) Write a C program to find the two's complement of a binary number.

    b) Write a C program to convert a Roman numeral to its Decimal Equivalent.

16. Write a C program that uses functions to perform the following operations using Structures:

    a) Reading a complex number.

    b) Writing a complex number.

    c) Addition of two complex numbers.

    d) Multiplication of two complex numbers.

17. a) Write a C program which copies one file to another.

    b) Write a C program to count the number of characters, lines, words, tabs and spaces in a given file.

PROFESSIONAL ETHICS

(Common to all Branches)

Course Code: 13NM1101	L	T	P	C
	2	0	0	0

Course Educational Objectives:

- To educate and make the young generation students aware of their Social responsibilities make an Endeavour to tell them first we are humans and then we are scientists, engineers, technocrats and professionals.
- To make students accountable to whatever job they do whether it is less paid or heavily paid.
- To inculcate a spirit of togetherness, unity and team work in an organization.
- To make him reasonably a 'good' professional conscious of his duties to the society that graced this wonderful life.
- To induce the spiritual aspect of life in one's own practical and real life.
- To give an overview of a decent, dignified, humane, dedicated professional with a sense of social responsibility and security.

Course Outcomes:

By the end of this course, it is expected that the student will be able to

- Deal with complex situations while dealing with the people in the society (parents, friends, and co-professionals) in making the work environment congenial, encouraging and loving.
- Discriminate when he is forced through certain undesirable and ambiguous situations either in his day today life as a student and as a professional in his career further.
- Understand the basics regarding the leadership and to become a conscious professional.

- Be aware of codes of professional bodies.
- Implement these concepts in one's career for achieving excellent job satisfaction.

UNIT-I (6 Lectures)

BASIC HUMAN VALUES:

'Be a Human First and then one can become a good Professional'; so the basic Human Values-Truth, Right Conduct (Righteousness), Love, Non-violence and Peace, Humility and character. What is ethics? Core areas of ethics: Social ethics, personal ethics Integrity and Trustworthiness, Honesty, Loyalty, Courage, Prudence, Confidence, Confidentiality.

Character: definition, 'A bundle of Virtues and weaknesses of Head and Heart- the resulting individuality of a person from the balance sheet of 'good' and 'bad qualities' is his/her character.

TRAITS OF GOOD CHARACTER:

Honesty and integrity, sense of duties and obligations to one's own profession, Adherence to truth and principles, excellent team work with a good rapport with the subordinates and colleagues, self-discipline, Responsibilities and accountability, self-lessness. Unity in thought, word and deed (Case studies relating to these aspects can be drawn from history & epics or from one's own experience)

Human values as practiced in the Indian societal context-past and present. (Examples drawn from any standard scriptures and many other sources available may be illustrated, debated and discussed).

Spirit of Nationalism and Patriotism with examples from 'struggle for Freedom' (Case studies in the lives of Mahatma Gandhi & His team who strived for Freedom from the British, Scientists and Engineers like Bhaha, Sarabhai, Dhavan, Abdul J Kalam, and Benjamin Franklin, Martin Luther King, or any renowned personalities)

UNIT-II (6 Lectures)

What is a profession? Who is a Professional? Special criteria to meet the definition of professional, criteria to be a 'professional engineer (Pages 24-36) of Mike W Martin and Roland Schinzinger)

The 5 Ds (Discipline, Devotion, Dedication, Discrimination and

Determination) against 3 Ps (Pay-Prospects and Promotion)

Personal ethics-Social ethics and professional ethics – are they different-How would you distinguish? –A debate

General and Applied ethics, Relationship between these two in day-to-day functioning of an Engineering Professional- (Pages 10-12 of Mike W Martin and Roland Schinzinger)

PROFESSIONAL AND ENGINEERING ETHICS:

Why Engineering ethics? Moral issues encountered by professional engineers during their day-to-day operations both at home and office/workplace-Moral problems that frequently arise in ones Profession, (case studies from Chapter 1 pages 2-9, analysis of the case studies on pages 13 &14)

MORAL AUTONOMY:

Moral integrity and social and professional behavior. Different theories proposed under moral autonomy-Kohlberg's and Gilligan's Theory. Heinz's Dilemma- Motive behind aggression (16-23 Pages)

LEADERSHIP IN PROFESSIONALISM:

Characteristics of a Leader? Case studies and examples (Leadership by Dr M L Chibber)

UNIT-III (6 Lectures)

Religion and Ethics and Morals-Debate and discussion- Spirituality, social consciousness and ethics

THEORY ABOUT MORALITY:

Virtue ethics, Utilitarianism, Duty ethics, Right ethics based on the concepts of Virtues and vices, most good for most people, Duties to respect for persons, Human rights respectively (pages 53-61, Study Questions for analysis and discussion on pages 60 &61)

Engineering Profession as a social responsibility, His responsibility and accountability while dealing with public issues such as safety, risk, hazards, Risk Analysis and assessment-a brief discussion (risk assessment problem on Page (Chapter 4, specified topics and Case studies)

(Present the case studies on Challenger space shuttle(97), Chernobyl (173), Bhopal tragedy (299), Titanic disaster (p 83), SLV-3, the Indian

Space Shuttle (Wings of Fire) recent nuclear holocaust in Japan recent floods and other man-made and natural calamities or accidents we come across frequently in our society)

Environmental ethics (304-308) & Computer ethics 319-323328-330) (All Pages from Mike W Martin and Roland Schinzinger)

UNIT-IV (6 Lectures)

RESPONSIBILITIES AND RIGHTS OF ENGINEERS:

Collegiality (Ones attitude) towards other engineers working in the same Organization or outside) and Loyalty (to the Employer), obligation of Loyalty and misguided loyalty, Respect for authority and its limitations, Bootlegging, Collective bargaining, Commitments and Convictions (APJ Abdul Kalam's "Wings of Fire") Confidentiality while changing jobs, Conflicts of interests, Gifts, bribes, kickbacks -case studies related, Occupational Crime and industrial espionage

Whistle blowing and moral guide line (case studies), Discrimination, preferential treatment and harassment Rights of Engineers (page 284-286)

Selected topics from Ch 5 and 6 and case studies on pages 200-201,

UNIT-V (6 Lectures)

Engineers as Managers and leaders promoting ethical climate (350-358)

–Ethics in Engineering by Mike W Martin and Roland Schinzinger)

Why a code of Ethics for professional Engineers? ('A code of ethics is not something you post on the Bulletin board; it is something you live every day in your life and career)

Code of ethics for Engineers, Organizational Culture, and Guidelines for use with the Fundamental canons of ethics; (pages 142-162 Indian Culture and Professional Ethics by P S R Murty and 399-414 0f Mike W Martin and Roland Schinzinger)

PROFESSIONAL BODIES:

IEEE, IETE, IE, ASME, ASCE, ABET, NSPE, ISTE Etc…

{** Any topic can be discussed and debated with known live examples and illustrations we find in our day-to-day -living circumstances.}

TEXT BOOKS :

1. Mike W Martin and Ronald Schinzinger : *"Ethics Engineering"*, 3rd Edition, Tata McGraw Hill Education Pvt. Ltd., 2003.
2. P S R Murthy : *"Indian Culture Values and Professional Ethics"*, 2nd Edition, B S Publications, Hyderabad. 2013.

REFERENCES:

1. M. Govindarajan, S Natarajan and V.S. Senthil Kumar : *"Engineering Ethics and Human Values"*, 1st Edition, PHI Publications , 2013.
2. A. Alavudden, R. Kalil Rahaman & M . Jayakumaran : *"Professional Ethics & Human Values"*, 1st Edition, University Science Press (An Imprint of Laxmi Publications Pvt Ltd., Chennai, Bangalore. 2008.
3. Lieunt Gen Dr. M. L. Chibber : *"Leadership-Education in Human Values"*, Sri Sathya Sai Books and Publications Trust, Prasantinilayam, 1st Edition, 2009.
4. Kalam A P J : *"Wings of Fire"*, Universities Press Publications, 2013.
5. Charles B. Fleddermann : *"Engineering Ethics"*, 4th Edition, PHI, 2012.

SYLLABI FOR II SEMESTER

MATHEMATICS-II

(Common to all Branches)

Course Code:13BM1102

L	T	P	C
4	0	0	3

Pre requisites:

- Basic formulae of differentiation and integrations.
- Basic terminology and elementary operations on Matrices.
- Basic concept of partial differentiation.

Course Educational Objectives:

- The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.
- Understand the most basic numerical methods to solve simultaneous linear equations.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- Solve simultaneous linear equations using matrix methods.
- Calculate eigenvalues and eigen vectors of matrices that are essential for vibration/design analysis.
- Understand Fourier series, integral ,transforms and they are provided with practice in their application and interpretation in a range of situations.
- Identify/classify and solve the different types of partial differential equations.

UNIT-I (12 Lectures)

MATRICES:

Rank, Normal form, Echelon form, Consistency and Solution of system of simultaneous linear homogeneous and non-homogeneous equations. Finding eigenvalues and eigen vectors, properties, Cayley-Hamilton theorem, computing inverse and powers of a matrix by applying Cayley-Hamilton theorem, Diagonalisation of matrix.

(2.7, 2.10, 2.13 -2.16)

UNIT-II (12 Lectures)

NUMERICAL METHODS IN LINEAR ALGEBRA:

Solution of linear simultaneous equations: LU decomposition, Jacobi iteration and Gauss-Seidel methods. Determination of eigenvalues and eigen vectors by iteration (Rayleigh's Power Method) .

(28.5, 28.6(3), 28.7(1)(2), 28.9)

UNIT-III (12 Lectures)

DIFFERENCE EQUATIONS AND APPLICATIONS:

Difference operators (forward, backward and shift operators), Introduction to difference equation, formation of difference equation, Linear difference equations and it's complete solution. Rules for finding the complementary function and complete integral, Deflection of a loaded string.

(29.1, 29.4, 31.1 - 31.6, 31.8)

UNIT-IV (12 Lectures)

FOURIER SERIES:

Euler's formulae, Dirichlet's Conditions for a Fourier expansion, functions having points of discontinuities, Change of interval, even and odd functions, half range series, wave forms.

FOURIER TRANSFORMS :

Fourier integral theorem, Fourier transform and inverse Fourier transform, Fourier sine and cosine integrals. – Fourier sine and cosine transforms – properties of Fourier Transforms – Finite Fourier transforms.

(10.1 – 10.9, 22.1 – 22.5)

UNIT-V (12 Lectures)

PARTIAL DIFFERENTIAL EQUATIONS:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – solutions of first order linear (Lagrange) equation and nonlinear first order (standard type) equations.

APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS:

Method of separation of variables, Classification of second order linear Partial Differential Equations. Solutions of one dimensional heat equation, wave equation and two-dimensional Laplace's equation under initial and boundary conditions. (17.1 – 17.3, 17.5, 17.6, 18.1-18.7)

TEXT BOOK:

Dr.B.S.Grewal *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. Kreyszig E, "*Advanced Engineering Mathematics*", 8th Edition, John Wiley, Singapore, 2001.
2. Greenberg M.D, "*Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, "*Advanced Engineering Mathematics*", 7th Edition, Cengage Learning, 2011.

SPECIAL FUNCTIONS AND COMPLEX VARIABLES

(Common to ECE & EEE)

Course Code:13BM1104

L	T	P	C
4	1	0	3

Pre requisites

- Basic Knowledge in evaluation of definite integrals.
- Calculus of functions of real variables.

Course Educational Objectives:

- The aim of this course is to introduce the special functions, their generating functions and the algebra, geometry and calculus of functions of a complex variable.
- The emphasis will be on gaining a geometric understanding of complex analytic functions as well as developing computational skills in employing the powerful tools of complex analysis for solving theoretical and applied problems.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- Evaluate improper integrals using beta and gamma functions.
- Use elementary analytic functions like the exponential and logarithmic functions, trigonometric functions.
- Use residue calculations as integration method and find the Taylor or Laurent series of a given function.
- Determine basic mapping properties of elementary functions, including how functions transform simple shapes in the plane such as lines and circles.
- Apply mathematical reasoning and the theory of complex variables to solve theoretical and applied problems.

UNIT-I **(12 Lectures)**

SPECIAL FUNCTIONS-1:

(Beta, Gamma and Legendre functions)

Beta-function, Gamma function, Relation between Beta and Gamma functions, Series solution of Legendre's equation, Legendre's function, Rodrigue's formula, Legendre polynomials, Generating function, Recurrence formulae, Orthogonality of Legendre Polynomials, Fourier-Legendre expansion of $f(x)$. (7.14 - 7.16, 16.13 - 16.17)

UNIT-II **(12 Lectures)**

Special functions-2 (Bessel function)

Bessel's equation, Bessel's function, Recurrence formulae for Bessel function $J_n(x)$, Expansions for J_0 and J_1, value of $J_{\frac{1}{2}}(x)$, Generating function for $J_n(x)$, Orthogonality of Bessel's function, The Strum-Liouville problem: Eigen Values, Eigen functions and Orthogonality of eigen functions. (16.5-16.9, 16.1, 16.19)

UNIT-III **(12 Lectures)**

FUNCTIONS OF A COMPLEX VARIABLE :

Complex function, Real and Imaginary parts of Complex function, Limit, Continuity and Derivative of complex function, Cauchy-Riemann equations, Analytic function, entire function, singular point, conjugate function, equations in polar form, Harmonic functions, Milne-Thomson method, Simple applications to flow problems, Line integral of a complex function, Cauchy's theorem(only statement), Cauchy's Integral Formula.

(19.7, 19.12, 20.2-20.6, 20.12-20.14)

UNIT-IV **(12 Lectures)**

SERIES OF COMPLEX TERMS AND RESIDUES :

Absolutely convergent and uniformly convergent of series of complex terms, Radius of convergence, Taylor'series, Maclaurin's series expansion, Laurent's series. Zeros of an analytic function, Singularity, Isolated singularity, Removable singularity, Essential singularity, pole of order m, simple pole, Residues, Residue theorem, Calculation of residues, Residue at a pole of order m, Evaluation of real definite integrals: Integration around the unit circle, Integration around semi circle, Indenting the contours having poles on the real axis.

(20.16-20.19, 20.20(a),(b),(d))

UNIT-V (12 Lectures)

CONFORMAL TRANSFORMATION :

Standard transformations: Translation, Magnification and rotation, Inversion and reflection, Bilinear transformation, Properties, Conformal transformation, critical point, fixed points of a transformation, Special Conformal transformations: (20.8-20.10)

TEXT BOOK:

Dr. B.S.Grewal, *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. Kreyszig E, *"Advanced Engineering Mathematics"*, 8th Edition. John Wiley, Singapore, 2001.
2. Glyn James, *"Advanced Modern Engineering Mathematics"*, 3rd Edition, Pearson, 2004.

CHEMISTRY

(Common to all Branches)

Course Code: 13BC1101

L	T	P	C
4	0`	0	3

Course Eductational Objectives:

The course attempts impart a sound knowledge on the principles of chemistry involving different application oriented topics to requied for all engineering branches.

Course Outcomes :

The student should able to apply

- ✤ The principles involved in corrosion and its control
- ✤ Treatment of water for industrial purpose and concepts of energy storage devices.
- ✤ Utillisation of polymer engineering materials towards different applications.

UNIT-I (10 Lectures)

ELECTROCHEMICAL CELLS:

Electrode potential, Nernst equation, EMF of electrochemical cell, Reference electrodes-Standard hydrogen electrode, calomel electrode. Electrochemical series, Concentration cell, Construction of glass electrode, determination of P^H of given solution using glass electrode

Batteries-Primary cell-Dry or Lachanche cell, alkaline battery; secondary cells (storage batteries or accumulators) – Lead-acid Accumulator, Nickel-cadmium battery, Lithium ion battery (LIB) and redox flow battery.

Fuel cells - hydrogen - oxygen fuel cell, phosphoric acid fuel cell, solid oxide fuel cells

UNIT-II (12 Lectures)

CORROSION AND ITS CONTROL:

Introduction - Direct chemical corrosion and electrochemical corrosion and its mechanisms, Types of electrochemical corrosion-Differential aeration corrosion, galvanic corrosion, concentration cell corrosion, corrosion and pitting, stress corrosion, Galvanic series, passivity, factors influencing corrosion.

Corrosion control-proper designing, cathodic protection-sacrificial anodic protection and impressed current cathodic protection, modifying the environment and use of inhibitors.

Protective coatings- Anodic and cathodic coatings, Hot dipping-Galvanizing and Tinning, Metal cladding, Electroplating, Electroless plating, cementation or diffusion coatings.

UNIT-III (10 Lectures)

POLYMER TECHNOLOGY:

Polymerization, classification, degree of polymerization, functionality and tacticity of polymer, Types of polymerization-addition and condensation polymerization, Mechanism of addition polymerization, Condensation polymerization, Preparation, properties and uses of polythene, PVC, Teflon, nylons-6,6, Polyester, Bakelite and Silicones.

Plastics- Thermo plastics and thermosetting plastics, compounding of plastic.

Elastomers-Natural and synthetic rubbers, Manufacture, properties and applications of natural rubber-vulcanization, compounding of rubber, Synthetic rubbers-Preparation, properties and applications of Buna-S and Buna-N.

UNIT-IV (12 Lectures)

WATER TECHNOLOGY:

Introduction-characteristics imparted by impurities, hardness of water – Temporary and permanent hardness- units, Determination of hardness by EDTA method, Disadvantages of hard water, Chemical aspects of scale and sludge formation in boilers, caustic embrittlement,boiler corrosion, priming and foaming, Municipal water treatment-sedimentation, coagulation,

and filtration, Desalination of brackish water, Water softening methods-lime -soda method, zeolite method and ion exchange process.

UNIT-V (16 Lectures)

ENGINEERING MATERIALS:

Fuels- classification, characteristics of fuel, calorific value –determination of calorific value by bomb calorimeter and Junkers gas calorimeter, theoretical calculation of calorific value, Types and Analysis of coal - Proximate and ultimate analysis of coal, Manufacture of coke- Petroleum-classification based on sources of petroleum, Refining of petroleum, Knocking, octane value, cetane value, Cracking -thermal cracking and catalytic cracking-fixed bed & moving bed catalytic cracking, reforming.

Cement: Classification of cement, chemical composition, functions of ingredients in Portland cement, Manufacture of Portland cement- raw materials, setting and hardening of Portland cement.

Refractories- Classification and properties of refractories, Failures of refractory materials.

Lubricants-friction, lubrication, functions of lubricants, mechanism of lubrication-thick film, thin film and extreme pressure lubrication, types of lubricants- solid, semisolid and liquid lubricants and their properties .

TEXT BOOKS:

1. Jain& Jain, *"A text book of Engineering Chemistry"*, 15th Edition, Dhanapat Roy publishing company, 2010.
2. Sasichawla, *"Engineering Chemistry"*, 3rd Edition, Dhanapat Roy publishing company, 2004.

REFERENCES:

1, S.S. Dara, *"A Text book of Engineering Chemistry"*, 11th Edition, S.Chand & Co, 2006.

2. C. Parameswara Murthy, C.V. Agarwal and Andhra Naidu, *"A Text Book of Engineering Chemistry"*, 1st Edition, B.S. Publications, 2006.

ELECTRONIC DEVICES AND CIRCUITS

(Common to EEE, CSE, IT)

Course Code: 13EC1142

L	T	P	C
4	1	0	3

Pre requisites:

Basic Electrical Engineering, Network Analysis, Engineering Physics,and Basics of Mathematics

Course Educational Objectives:

- To study the principles of electronics Engineering
- To study the operation and characteristics of different semiconductor devices.
- To study the basic design concepts of low frequency amplifiers & oscillators circuits using various transmissions for different applications.

Course Outcomes:

Upon completion of the course, students will:

- State the operating principles of major electronic devices, circuit models and connection to the physical operation of device
- Be able to apply this knowledge to the analysis and design of basic circuits

UNIT-I **(14 Lectures)**

DIODE CHARACTERISTICS:

Introduction to semiconductor materials, V-I Characteristics of Diode, Zener Diode Characteristics, Zener Diode as Voltage Regulator, Tunnel diode, LED.

RECTIFIERS AND FILTERS:

Half wave rectifier, Full wave rectifier, Advantages of full wave rectifier over Half Wave rectifier, C- Filter, Inductor filter, LC- Filter, ð- - filter.

UNIT-II (12 Lectures)

TRANSISTOR CHARACTERISTICS:

Bipolar junction transistors (BJT) - input & output Characteristics of transistor in CB, CE, CC configurations, Relations between á,â,ã. Characteristics of JFET, MOSFET (Enhancement and depletion), Characteristics of UJT .

UNIT-III (10 Lectures)

BIASING AND STABILITY:

Need for biasing, criteria for fixing the operating point, thermal run away, thermal stability, stabilization techniques.

UNIT-IV (10 Lectures)

SMALL SIGNAL AMPLIFIERS:

h-parameter representation of a Transistor, Analysis of single stage transistor amplifier using h-parameters, comparison of transistor configurations in terms of A_V , A_I , R_i ,R_o.

UNIT-V (14 Lectures)

FEEDBACK AMPLIFIERS:

Concept of feedback, classification of feedback amplifiers, general characteristics of negative feedback amplifiers, effect of negative feedback on input and output Resistances.

OSCILLATORS:

Condition for oscillations, RC Phase shift oscillator with Transistor, Wein bridge oscillator, Hartley and Colpitts oscillator.

TEXT BOOKS:

1. Millman Jacob Halkias C Christos: *"Electronic Devices and Circuits"*, 2nd Edition, Tata Mcgrawhill Publications, 2007.
2. Boylestad.Robert *"Electronic Devices and Circuits Theory"*, PHI Publications, 10th Edition, 2008.

REFERENCES:

1. B.Visweswara Rao, K.Bhaskarram Murthy, K.Raja Rajeswari, P.Chalam Raju Pantulu. *"Electronic Devices and Circuits"*, Pearson Publications, 2nd Edition, 2009.

2. Raju GSN, *"Electronic Devices Electronic Devices And Circuits"*, IK International Publishing House, 1st Edition, 2006.

3. Lal Kishore *"Electronic Devices & Circuits"*, BSP Publications, 2nd Edition, 2005.

BASIC NETWORK ANALYSIS

(Common to ECE & EEE)

Course Code:13EE1101

L	T	P	C
4	1	0	3

Pre requisites: Mathematics.

Course Educational Objectives:

The course objective is to teach Principles of Electrical Network Analysis which was a basic foundation course for the disciplines EEE and ECE. Hence this is introduced in I-Year so that the students feel comfortable with various other Electrical and Electronics Courses they come across.

Course Outcomes:

Student will be comfortable in handling lab classes and gets the knowledge base to analyze and design simple electrical networks.

UNIT-I (12 Lectures)

BASIC COMPONENTS AND ELECTRIC CIRCUITS :

Introduction, Units and scales, Charge, current, voltage and Power; Voltage and current sources - Independent and dependent sources; Networks and circuits; Ohm's Laws, power absorption, conductance; Voltage and Current Laws: Nodes, paths, loops and branches, Kirchoff's current law, Kirchoff's voltage law; The single loop circuit; The single-node-pair circuit; series and parallel connected sources; Resistors in series and parallel; Voltage and current division. Circuit Analysis: Nodal Analysis, Super node; Mesh analysis, super mesh; Nodal Vs Mesh analysis – a comparison; Linearity and superposition, The superposition principle; Source transformations; Thevenin and Norton equivalent circuits; Maximum Power Transfer Theorem; Reciprocity theorem; Delta-wye conversion.

UNIT-II (12 Lectures)

CAPACITORS, INDUCTORS AND BASIC RL & RC CIRCUITS:

Capacitor, Integral Voltage-current relationship, energy stored in a capacitor; The inductor, integral voltage-current relationship, energy stored in an inductor; Inductance and Capacitance combinations- inductors in series and parallel; Capacitors in series and parallel; Magnetically Coupled circuits – Mutual inductance - coefficient of mutual inductance, dot convention, combined mutual and self-induced voltages, Energy considerations, the coupling coefficient. Basic RL and RC circuits: The source free RL circuit – A direct approach, an alternate approach, a more general solution approach; Properties of the exponential response; The source free RC Circuit; A more general perspective – General RL circuits, distinction between 0^+ and 0^- General RC circuits; The unit-step function, Physical sources and the unit step function, the rectangular pulse function; Driven RL circuits – Natural and Forced response, determination of the complete response; Driven RC circuits.

UNIT-III (12 Lectures)

THE RLC CIRCUIT AND SINUSOIDAL STEADY-STATE ANALYSIS:

The source free parallel RLC circuit – obtaining the differential equation, solution to the differential equation; Overdamped, critically damped and the underdamped cases; The source free series RLC circuit – the complete response of the series RLC circuit; The lossless LC circuit. Characteristics of sinusoids, The Phasors – Phasor relationships for R,L and C; Kirchoff's laws using phasors; Impedance – series and parallel combinations; Admittance; Nodal and Mesh Analysis; Superposition, Thevenin's and Norton's theorems, Source transformations; Phasor diagrams.Parallel Resonance – Resonant frequency, band width and quality factor; Series Resonance – Resonant frequency, band width and quality factor, Locus diagrams in RL and RC circuits.

UNIT-IV (12 Lectures)

AC CIRCUIT POWER ANALYSIS:

Introduction, Instantaneous Power, Power due to sinusoidal excitation, Average Power – Average power for periodic waveforms, average power in the sinusoidal steady state, Average power absorbed by an ideal resistor and purely reactive elements; Maximum Power Transfer; Effective values of current and voltage – effective value of a periodic waveforms, use of effective value to compute average power, effective value with multiple frequency circuits; Apparent Power and Power Factor; Complex Power – Power Triangle and Power Measurement.

UNIT-V **(12 Lectures)**

SINGLE PHASE AND THREE PHASE CIRCUITS:

Introduction, Balanced three phase voltages, Balanced Wye-Wye connection, Balanced Wye-Delta connection, Balanced Delta-Delta connection, Balanced Delta-Wye connection, power in a balanced system, Un-balanced Three phase system.

TEXT BOOKS:

1. William H.Hayt, Jr., Jack E.Kemmerly and Steven M.Durbin, *"Engineering Circuit Analysis"*, 7th Edition, McGraw Hill Publications, 2007. (Unit-I to Unit-IV).
2. Charles K. Alexander and Mathew N.O.Sadiku, *"Fundamentals of Electric Circuits"*, 4th Edition, McGraw Hill Publications, 2009. (Unit-V).

REFERENCES:

1. M.E.Van Valkenberg, *"Network Analysis"*, Prentice Hall of India, New Delhi.
2. Russell M.Kerchner, *"Alternating-current circuits"*, 4th Edition, John Wiley and sons, 1960.

CHEMISTRY LAB

(Common to all Branches)

Course Code: 13BC1103	L	T	P	C
	0	0	3	2

Course Educational Objectives:

The course is to develop the basic experimental skills and analytical thinking.

The course attempt to provide information regarding various chemical techniques used in quantitative chemical analysis.

Course Outcomes:

The student will be able to determine the substance quantitatively and analyse the data obtained to resolve the prolem in their respective areas.

LIST OF EXPERIMENTS :

1. Determination of ferrous iron.
2. Determination of ferric iron.
3. Determination of total hardness of water.
4. Determination of carbonate and bicarbonate of water.
5. Determination of dissolved oxygen.
6. Determination of available chlorine in bleaching powder.
7. Determination of zinc by potassium ferrocyanide.
8. Determination of copper by EDTA method
9. Determination of calcium by permanganate.
10. Determination of iron-II by potentiometric method.
11. Determination of viscosity of lubricant by viscometer.
12. Determination of flash and fire points of lubricant.
13. Determination of percentage residue of carbon in oils.

14. Determination of calorific value of solid fuels.
15. Determination of fluoride by spectrophotometric method.
16. Determination of iron in cement by spectrophotometric method.

REFERENCE:

A.I.Vogel, *"A Text book of quantitive chemical analysis"*, 6th Edition, Pearson Education, Pvt. Ltd., 2002.

ELECTRONIC DEVICES AND CIRCUITS LAB

Course Code:13EC1144

L	T	P	C
0	0	3	2

Pre requisites: Electronic Devices Theory

Course Educational Objectives :

- ✤ To impart the practical knowledge in semiconductor diodes characteristics and applications of diodes as regulators, rectifiers.
- ✤ To measure the V-I characteristics of various devices that are used in the electronic equipment.
- ✤ Practical & functional verification through V-I characteristics of active devices like BJT, JFET, MOSFETS and applications.

Course Outcomes :

- ✤ Student comprehends the depth of semiconductor devices like diodes, transistor, JFET, MOSFETs characteristics are verified. Student gains hands on experience in handling electronic components and devices.
- ✤ Student gets the knowledge about PN junction diodes, Zener & transistor configurations, and V-I characteristics.
- ✤ Student acquires about the JFET, MOSFET and its characteristics are verified
- ✤ To impart the practical knowledge in various amplifiers design &verification ofimpedances, and band width calculations.

LIST OF EXPERIMENTS:

1. PN Junction diode characteristics.
2. Zener Diode characteristics & Voltage Regulator.
3. Rectifiers without filters (Half wave & Full wave).
4. Rectifiers with filters (Half wave & Full wave).

5. Transistor CB characteristics.
6. Transistor CE characteristics.
7. JFET characteristics.
8. MOSFET Characteristics
9. UJT characteristics.
10. CE Amplifier
11. CC Amplifier.
12. CS FET Amplifier.
13. RC Phase shift oscillator.
14. Colpitt's oscillator.

Note: Any TEN of the above experiments are to be conducted.

ENGINEERING DRAWING

(Common to all Branches)

Course Code:13ME1103

L	T	P	C
1	0	3	3

Course Educational Objectives:

To make the student

- ✤ Familiar with the drawing practices and conventions.
- ✤ Familiar with projections of points, lines, planes and solids
- ✤ Familiar with isometric views

Course Outcomes:

Student will be able to

- ✤ Draw various types of engineering curves
- ✤ Draw orthographic projections of points, lines, planes and solids inclined to one plane or both the planes
- ✤ Draw isometric views of simple solids

LIST OF EXERCISES:

1. Introduction to engineering drawing & basics of geometrical construction
2. Construction of parabola, ellipse, hyperbola- general method
3. Cycloid, epicycloids, hypocycloid, involutes of circle and square
4. Projections of points
5. Projections of lines inclined to one plane
6. Projections of lines inclined to both the planes
7. Projections of planes inclined to one plane
8. Projections of planes inclined to both the planes
9. Projections of solids in simple positions

10. Projections of solids inclined to both the planes
11. Isometric views

TEXT BOOK:

N.D. Bhatt and V.M. Panchal, *"Engineering Drawing"*, Charotar Publication House, 49th Edition, 2008.

ENGINEERING WORKSHOP

(Common to all Branches)

Course Code :13MT1101	L	T	P	C
	0	0	3	2

Course Educational Objectives:

To provide hands on experience on basic Engineering and IT related skills.

- ✤ To train the student in the basics of computer components, maintenance software(s) installation
- ✤ To train the students in office tools.
- ✤ To give the student exposure to DOS commands and LINUX commands.
- ✤ To demonstrate and train the students in basic professional trades.
- ✤ To train the students to know about different system tools in personal computer.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Identify the peripherals of a computer, components in a CPU and its function
- ✤ Work with MS-OFFICE
- ✤ Work with DOS commands
- ✤ Work with LINUX commands
- ✤ Understands different system tools in personal computer.

COMPULSORY EXERCISES:

1. Identification of the peripherals of a computer, components in a CPU and its function – Block diagram of the CPU along with the configuration of each peripheral. Disassembly and assembly of a personal computer.

2. Installation of MS windows on the personal computer.
3. One lamp controlled by a one-way switch and (b) Two-way switching for stair-case lamp.

ANY NINE EXPERIMENTS FROM THE FOLLOWING:

Carpentry: Making a Cross-half lap joint using wooden pieces.

Carpentry: Making a Mortise and Tenon joint using wooden pieces.

Fitting: Preparation of a V-fit between mild steel flat pieces.

Fitting: Preparation of a Square-fit between mild steel flat pieces.

Foundry: Preparation of a sand mould using a single piece pattern

Foundry: Preparation of a sand mould using a split piece pattern.

Tin-Smithy: Preparation of a sheet metal pipe-joint using tin-smithy tools.

Tin-Smithy: Preparation of a sheet metal funnel using tin-smithy tools.

Welding: Making a Lap joint through arc welding.

Lathe Machine: Demonstration of turning related activities on Lathe machine.

Black smithy: Demonstration of Plumbing trade.

Plumbing: Demonstration of plumbing trade

Operating System: Changing Boot Device Priority, Installation of Linux, putting passwords, Enabling and disabling external devices, Connectivity Boot Camp.

Hands on Exposure on Linux shell commands: Using man, info commands for finding information about commands. Using file processing commands (ls, cp, mv, ln, mkdir, rmdir, chmod etc..), Using text processing commands (grep, egrep, sed etc…), Using disk utility commands, mount commands (du, df, mount etc..), Vi-Editor.

MS-Word: Using Ms-Word, creating project abstract, creating newsletter, creating feedback form

MS- Excel: Excel orientation, creating scheduler, calculating CGPA, Performance Analysis

MS-PowerPoint: PPT Orientation, Slide Layouts, Custom Animation, Hyperlinks, inserting Images, Clip Art, Audio, Video, Objects, Tables, Charts.

System tools, Hardware Troubleshooting, Software Troubleshooting and Installations of Anti Virus.

Multimedia Flash (Adobe)

a. Introduction to Flash interface

b. Introducing the tools

c. Putting text into Flash

d. Smoothen/straighten drawings

e. Animation Part 1: Using layers, key frames and motion tweening

f. Animation Part 2: Shape tweening, motion guide and frame by frame animation

SYLLABI FOR
III SEMESTER

FLUID MECHANICS AND HYDRAULIC MACHINES

Course Code: 13CE1157

L	T	P	C
4	0	0	3

Course Educational Objectives:

- ✤ To familiarize the students with fluid statics and fluid dynamics.
- ✤ To introduce the concepts of the working and design aspects of hydraulic machines like turbines and pumps and their applications.

Course Outcomes:

- ✤ Student will be able to develop to gain basic knowledge on Fluid Statistics, Fluid Dynamics, closed conduit flows, hydro-electric power stations.
- ✤ Student will be able to design various components of pumps and turbines and study their characteristics.

UNIT-I (12 Lectures)

FLUID STATICS: DIMENSIONS AND UNITS:

Physical properties of fluids – mass density, specific weight, specific volume, specific gravity, viscosity, surface tension, vapour pressure and their influence on fluid motion. Atmospheric pressure, gauge pressure and vacuum pressure, measurement of pressure – Piezometers, U-tube and differential manometers – mechanical pressure gauges.

FLUID KINEMATICS:

Stream line, path line and streak lines and stream tubes. Classification of flows ideal fluid and real fluid – steady and unsteady flows, uniform and non-uniform flows, laminar and turbulent flows, rotational and irrotational flows, equation of continuity for one-dimensional flows.

UNIT-II (12 Lectures)

FLUID DYNAMICS:

Various forces acting on a fluid element- Euler's and Bernoulli's equation for flow along a streamline, momentum equation and its applications for pipe bend problem. Closed conduit flow – Reynolds number, Reynolds experiment – "Darcy –Weisbach" equation – Minor losses in pipes – pipes in series and pipes in parallel – total energy line – hydraulic gradient line, measurement of flow : Pitot tube, venturimeter, orificemeter and flow nozzle meter.

UNIT-III (12 Lectures)

HYDRO-ELECTRIC POWER STATIONS :

types – concept of pumped storage plants – storage requirements, mass curve, estimation of storage capacity for a uniform demand, estimation of power developed from a given catchment area, heads and efficiencies.

BASICS OF TURBO MACHINERY :

Hydrodynamic force on jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity diagrams, work done and efficiency, flow over radial vanes.

UNIT-IV (12 Lectures)

HYDRAULIC TURBINES :

Classification of turbines – Impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine – working principles, workdone, efficiencies, hydraulic design, draft tube theory, functions and efficiency.

PERFORMANCE OF HYDRAULIC TURBINES:

Geometric similarity, unit and specific quantities, characteristic curves, governing of turbines, selection of type of turbines, cavitation, surge tank, water hammer.

UNIT-V (12 Lectures)

CENTRIFUGAL AND RECIPROCATING PUMPS:

Classification working of centrifugal pump, work done – manometric head – losses and efficiencies – specific speed – pumps in series and parallel – performance characteristic curves, NPSH. Working of receiprocating pumps, discharge, slip, percentage slip, Indication diagrams.

TEXT BOOKS:

1. P.N. Modi and S.M. Seth "*Hydraulics, fluid mechanics and hydraulic machinery*", 14th Edition, Standard Book House, New Delhi 2002.
2. R.K. Rajput "*A text book of Fluid Mechanics and Hydraulic Machines*", 5th Edition, S.Chand & Company (Ltd) New Delhi, 2009.

REFERENCES:

1. D.S. Kumar, "*Fluid Mechanics and Fluid Power Engineering*", 2nd Edition, SK. Katania and Sons, 2010.
2. Dr. R.K. Bansal "*A Text book of Fluid Mechanics and Hydraulic Machines*", 9th Edition, Laxmi Publications Pvt. Ltd., New Delhi, 2010.
3. A.K.Jain, "*Fluid Mechanics Including Hydraulic Machines*", 8th Edition, Khanna Publishers, New Delhi, 2003.

ELECTRICAL MACHINES-I

Course Code:13EE1102

L	T	P	C
4	0	0	3

Pre requisites: Basic Network Analysis

Course Educational Objectives :

- To familiarize with the constructional details of different type of transformers, working principle and their performance.
- To introduce the concept of rotating machines and the principle of electromechanical energy conversion.
- To understand the functioning of different types of D.C. generators and study their performance.
- To study the working principles of various types of D.C. motors and their load characteristics, starting and methods of speed control.
- To estimate the various losses occurring in D.C. machines and transformers and to study the different testing methods to arrive at their efficiency.

Course Outcomes:

- Students will acquire basic knowledge of transformers and dc machines.
- Students will able to design and conduct experiments on transformers and dc machines.

UNIT-I **(12 Lectures)**

TRANSFORMERS

Constructional details of core and shell type transformers - Types of windings – Principle of operation - emf equation - Transformation ratio - Transformer on no-load - Parameters referred to HV / LV windings - Equivalent circuit – Transformer on load – Efficiency and Regulation.

UNIT-II (12 Lectures)

PARALLEL OPERATION & TESTING OF TRANSFORMERS:

Parallel operation of single phase transformers – Three phase transformers – Vector group-Auto transformer

Testing of transformers – Polarity test, load test, open circuit and short circuit tests – All day efficiency.

UNIT-III (12 Lectures)

BASIC CONCEPTS OF ROTATING MACHINES:

EMF induced in dc machine-wave shape of induced e.m.f- flux distribution curve and fringing-average value of induced EMF-direction of induced EMF-force on conductor carrying current-power developed by armature-torque developed by armature-the laws of the magnetic circuit-units-relative permeability-magnetization curves for iron-magnetic circuit of dc machine-flux distribution curve or filed form-reluctance of air gap-active iron length-armature teeth-tapered teeth-real and apparent flux density-armature core-form of pole section-magnetic leakage-effect of load upon leakage coefficient-the yoke-magnetization curve of dc machine-effect of saturation upon filed form-filed form and voltage between commutator-segments-flux plotting.

UNIT-IV (12 Lectures)

DC GENERATORS:

Constructional details– Methods of excitation – Self and separately excited generators – shunt generator- effect of speed upon self excitation- failure of excite-reversed polarity-series generator-compound. Wound generator-field windings-calculation of shunt coils- calculation of series coils-external characteristics of separately excited and shunt generator-series generator characteristics-compound generator characteristics-generator in parallel-equalizing connection.

UNIT-V (12 Lectures)

DC MOTORS &TESTING OF DC MACHINES:

Back EMF induced in DC motor armature-load characteristics of shunt, series, and compound motors-speed-voltage characteristics of motors-parallel operation- series operation-speed control of dc motors-Ward

Leonard control

Brake test, Swinburne's test, Retardation test and Hopkinson's test – separation of iron and friction loss- separation of hysteresis and eddy current losses.

TEXT BOOKS:

1. I. J. Nagrath&D.P.Kothari, *"Electric Machines"*, Tata McGraw-Hill Publishers,4th Edition, 2010.

REFERENCES:

1. M.G. Say, *"Performance and Design of A.C. Machines"*, ELBS and Pitman & Sons, 3rd Edition, 2008
2. AE Clayton and NN Hancock, *"The Performance and Design of Direct Current Machines"*, CBS Publishers, 3rd Edition, 2004.

ELECTROMAGNETICS

Course Code:13EE1103

L	T	P	C
4	1	0	3

Course Educational Objectives:

To gain basic understanding of electric and magnetic field laws and to clearly understand Maxwell's equations and solve simple problems in both electric and magnetic fields.

Course Outcomes:

After completion of the course, the student should be able to solve problems in electromagnetics and able to apply the concepts in simple practical electromagnetic devices.

UNIT-I (12 Lectures)

ELECTROSTATICS:

Electrostatic Fields – Coulomb's Law – Electric Field Intensity (EFI) – EFI due to a line and a Surface Charge – Work done in moving a Point charge in an electrostatic field – Electric Potential – Properties of Potential Function – Potential Gradient – Gauss's Law, Application of Gauss's Law – Maxwell's first equation $\nabla . D = r_v$, Maxwell's second equation $\nabla \times E = 0$.

Laplace's and Poisson's Equations – Solution of Laplace's Equation in one variable. Electric dipole – Dipole Moment – Potential and EFI due to an electric dipole – Behavior of conductors in an electric field – Conductors and Insulators.

Electric Field inside a dielectric material – Polarization – Dielectric – Conductor and Dielectric – Dielectric Boundary Conditions, Capacitance – Capacitance of Parallel Plate and Spherical and co-axial capacitors with composite dielectrics – Energy stored and Energy Density in a Static Electric field – Current Density – Conduction and Convection current densities – Ohm's law in point form – Equation of Continuity.

UNIT-II (12 Lectures)

MAGNETOSTATICS:

Static Magnetic fields – Biot – Savart's Law – Oesterd's Experiment – Magnetic Field Intensity (MFI) – MFI due to circular and solenoid current carrying wire – Relation between magnetic flux, magnetic flux density and MFI – Maxwell's Equation $\nabla . B = 0$

Ampere's Circuital Law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament – Point form of Ampere's Circuital Law – Maxwell's Equation Curl(H) = $J + \partial D / \partial t$,

Field due to circular loop of wire.

UNIT-III (12 Lectures)

FORCE IN MAGNETIC FIELDS:

Magnetic Force – Moving charges in Magnetic Field – Lorentz force Equation – Force on a current element in Magnetic field – Force on a straight and a long current carrying conductor in magnetic field – Force between two straight long and parallel current carrying conductors – Magnetic Dipole and Dipole Moment – a differential current loop as a magnetic dipole – Torque on a current loop placed in a magnetic field

UNIT-IV (12 Lectures)

MAGNETIC POTENTIAL:

Scalar Magnetic Potential and its limitations – vector magnetic potential and its properties – vector magnetic potential due to simple configurations – vector Poisson's equations. Self and Mutual Inductances – Neuman's formulae – determination of self-inductance of solenoid and toroid and mutual inductance between a straight long wire and square loop wire in the same plane – Energy stored and Energy Density in a magnetic field. Introduction to Permanent Magnets, their characteristics and applications.

UNIT-V (12 Lectures)

TIME VARYING FIELDS:

Time Varying Fields – Faraday's Laws of Electromagnetic Induction – Its integral and Point Forms – Maxwell's Equation – Statically and Dynamically Induced EMF's – Simple problems. Modification of Maxwell's equations for time varying fields – Displacement Current – Poynting theorem

TEXT BOOKS:

1. William H. Hayt & John. A. Buck, *"Engineering Electromagnetics"* 7th Edition. 2006., Mc. Graw – Hill Companies. (UNITS – I, II, V)
2. Sadiku, *"Electro Magnetic Fields"*, 4th Edition, Oxford Publications, 2009. (UNITS – III, IV)

REFERENCES:

1. D J Griffiths, *"Introduction to Electro Dynamics"*, 2nd Edition, Prentice – Hall of India Pvt. Ltd.
2. J.D. Kraus, *"Electromagnetics"*, 4th Edition, Mc Graw-Hill Inc, 1992.
3. N. Narayana Rao, *"Elements of Engineering Electromagnetic"*, Prentice – Hall of India Pvt. Ltd.

NETWORK ANALYSIS AND SYNTHESIS

(Common to ECE, EEE)

Course Code:13EE1104

L	T	P	C
4	1	0	3

Pre requisites:

Knowledge of Mathematics and Basic Network Analysis.

Course Educational Objectives:

This course trains the student to think deep into the subject for analyzing the time – domain and frequency domain analysis of systems in general and prepares the student for advanced learning and research.

Course Outcomes:

Students will be able to solve the Network problems using differential equation approach and transform methods. They will also able to synthesize LC, RC & RL networks.

UNIT-I (12 Lectures)

NETWORK TOPOLOGY:

Linear Graphs in Electrical Networks, Basic Definitions, Incidence, Loop and cut-set matrices, Fundamental Loop and Fundamental Cut-Set Matrices, Graph Theoretic version of KCL and KVL, Loop Impedance and Node Admittance Matrices, Duality in Electrical Networks.

UNIT-II (12 Lectures)

NETWORK ANALYSIS - I (DIFFERENTIAL EQUATION APPROACH):

Network elements, Initial and final conditions (Constant flux linkage and Charge theorems), Step and Impulse response of RC & RL Circuits (Concept of time constant), Solution of RLC- Series & Parallel circuits for the step and impulse excitations, Analysis of Transformer (Mutual Inductance).

UNIT-III (12 Lectures)

NETWORK ANALYSIS USING LAPLACE TRANSFORMS:

The Transformed Circuit, Thevenin's and Norton's Theorems, The system function (with poles and zeros), the step and impulse responses, the convolution Integral, The Duhamel Superposition Integral.

UNIT-IV (12 Lectures)

NETWORK ANALYSIS – II (TWO- PORTS :

Network functions, Two Port Networks: Z, Y, h and T (ABCD) Parameters, Relationship between Two Port parameters, Transfer function using two port parameters, inter connection of two port networks, Analysis of Ladder networks.

UNIT-V (12 Lectures)

SYNTHESIS OF NETWORKS:

Causality and stability, Hurwitz polynomials, Positive Real Functions, Elementary Synthesis procedure, Properties of LC Immittance functions, Synthesis of LC driving point function by Foster's and Cauer Forms, Properties of RC & RL driving Point Function, Synthesis of RC & RL functions Foster's and Cauer Forms.

TEXT BOOKS:

1. N.C. Jagan and C. Lakshmi Narayana, *"Network Analysis"*, B.S. Publications, 2nd Edition, 2008. (Unit-I).
2. Franklin F.Kuo, *"Network Analysis and Synthesis"*, Wiley International, 5th Edition, 2012. (Unit-II to Unit-V).

REFERENCES:

1. M.E. Van Valkenburg, *"Network Analysis"*, Prentice Hall of India Pvt. Ltd., 2000.
2. M.E. Van Valkenburg, *"Introduction to Modern Network Synthesis"*, Wiley Eastern Limited, 1993.
3. Charles K. Alexander, Mathew N.O Sadiku, *"Fundamentals of Electric Circuits"* TMH Education Pvt. Ltd, 3rd Editions, 2008.

CONTROL SYSTEMS

(Common to EEE, ECE)

Course Code:13EE1105

L	T	P	C
4	0	0	3

Pre requisites: Mathematics and Networks.

Course Educational Objectives:

In this course, it is aimed to introduce to the students the principles and applications of Control Systems in everyday life.

- To teach students the concepts of block diagrams and transfer functions
- To teach students the characteristics of closed-loop control systems including steady-state and transient response, parametric sensitivity, disturbances, error, and stability
- To teach students basic performance criteria for first and second order systems
- To teach students basic control system design methods, including root locus diagrams and frequency response methods.
- Introduce students to the basic concepts of Proportional, Integral and Derivative (PID) control, State Space.

Course Outcomes:

- Operate and troubleshoot open loop and closed loop control systems. Use transfer functions to predict the correct operation of control systems. Measure and evaluate the performance of basic open loop and closed loop control systems.
- Identify the basic elements and structures of feedback control systems.
- Construct and recognize the properties of root-locus for feedback control systems with a single variable parameter.

- Specify control system performance in the frequency-domain in terms of gain and phase margins, and design compensators to achieve the desired performance.
- Analyze control systems using state-space methods.

UNIT-I (12 Lectures)

MATHEMATICAL MODELING AND TRANSFER FUNCTION REPRESENTATION:

Introduction: Basic concept of simple control system – open loop – closed loop control systems. Effect of feedback on overall gain – stability sensitivity and external noise. Types of feedback control systems – Liner time invariant, time variant systems and non linear control systems

MATHEMATICAL MODELS AND TRANSFER FUNCTIONS OF PHYSICAL SYSTEMS:

Differential equations – impulse response and transfer functions – translational and rotational mechanical systems. Transfer functions and open loop and closed loop systems. Block diagram representation of control systems – block diagram algebra – signal flow graph – Mason's gain formula

COMPONENTS OF CONTROL SYSTEMS:

DC servo motor – AC servo motor – synchro transmitter & receiver.

UNIT-II (12 Lectures)

TIME DOMAIN ANALYSIS AND STABILITY

TIME DOMAIN ANALYSIS:

Standard test signals – step, ramp, parabolic and impulse response function – characteristic polynomial and characteristic equations of feedback systems – transient response of first order and second order systems to standard test signals. Time domain specifications - steady state response – steady state error and error constants. Effect of adding poles and zeros on over shoot, rise time, band width – dominant poles of transfer functions.

STABILITY ANALYSIS IN THE COMPLEX PLANE:

Absolute, relative, conditional, bounded input –bounded output, zero input stability, conditions for stability, Routh –Hurwitz criterion.

UNIT-III (12 Lectures)

FREQUENCY DOMAIN ANALYSIS

Introduction – correlation between time and frequency responses – polar plots – Bode plots – Nyquist stability criterion – Nyquist plots. Assessment of relative stability using Nyquist criterion – closed loop frequency response.

UNIT-IV (12 LECTURES)

ROOT LOCUS AND COMPENSATION TECHNIQUES:

Root locus Technique: Introduction – Construction of Root Loci

Introduction to Compensation Techniques- Lead, Lag, Lead Lag and Lag Lead,

Controllers- P, I, D, PD, PI, PID.

UNIT-V (12 Lectures)

STATE SPACE ANALYSIS:

Concepts of state, state variables and state models – diagonalisation – solution of state equations – state models for LTI systems- State Transition Matrix and it's properties. Concepts of Controllability and Observability.

TEXT BOOKS:

1. I.J.Nagrath & M Gopal, "Control Systems Engineering", 5th Edition, New Age International.2012.
2. Norman S.Nise, "Control Systems Engineering", 4th Edition, Wiley & Sons, 2009.

REFERENCES:

1. B.C. Kuo,"Automatic control systems", 7th Edition, PHI, 2004.
2. M.Gopal,"Control Systems Principles and Design", 4th Edition, TMH, 2012.
3. K. Ogata, "Modern Control Engineering", 4th Edition, PHI, 2002.

SWITCHING THEORY AND LOGIC DESIGN

(Common to ECE, EEE, CSE, IT)

Course code: 13EC1105

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To familiarize students with different number systems, digital logic, simplification and minimization of Boolean functions.
- To design combinational & sequential digital circuits and state machines.
- To introduce programmable logic devices.

Course Outcomes:

Students can design optimized logic circuits through combinational and sequential logic.

UNIT-I (10 Lectures)

NUMBER SYSTEMS & CODES:

Introduction to number systems, Complement representation of negative numbers, binary arithmetic, binary codes, Error detecting & correcting codes.

UNIT-II (15 Lectures)

BOOLEAN ALGEBRA AND SWITCHING FUNCTION:

Fundamental postulates of Boolean algebra, Basic theorems and properties, switching functions, Simplification of Boolean equations, Digital logic gates, properties of XOR gates, universal gates - NAND/NOR realizations. K-map method, Prime implicants, don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime –Implicant chart, simplification rules.

UNIT-III (13 Lectures)

COMBINATIONAL LOGIC DESIGN:

Adders, Subtractor, Multiplexer, De-Multiplexer, MUX Realization of switching functions, Encoder, Decoder, Parity bit generator, Code-converters, Basic PLD's-ROM, PROM, PLA, PAL Realizations.

UNIT-IV (13 Lectures)

SEQUENTIAL CIRCUITS:

Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples) Latches and Flip-flops-Triggering and excitation tables, registers, shift registers, Steps in synchronous sequential circuit design, synchronous counters, ripple counters, Design of modulo-N Ring & Shift counters, Serial binary adder, sequence detector.

UNIT-V (9 Lectures)

FINITE STATE MACHINES:

Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified sequential machines, Partition techniques, incompletely specified sequential machines using merger table.

ALGORITHMIC STATE MACHINES:

Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.

TEXT BOOKS:

1. Morris Mano, *"Digital Design"* PHI, 3rd Edition, 2006.
2. Anand Kumar, *"Switching Theory and Logic Design"* PHI, 2008

REFERENCES:

1. Zvi Kohavi, *"Switching & Finite Automata theory"* TMH, 2nd Edition,
2. R.P.Jain. *"Modern Digital Electronics"*, 4th Edition., TMH, 2009.
3. John M. Yarbrough, *"Digital Logic Applications and Design"* Thomson Publications, 2006.
4. Charles H. Roth, *"Fundamentals of Logic Design"* Thomson Publications, 5th Edition, 2004.

NETWORKS & SIMULATION LAB

Course Code:13EE1106

L	T	P	C
0	0	3	2

Prerequsites : Knowledge of Basic Network Analysis

Course Educational Objectives:

To give the practical exposure to the students which they have gone through in the Basic Network Analysis.

Course Outcomes:

After this lab course, the student will be able to

1. Apply the knowledge of Basic Network Analysis in solving and verifying various Network Laws and Theorems.
2. Analyze the coupling circuits.
3. Analyze the resonant Frequency and draw the Locus Diagrams of the RL and RC Circuits.

*** The following experiments are required to be conducted as compulsory experiments:.**

1. Verification and Simulation of KIRCHHOFFS laws.
2. Volt-Ampere Characteristics of a Filament Lamp.
3. Verification and Simulation of THEVENIN's & NORTON's Theorems.
4. Verification and Simulation of Superposition & Reciprocity Theorems.
5. Verification andSimulation of Maximum Power Transfer Theorems.
6. Locus Diagrams of RL and RC Series Circuits.
7. Series Resonance.
8. Determination of Self, Mutual Inductances and Coefficient of Coupling.

* **In addition to the above eight experiments, at least any two experimentsfrom the following list are required to be conducted.**

9. Harmonic Analysis of Non-Sinusoidal waveform signal.
10. Transient Analysis of RLC circuit.
11. Measurement of Active Power for Balanced Loads
12. Time Response of RL & RC Networks
13. Determination of a Form factor of Non-sinusoidal input.

TEXT BOOK:

N.C. Jagan and C-Lakshmi Narayana, *"Network Analysis"*, 2nd Edition, B.S.Publications, 2008 .

REFERENCES:

1. M.E Van Valkenburg , *"Network Analysis"*, Prentice Hall of India Pvt. Ltd., 3rd Edition, New Delhi.
2. Hayt and Kemmerly, *"Engineering Circuit Analysis"*, TMH Publications, 7th Edition, 2007.

FLUID MECHANICS AND HYDRAULIC MACHINES LAB

Course Code: 13CE1117

L	T	P	C
0	0	3	2

Course Educational Objectives:

- To impart the experimental skills in flow measurement and real fluid flow problems
- To impart experimental skills to verify the performance characteristics of pumps and turbines

Course Outcomes:

- Student will be able to utilize the knowledge in the design of water supply pipe networks and measure the rate of flow in pipes and channels.
- Students will have confidence in the hydraulic design of turbines and should be able to identify suitable pumps and turbines for different working conditions.

LIST OF EXPERIMENTS:

1. Calibration of Venturimeter.
2. Calibration of Orifice meter.
3. Determination of Coefficient of discharge for a small orifice by a constant head method.
4. Determination of Coefficient of discharge for an external mouth piece by variable head method.
5. Calibration of contracted Rectangular Notch.
6. Calibration of contracted Triangular Notch.
7. Determination of friction factor for a given pipe line.
8. Determination of coefficient of loss of head due to pipe fittings.

9. Verification of Bernoulli's theorem.
10. Reynolds's Experiment- Demonstration of types of flows.
11. Impact of jet on vanes.
12. Performance test on Pelton Wheel Turbine.
13. Performance test on Francis Turbine.
14. Performance test on Single Stage Centrifugal Pump.
15. Performance test on Multi Stage Centrifugal Pump.
16. Performance Test on Reciprocating Pump
17. Performance Test on Kaplan Turbine

ENVIRONMENTAL STUDIES

(Common to all Branches)

Course Code: 13NM1102	L	T	P	C
	2	0	0	0

Course Educational objectives:

This course introduces the students to the following

- Important & Scope of the Environment.
- Awareness about the resources and their limitations.
- Appreciate the variedness of nature and role of different species in nature.
- The importance of understanding the impact of any development of nature.
- Population control and its importance.

Course Outcomes:

After studying the course the student will have good understanding of

- Environment and its conservation.
- The impacts of human action on nature and remedial measures.
- Being proactive instead of reactive.

UNIT-I (8 Lectures)

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES & NATURAL RESOURCES:

Definition, Scope and Importance – Need for Public Awareness.

Renewable and non-renewable resources– Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems -Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources,

case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Case studies. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT-II (7 Lectures)

ECOSYSTEMS, BIODIVERSITY AND ITS CONSERVATION:

Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Definition: genetic, species and ecosystem diversity.- Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a mega diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. - Endangered and endemic species of India Conservation of biodiversity: In-situ and Exsitu conservation of biodiversity.

UNIT-III (7 Lectures)

ENVIRONMENTAL POLLUTION:

Definition, Cause, effects and control measures of a) Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards.

SOLID WASTE MANAGEMENT:

Causes, effects and control measures of urban and industrial wastes. – Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT-IV (6 Lectures)

SOCIAL ISSUES AND THE ENVIRONMENT:

From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, and watershed management -Resettlement and rehabilitation of people; its problems and concerns. Case Studies Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. -Wasteland reclamation. -Consumerism and waste products. –Environment.

Protection Act. -Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution)

Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

UNIT-V (8 Lectures)

HUMAN POPULATION AND THE ENVIRONMENT:

Population growth, variation among nations. Population explosion - Family Welfare Programme. -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. -Women and Child Welfare. -Role of information Technology in Environment and human health. – Case Studies.

FIELD WORK:

Visit to a local area to document environmental assets

River /forest grassland/hill/mountain -Visit to a local polluted site-

Urban/ Rural/industrial/ Agricultural Study of common plants, insects, birds. - Study of simple ecosystems-pond, river, hill slopes, etc.

TEXT BOOKS:

1. Bharucha. E., "*Textbook of Environmental Studies for Undergraduate Courses*", University Press, 2005.
2. Rajagopalan. R., "*Environmental Studies*", Oxford University Press, 2005.

REFERENCE:

AnjiReddy. M., "*Textbook of Environmental Sciences and Technology*", BS Publications, 2010.

NOTES

SYLLABI FOR IV SEMESTER

RANDOM VARIABLES AND NUMERICAL METHODS

(Common to ECE, EEE)

Course Code: 13BM1107

L	T	P	C
4	1	0	3

Pre requisites:

- Fundamentals of Set theory.
- Basic concepts of Probability.
- Basic concepts of calculus.

Course Educational Objectives:

The objective is to equip students with the basic tools required to build and analyze probabilistic models in both the discrete and continuous context. Also to introduce Numerical techniques to solve the real world applications.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- Apply concepts of Random variables for a wide range of areas in communications, signal processing, control and other areas of engineering in which randomness has an important role.
- Solve engineering problems using Numerical techniques.

UNIT-I (12 Lectures)

The Random Variable Concept, Discrete, Continuous, Mixed random variable distribution function, Density function, The Gaussian Random variable, Conditional distribution and density Function, Expected value, Conditional expected value, Moments, Moments about the origin, Central moments,Variance and Skew, Chebychev's inequality, Markov's inequality.

Monotonic and Non monotonic transformations of a continuous random variable, Transformations of a discrete random variable.
(2.1 to 2.4, 2.6, 3.1, 3.2,3.4 of Text book [1])

UNIT-II **(12 Lectures)**

Vector random variables, Joint distribution and its properties, Joint density and its properties, Conditional distribution and density statistical independence distribution and density of a sum of random variables, Central limit theorem (without proof). Expected value of a function of random variables, Joint moments about the origin, Joint central moments.
(4.1 to 4.7, 5.1 of Text book [1])

UNIT-III **(12 Lectures)**

Jointly Gaussian random variables-two random variables, Jointly gaussian random variables-N Random variables. Transformations of multiple random variables- One function, Transformations of multiple random variables- multiple functions, Linear transformation of Gaussian random variables. The Random process concept-classification of processes Deterministic and Nondeterministic processes.
(5.3 to 5.5, 6.1 of Text book [1])

UNIT-IV **(12 Lectures)**

Introduction to Numerical Methods, Solution of algebraic and transcendental equations-Bisection method, Method of false position Newton's method.

Finite differences-Forward differences, Backward differences, Central differences, Differences of a polynomial, Other Difference operators – Shift operator, Average operator, Relations between the operators, Newton's interpolation formulae - Newton's forward interpolation formula Newton's backward interpolation formula.
(28.1 to 28.3, 29.1 to 29.5, 29.6 of Text book [2])

UNIT-V **(12 Lectures)**

INTERPOLATION WITH UNEQUAL INTERVALS:

Lagrange interpolation, Divided differences, Newton's divided difference formula Difference formula, Inverse interpolation. Numerical Integration- Trapezoidal, Simpson's one-third and Simpson's three-eighth rules.

NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS:

Euler's Method, Modified Euler's Method, Runge-Kutta method of order 4.

(29.9 - 29.13, 30.4, 30.6-30.8, 32.4, 32.5, 32.7 of Text book [2])

TEXT BOOKS:

1. Peyton Z . Peebles, Jr., "Probability, Random Variables and Random Signal Principles", Fourth Edition, TMH, 2002.
2. Dr.B.S.Grewal "Higher Engineering Mathematics", 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. Athanasios Papoulis and S.Unnikrishna Pillai, *"Probability, Random variables and Stochastic processes"*, 4th Edition, PHI, 2002.
2. M.K.Jain, S.R.K.Iyengar and R.K.Jain, *"Numerical Methods form scientific and Engineering Computation"*, 4th Edition, New age International Publishers, 2003.
3. S. S. Sastry, *"Introductory Methods of Numerical Analysis"*, 4th Edition, Prentice Hall India Pvt., Limited, 2005.

MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTING

Course Code : 13HM1101

L	T	P	C
4	0	0	3

Course Educational Objectives :

To explain the basic principles of managerial economics, accounting practices and financial management techniques for effective business decision making and to promote entrepreneurial abilities among the budding engineers.

Course Outcomes :

To understand the economic environment and to give an idea on various accounting concepts and financial management techniques for effective utilization of economic resources.

UNIT-I (12 Lectures)

INTRODUCTION TO MANAGERIAL ECONOMICS & DEMAND:

Definition, Nature and Scope of Managerial Economics, Factors influencing managerial decision making process

Demand Analysis: Definition-types of demand - Demand Determinants, Law of Demand and its exceptions.

Elasticity of Demand: Definition, Types, Significance of Elasticity of Demand. Demand Forecasting: definition, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

UNIT-II (12 Lectures)

THEORY OF PRODUCTION AND COST ANALYSIS:

Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Types of Cost, Break-even Analysis (BEA)-Determination of Break-Even Point (Simple numerical problems) - Managerial Significance and limitations of BEA.

UNIT-III (10 Lectures)

BUSINESS & ENVIRONMENT:

Features of Business Organization, Features, Advantages & limitations of Sole Proprietorship, Partnership, and Joint Stock Company, Steps for formation and Registration of the company- Internal and External factors affecting business environment (PESTLE analysis)- Impact of environment on business

UNIT-IV (12 Lectures)

INTRODUCTION TO FINANCIAL ACCOUNTING:

Accounting Principles, Concepts & conventions, Double-Entry Book Keeping, Journal, Ledger, Trial Balance

UNIT-V (18 Lectures)

PREPARATION AND ANALYSIS OF FINANCIAL STATEMENTS:

Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments) - Financial statement Analysis (Comparative and Common Size Statements)- Ratio analysis (Liquidity Ratios, Activity ratios, Solvency and Profitability ratios)

TEXT BOOKS :

1 A.R. Aryasri, *"Managerial Economics and Financial Analysis"*, 2nd Edition, TMH, 2009

2 S A Siddiqui & A. S. Siddiqui, *"Managerial Economics & Financial Analysis"*, 1st Edition, New Age Publishers, 2005.

3 P Venkata Rao, J.V.Prabhakar Rao *"Managerial Economics and Financial Analysis"*, 1st Edition, Maruti Publications, 2012.

4 R.L.Varshney & K.L Maheswari, *"Managerial Economics"*, 5th Edition, S.Chand Publishers, 2005.

REFERENCES :

1 D N Dwivedi, *"Managerial Economics"*, 8th Edition, PHI, 2010.

2 S P Jain & KL Narang, *"Cost and Management Accounting"*, 3rd Edition Kalyani Publishers, 2004.

3 P.K.Sharma & Shashi K. Gupta, *"Management Accounting Principles and Practice"*, 1st Edition, Kalyani Publishers, 2004.

INTRODUCTION TO SIGNALS AND SYSTEMS

Course Code:13EE1107

L	T	P	C
4	0	0	3

Pre requisites: Mathematics – I, II & III.

Course Educational Objectives:

To get basic understanding of continuous time signals and systems and clearly understand how signals and systems can be viewed from various points of view (time, frequency). To Understand how transform methods can be used for analyzing continuous time systems and discrete time systems.

Course Outcomes:

To be able to classify systems, apply transform methods to analyze systems described by differential and difference equations. Also to be able to visualize what happens when signals pass through linear systems.

UNIT-I **(12 Lectures)**

SIGNALS AND SYSTEMS:

Introduction, Signals, Transformations of the Independent Variable, Basic continuous-Time Signals, Basic Discrete – Time Signals, Systems, Properties of Systems.

The Representation of Signals in terms of Impulses, Discrete-Time LTI systems: The Convolution sum, Continuous-Time LTI systems: The Convolution Integral, Properties of Linear Time-Invariant Systems, Systems Described by Differential and Difference Equations, Block-Diagram Representations of LTI systems described by Differential Equations.

UNIT-II **(12 Lectures)**

FOURIER SERIES & FOURIER TRANSFORM:

Fourier series representation of continuous time periodic signals. Properties of Fourier series. Examples of continuous time filters described by differential equations.

Representation of periodic signals: The CT Fourier transform. The Fourier transform for periodic signals. Properties of continuous time Fourier transform.

UNIT-III (12 Lectures)

SAMPLING:

Introduction, Representation of continuous time signals by its samples: The sampling theorem. Reconstruction of a signal from its samples using interpolation. The effect of under sampling: aliasing.

UNIT-IV (12 Lectures)

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS:

Linear system, impulse response, response of a linear system, linear time invariant(LTI) system, Transfer function of LTI system, filter characteristics of linear systems, Distortion less transmission through a system, Signal bandwidth, Ideal LPF,HPF and BPF characteristics, Causality and Poly-wiener criterion for physical realization.

UNIT-V (12 Lectures)

THE Z-TRANSFORM & PROPERTIES:

Introduction, the Z-transform, The region of convergence for the Z-Transform, Some common Z-Transform pairs. Analysis and characterization of linear time invariant systems using Z-transforms. Block diagram representations

TEXT BOOKS:

1. Signals and systems – A.V.Oppenheim, A.S.Willsky and S.H.Nawab, PHI, 2nd Edition, 1997. (UNITS – I, II, III, V)
2. Communications Systems – B.P.Lathi, BS Publications. (UNIT – IV)

REFERENCES:

1. Simon Haykin and Van veen, Wiley, *"Signals & Systems"*, 2nd Edition, 2002.
2. P.Rama Krishna Rao, *"Signals & Systems"*, 1st Edition, TMH, 2008.

3. Robert, *"Signals & Systems Analysis Using Transformation Methods & MATLAB"*, TMH, 2003.
4. C.L.Philips, J.M.Parr and Eve A.Riskin, *"Signals, Systems and Transforms"*, Pearson Education. 3rd Edition, 2004.
5. Sanjay Sharma, *"Signals and Systems with MATLAB programs"*, S.K.Publication, 5th Edition, 2005.

ELECTRICAL MACHINES – II

Course Code:13EE1108

L	T	P	C
4	1	0	3

Pre requisites: Basic Network Analysis

Course Educational Objectives:

- To study the theory and performance characteristics of3 phase induction machines andSynchronous machines.
- To study theory of operation and performance characteristics of single-phaseinduction motors; PMDC motors and Reluctance motors

Course Outcomes:

- Students will acquire good knowledge of 3 phase induction machines and synchronous machines.
- Students will able to conduct experiments on 3 phase induction motors and synchronous machines.

UNIT-I **(12 Lectures)**

BASIC CONCEPTS OF AC ROTATING MACHINES:

Introduction- elementary machines-generated e.m.f-MMF of distributed AC windings- rotating magnetic field-torque in round rotor machine- laws of magnetic circuits-phase reactance of an induction motor- phase reactance of a synchronous machine-ac winding-distribution factor – coil span factor-phase connection-tooth harmonics.

UNIT-II **(12 Lectures)**

THREE PHASE INDUCTION MOTOR:

Constructional details – flux and MMF waves– Principle of operation – Slip – Equivalent circuit – Slip-torque characteristics - Condition for maximum torque - No load and blocked rotor tests - Circle diagram – Separation of no load losses – Losses and efficiency – Load test -Double cage rotors –cogging and crawling- Types of induction motors- Induction generator principles

UNIT-III (12 Lectures)

STARTING AND SPEED CONTROL OF THREE PHASE INDUCTION MOTOR:

Need for starting – Types of starters – Rotor resistance, Autotransformer and Star-delta starters – Speed control – Change of voltage, torque, number of poles and slip – Cascaded connection – Slip power recovery scheme.

UNIT-IV (12 Lectures)

SYNCHRONOUS MACHINES:

Constructional details – Types of rotors – EMF equation – Synchronous reactance – Armature reaction – Voltage regulation – EMF, MMF and ZPF methods – Synchronizing and parallel operation – Synchronizing torque - Change of excitation and mechanical input – Two reaction theory – Determination of direct and quadrature axis synchronous reactance using slip test – Operating characteristics - Capability curves-synchronous motor- V and inverted-V curves-Synchronous condenser.

UNIT-V (12 Lectures)

SINGLE PHASE INDUCTION MOTORS & 3 PHASE SPECIAL MOTORS:

Single phase induction motor – Constructional features-Double revolving field theory – Elementary idea of cross-field theory – circuit model of single phase induction machine-split phase motors – shaded pole motor.

Principles and performance of Permanent Magnet DC (PMDC) Motor and Reluctance Motors.

TEXT BOOK:

1. I. J. Nagrath&D.P.Kothari, *“Electric Machines”*, Tata McGraw-Hill Publishers, 4th Edition, 2010.

REFERENCE:

1. M.G. Say, *“Performance and Design of A.C. Machines”*, ELBS and Pitman & Sons, 3rd Edition, 2008.

PULSE AND DIGITAL CIRCUITS
(Common to ECE, EEE)

Course Code: 13EC1106

L	T	P	C
4	0	0	3

Pre requisites:

Engineering Physics, Electronic devices Circuits, Basics of Mathematics

Course Educational Objectives:

- To understand the concepts of wave shaping.
- Study of multivibrators
- Understand the applications of analog and digital waveform generation.

Course Outcomes:

- Capability to design linear and non-linear wave shaping circuits.
- Capability to design square wave and time base generators and their applications.

UNIT-I **(15 Lectures)**

LINEAR AND NON-LINEAR WAVESHAPING :

Lowpass & Highpass RCcircuits, Response for sinusoidal, step, pulse, square and rampinputs, RC network as differentiator and integrator,Ringing circuit. Diode clippers, Transistor clippers, Emitter coupled clipper, clamping circuits, clamping circuit theorem.

UNIT-II **(15 lectures)**

MULTIVIBRATORS:

Classification of Multivibrators, Bistable multivibrator, commutating capacitors, triggering binary-symmetrical &unsymmetrical triggering, Schmitt Triggercircuit. Monostable multivibrators- collector coupled, emitter coupled, Triggering monostable. Astable Multivibrators -collector coupled and emitter coupled using transistors.

UNIT-III (12 Lectures)

TIMEBASEGENERATORS:

General features of a timebase signal, methods of generating time base wave form, Miller and Boots traptime base generators basic principles, Transistor miller time base generator, transistor Boots trap time base generator, Current time base generators.

UNIT-IV (10 Lectures)

SYNCHRONIZATION AND FREQUENCYDIVISION:

Principle of Synchronization, Frequency divisionin sweep circuit, Astable relaxation circuits, Monostable relaxation circuits, Synchronization of as weepcircuit with symmetrical signal, Sine wave frequency division with as weepcircuit.

UNIT-V (8 Lectures)

SAMPLING GATES:

Basic operating principles of sampling gates, Unidirectionaland Bi-directionalsamplinggates,Reductionofpedestal ingatecircuits, Applications of sampling gates.

Logic Gates: Logic gates usingDiodes, resistors and transistor- RTL, DTL.

TEXT BOOKS:

1. J.MillmanandH. Taub, *"Pulse,Digital and Switching Waveforms"* McGraw-Hill, 2008.
2. A.Anand Kumar, *"Pulse and Digital Circuits*" PHI, 2nd Edition, 2005.

REFERENCES:

1. David A. Bell, "*Solid State Pulse circuits*"PHI,4th Edition.,2002
2. L.Strauss, *"Wave Generation andShaping*"Literary Licensing, LLC, 2012
3. Venkata Rao K,Rama Sudha K, Manmadha Rao G. "*Pulse and Digital Circuits",* Pearson Education India, 2010

POWER GENERATION ENGINEERING

Course Code: 13EE1109

L	T	P	C
4	0	0	3

Pre requisites:

Fluid Mechanics and Hydraulic Machines & Electrical Machines.

Course Educational Objectives:

Electrical Power plays significant role in day to day life of entire mankind. This course concerns the generation of power along with the economic aspects.

Course Outcomes:

- ✤ After completion of the course students are able to know how to generate different methods of power generation
- ✤ After completion of course students are able to know to calculate different methods of tariff

UNIT-I **(12 Lectures)**

THERMAL AND HYDROELECTRIC POWER STATIONS:

Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, ash and flue gases.- Brief description of TPS components: Economizers, Boilers, Super heaters, Turbines, Condensers, Chimney and Cooling towers, ESP, Turbo-Generator Features.

Plant Layout, Classification, Components, Calculation of Available Power, Hydrology, Hydroelectric Power Plant, Hydroelectric Generator Features.

UNIT-II **(12 Lectures)**

NUCLEAR, GAS AND DIESEL POWER STATIONS:

Nuclear Power Stations: Nuclear Fission and Chain reaction.- Nuclear fuels.- Principle of operation of Nuclear reactor.-Reactor Components: Moderators, Control rods, Reflectors and Coolants.- - Types of Nuclear reactors and brief description of PWR, BWR and FBR, Radiation hazards: Shielding and Safety precautions.

Gas Power Stations: Principle of Operation and Components (Block Diagram Approach Only), Combined Cycle Power Plant.

Diesel Power Stations: Main Components, Schematic arrangement, Diesel Engine types and characteristics, Plant Operation, Plant layout.

UNIT-III (12 Lectures)

NON-CONVENTIONAL SOURCES OF ENERGY:

Renewable Energy sources-Advantages-Obstacles to the implementation of Renewable Energy sources-Prospects-Introduction to Solar Energy, Wind Energy, Bio-Mass Energy, Geo Thermal Energy, Ocean Energy, Tidal and Wave Energies-Schematic Diagrams and Principle of Operation only.

UNIT-IV (12 Lectures)

SUBSTATIONS:

Classification of substations: Air insulated substations - Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment. Bus bar arrangements in the Sub-Stations: Simple arrangements like single bus bar, sectionalized single bus bar, main and transfer bus bar system, main and transfer bus bar system ,one-and-a-half breaker scheme with relevant diagrams.

Gas insulated substations (GIS) – Advantages, different types, single line diagram, bus bar arrangement, construction aspects of GIS, Installation and maintenance of GIS, Comparison of Air insulated substations and Gas insulated substations.

UNIT-V (12 Lectures)

ECONOMICS OF POWER GENERATION AND TARIFF METHODS:

Load curve, load duration and integrated load duration curves-load, demand, diversity, capacity, utilization and plant use factors- Numerical Problems.

Costs of Generation and their division into Fixed, Semi-fixed and Running Costs, Desirable Characteristics of a Tariff Method, Tariff Methods- Flat Rate, Block-Rate, two-part, three –part, and power factor tariff methods, Numerical Problems.

TEXT BOOKS:

1. M.L. Soni, P.V. Gupta, U.S. Bhatnagar and A. Chakraborti, *"A Text Book on Power System Engineering"*, 2nd Edition, Dhanpat Rai & Co. Pvt. Ltd., 2010.[Unit-1,2,4,5]
2. D. P. Kothari, K. C. Singal, Rakesh Ranjan, *"Renewable Energy Sources and Emerging Technologies"*, 2nd Edition, PHI Learning Private Limited, 2011.[Unit-3].

REFERENCES:

1. M.V. Deshpande, *"Elements of Power Station Design and Practice"*, Wheeler Publishing,1979
2. Arora Domukundwar, *"Power Plant Engineering"*, Dhanpat Rai& Sons,1978.

CONTROL SYSTEMS & SIMULATION LAB

Course Code:13EE1110

L	T	P	C
0	0	3	2

Course Educational Objectives:

To evaluate time response of first & second order systems, servomotors, and effect of P, PD, PI, PID controllers on second order system, Design of Compensation, Network coding in MATLAB for Control Systems Problems.

Course Outcomes:

- ✤ Construct and recognize the properties of root-locus for feedback control systems with a single variable parameter
- ✤ Specify control system performance in the frequency-domain in terms of gain and phase margins, and design compensators to achieve the desired performance.
- ✤ Analyze control systems using state-space methods.

THE FOLLOWING ARE THE EXPERIMENTS REQUIRED TO BE CONDUCTED AS COMPULSORY EXPERIMENTS:

1. Characteristics of Synchros.
2. Characteristics of magnetic amplifiers
3. Effect of feedback on DC servo motor.
4. Lag and lead compensation – Magnitude and phase plot.
5. Effect of P, PD, PI, PID Controller on a second order systems.
6. Design problems for required specifications using Root locus and Bode Plot with MATLAB.
7. State space model for classical transfer function verification using MATLAB.
8. PSPICE-simulation of Op-Amp based integrator and differentiator circuits.

In addition to the above eight experiments, at least any two of the

EXPERIMENTS FROM THE LIST ARE REQUIRED TO BE CONDUCTED:

1. Transfer function of DC generator
2. Temperature controller using P, PI controllers.
3. Transfer function of DC motor.
4. Characteristics of AC servo motor.

ELECTRICAL MACHINES LAB-I

Course Code:13EE1111

L	T	P	C
0	0	3	2

Pre requisites: The students should have undergone a basic course on construction and operation transformers and DC machines.

Course Educational Objectives:

The lab is intended for the students to get hands on experience in dealing with transformers and DC machines.

Course Outcomes:

Students to get hands on experience in relation to transformers and DC machines in a laboratory setting.

THE FOLLOWING EXPERIMENTS ARE TO BE CONDUCTED COMPULSORY:

1. O.C. & S.C. tests on single-phase transformer
2. Sumpner's test on a pair of single-phase transformers for efficiency determination.
3. Three-phase to two-phase (Scott) connection of transformers.
4. Separation of core losses in a single-phase transformer
5. Open Circuit Characteristics of DC shunt generator and determination of critical field resistance and critical speed.
6. Load test on DC shunt generator and compound generators and determination of their performance characteristics.
7. Speed control of DC shunt motor.
8. Predetermination of efficiency at various loads (1/4,1/2,3/4 and full load). (Swinburne's test).

   In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted:

9. Hopkinson's test on DC shunt machines. Determination of efficiency.
10. Brake test on a DC shunt motor and determination of performance characteristics.
11. Brake test on DC compound motor. Determination of performance curves.
12. Retardation test on DC shunt motor (for determination of moment of inertia of machines J).
13. Separation of losses in DC shunt motor.

NOTES

SYLLABI FOR
V SEMESTER

POWER TRANSMISSION ENGINEERING

Course Code: 13EE1112

L	T	P	C
4	1	0	3

Pre requisites: Basic Network Analysis &Electrical Machines.

Course Educational Objectives:

This course deals with basic theory of transmission lines modeling and their performance analysis. Also this course gives emphasis on mechanical design of transmission lines, cables and insulators.

Course Outcomes:

After the course is over the student is expected to analyze any isolated transmission line with given terminal condition and also design from electrical and mechanical points of view.

UNIT-I (12 Lectures)

SERIES IMPEDANCE AND CAPACITANCE OF TRANSMISSION LINE:

Types of conductors, calculation of resistance, skin effect, Calculation of inductance for single phase two-wire line, composite-conductor lines, inductance of three-phase lines with equilateral and unsymmetrical spacing, bundled conductors and parallel circuit three-phase lines. Capacitance of a two-wire line, three-phase lines with equilateral and unsymmetrical spacing, Effect of earth on the capacitance of three-phase transmission lines, bundled conductors and parallel circuit three-phase lines, An introduction to per unit systems.

UNIT-II (12 Lectures)

PERFORMANCE OF SHORT, MEDIUM AND LONG LENGTH TRANSMISSION LINES:

Classification of Transmission Lines - Short, medium and long line and their model representations - Nominal-T, Nominal-Pie and A, B, C, D Constants for symmetrical & Asymmetrical Networks, Numerical Problems. Mathematical Solutions to estimate regulation and efficiency of all types of lines - Long Transmission Line-Rigorous Solution, evaluation of A,B,C,D Constants, Interpretation of the Long Line Equations, Incident, Reflected and Refracted Waves -Surge Impedance and SIL of Long Lines, Wave Length and Velocity of Propagation of Waves - Representation of Long Lines - Equivalent-T and Equivalent Pie network models (numerical problems).

UNIT-III (12 Lectures)

POWER SYSTEM TRANSIENTS AND CORONA:

Types of system transients, travelling waves and propagation of surges: reflection and refraction of travelling waves, reflection and refraction at a t-junction, lumped reactive junction, attenuation and distortion of travelling waves, bewley lattice diagram. Critical disruptive voltage, conditions affecting corona, corona loss, practical importance of corona

UNIT-IV (12 Lectures)

INSULATORS AND MECHANICAL DESIGN OF TRANSMISSION LINE:

Types of Insulators, Potential Distribution Over A String Of Suspension Insulators, Methods Of Equalizing Potential, Insulation Failure, Testing Of Insulators.

Sag and Tension Calculations with equal and unequal heights of towers, Effect of Wind and Ice, Stringing chart and sag template.

UNIT-V (12 Lectures)

UNDERGROUND CABLES:

Types of cables, capacitance of single-core cable, grading of cables, power factor and heating of cables, capacitance of 3-core belted cable, D.C. Cables.

TEXT BOOKS:

1. William D Stevenson. Jr, *"Elements of Power System Analysis"*, McGraw-Hill International Editions, 4th Edition, 1982.[Unit-1,2,3]
2. D.P Kothari and I.J. Nagarath, *"Power System Engineering"*, Tata McGraw-Hill, 2nd Edition, 2010. [Unit-4,5]

REFERENCES:

1. John J Grainger and William D Stevenson, *"Power System Analysis"*, TMH, 1st Edition, 2003.
2. C.L. Wadhwa, *"Electrical Power Systems"*, New Age International (P) Limited, Publishers, 5th Edition, 2009.
3. B.R. Gupta, *"Power System Analysis and Design"*, S. Chand, Reprint, 2010.
4. S.A. Nasar, *"Theory and Problems of Electric Power Systems"*, Schaum's Outline series, Mc Graw-Hill Company, 2nd Edition 2010.
5. Hadi Saadat, *"Power System Analysis"*, TMH Edition, 2nd Edition, 1999.

POWER ELECTRONICS

(Common to EEE & ECE)

CourseCode:13EE1113

L	T	P	C
4	1	0	3

Pre requisites:

Basic Network Analysis, Electronic Devices and Electronic Circuits

Course Educational Objectives:

To familiarize the students with different power semiconductor devices, converter circuits that find wide application in industry.

Course Outcomes:

After completion of this course the students get familiarized with different power semiconductor devices, converter circuits, their analysis and applications.

UNIT-I (12 Lectures)

POWER SEMICONDUCTOR DEVICES:

Power BJTs, Power MOSFETs, Power IGBTs, GTOs and their characteristics. Basic principle of operation of SCR, Static characteristics, Two transistor model of SCR, SCR Turn on and SCR turn off characteristics, Comparison of various Power Electronic (PE) - devices.

TRIGGERING CIRCUITS:

Series and parallel connections of Thyristors, di/dt protection, dv/dt protection of SCRs, MOSFET gate drive circuit, BJT base drive circuit, Isolation of gate and base drive, Thyristor firing circuits.

UNIT-II (12 Lectures)

1- PHASE, PHASE- ANGLE CONTROLLED THYRISTOR CONVERTERS:

Principle of phase angle control: Single phase full converter with R-L load, Single phase dual converter, Single phase semi-controlled converter with R-L load.

3- PHASE, PHASE- ANGLE CONTROLLED THYRISTOR CONVERTERS:

Three phase half wave converter with R-L load, Three phase Full wave converter with R-L load, Three phase dual converter, Three phase semi converter with R-L load.

UNIT-III (12 Lectures)

AC VOLTAGE CONTROLLERS & CYCLO CONVERTERS:

Principle of on-off control, Principle of phase control, Single phase bidirectional controllers with resistive load, Single phase controllers with inductive load, 1-phase / 3-phase cyclo-converters.

UNIT-IV (12 Lectures)

DC-DC CONVERTERS:

Principle of step down chopper, Generation of duty cycle, Step down converters with and without back e.m.f load, Principle of step up chopper, Performance of step down/ up choppers, Converter classifications.

UNIT-V (12 Lectures)

INVERTERS:

Single phase half bridge inverter, Single phase full bridge inverter, Three phase voltage source inverters (180 and 120 degree modes).

VOLTAGE CONTROL TECHNIQUES OF INVERTERS:

Single Pulse Width Modulation, Multiple Pulse-width Modulation, Sinusoidal Pulse width Modulation, Modified Sinusoidal Pulse Width Modulation.

TEXT BOOKS:

M. H. Rashid, *"Power Electronics: Circuits, Devices and Applications"*, Prentice Hall of India 3rd Edition, 2011

REFERENCES:

1. P.C.Sen, *"Power Electronics"*, Tata McGraw-Hill, 1st Edition, 2001.

2. Ned Mohan, Tore M. Undeland, *"Power Electronics - Converters, Applications and Design"*, Wiley India Edition, 3rd Edition.
3. M. D. Singh & K. B. Kanchandhani, *"Power Electronics"*, Tata McGraw – Hill Publishing company, 2nd Edition, 2010.

COMMUNICATION SYSTEMS
(Common to EEE & IT)

Course Code:13EC1145

L	T	P	C
4	0	0	3

Prerequistes:

Course Educational Objectives:

- To understand the fundamentals concepts of various communication systems.
- To understand different modulation techniques for analog and digital communication.

Course Outcomes:

After completion of the course, students shall be able to understand

- The basics of various communication systems
- Modulation schemes
- Principles of TV and satellite communication.

UNIT-I **(12 lectures)**

ANALOG MODULATION :

Introduction to communication systems, Bandwidth requirements, Need for modulation, Amplitude modulation, AM transmitters and receivers, Single sideband systems, Balanced Modulator, Single sideband transmitters and receivers, Frequency and Phase Modulation: Mathematical representation, Frequency spectrum, Pre-emphasis and De-emphasis, FM transmitters and receivers.

UNIT-II

PULSE AND DIGITAL MODULATION:

Pulse modulation-Pulse amplitude modulation, Pulse width modulation, Pulse position modulation, Pulse code modulation, Sampling and

Quantization. Information capacity, Amplitude shift keying, phase shift keying, Quadrature amplitude modulation, Differential phase shift keying,

UNIT-III (13 lectures)

PRINCIPLES OF TV & BROADCASTING:

Gross structure, Image continuity, scanning, flicker, interlaced scanning, number of scanning lines, Fine structure, Tonal Gradation. Video signal dimensions, Horizontal sync.Details, Vertical sync. Details, Scanning sequence details, Functions of vertical pulse train, Channel bandwidth, vestigial side band transmission, Colour transmission and Reception.

UNIT-IV (12 lectures)

SATELLITE COMMUNICATIONS:

History of satellites, Kepler's laws, Satellite orbits, Geo synchronous satellites, Antenna look angles, satellite system link models, Link equations and Link Budget.

UNIT-V (10 lectures)

CELLULAR COMMUNICATIONS:

Mobile telephone service, Evolution of cellular telephone, channel allocation, frequency reuse, cellular capacity, Roaming and Handoffs, GSM, CDMA,

TEXT BOOKS:

1. Wayne Tomasi,*"Electronic Communications systems"* 2nd Edition, Pearson Publications, 2009.
2. George Kennedy and Bernard Davis, *"Electronic Communication Systems"*, TMH, 2006.

REFERENCES:

1. Dennis Roddy, *"Satellite Communication"*, McGraw Hill International, 4th Edition, 2006.
2. R. R.Gulati, *"Monochrome and Colour Television"*, New Age International, 2007.

ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

Course Code: 13EE1114

L	T	P	C
4	0	0	3

Pre requisites: Knowledge of Basic Network Analysis.

Course Educational Objectives:

To familiarize the students to various types of measuring instruments and their performance characteristics.

Course Outcomes:

Student is able to understand the basic principles of measuring instruments related to Electrical Engineering and choose a proper measuring instrument suitable for any given application taking into consideration the operating conditions.

UNIT-I

MEASURING INSTRUMENTS:

Measuring Systems, Performance Characteristics, Static and Dynamic Characteristics. Errors in Measurement – Gross Errors, Systematic Errors, Statistical Analysis of Random Errors.

Classification – Deflecting, Control and Damping Torques – Ammeters and Voltmeters – PMMC & MI Type Instruments – Expression for the Deflecting Torque and Control torque – Errors and Compensations, Extension of Range using Shunts and Series Resistance. Electrostatic Voltmeters, Electrometer and Attracted disc Types. Comparison of performance characteristics of various types of meters.

UNIT-II

MEASUREMENT OF POWER & ENERGY:

Single Phase and Three Phase Dynamometer wattmeter (LPF and UPF), Measurement of Active and Reactive Powers in Balanced and Unbalanced systems. Single Phase Induction Type Energy Meter – Driving and Braking torques – Three Phase Energy Meter – Maximum Demand Meter.

Type of P.F. Meters – Dynamometer and Moving Iron Type – Single and Three Phase meters, Frequency meters – Resonance Type and Weston type – Synchroscopes.

UNIT-III

MEASUREMENT OF RESISTANCE, INDUCTANCE AND CAPACITANCE:

Principle and operation of D.C. Crompton's potentiometer – Standardization – Measurement of unknown Resistance, Current, Voltage – Sensitivity of Wheatstone bridge, Kelvin's Double Bridge for measuring Low Resistance, Measurement of High Resistance – Loss of Charge method and Megger.

Measurement of Inductance, Quality Factor - Maxwell's, Hay's & Anderson's Bridges, Measurement of Capacitance and loss angle – De Sauty's, Wien's & Schering Bridges

UNIT-IV

MAGNETIC , OPTICAL AND THERMAL MEASUREMENTS:

Ballistic galvanometer, Calibration of Hibbert's Magnetic Standard Flux meter, Lloyd Fischer Square for measuring Iron loss. Testing of ring and bar specimens, determination for BH curve and Hysteresis loss using CRO, Determination of leakage factor.

Illumination-Definitions, Laws of Illumination, measurement of luminous intensity. General methods of measuring temperature- electrical Resistance pyrometers-laws of resistance variation with temperature-indicators and recorders-Thermo electric pyrometers-thermo electric emf's, radiation pyrometers.

UNIT-V

INSTRUMENT TRANSFORMERS AND TRANSDUCERS:

Current Transformer and Potential Transformer – Ratio and Phase angle errors – Design considerations .Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers; Principle operation of Resistive Transducers, Inductive Transducers, LVDT and Capacitive Transducers; LVDT

Applications, Thermistors, Thermocouples, Piezoelectric Transducers, Photovoltaic, Photo conductive cells, measurements of non electrical quantities- Strain gauge and its principle of operation, gauge factor, measurement of torque and angular velocity.

TEXT BOOKS:

1. E.W. Golding and F. C. Widdis, *"Electrical Measurements and Measuring Instruments"*, 5th Edition, Reem Publications,2011. [Unit-1,2,3,4]
2. A. K. Sawhney, *"A course in Electrical and Electronic Measurements and Instrumentation"*, Dhanpatrai & Co., 18th Edition, 2008.[Unit-5]

REFERENCES:

1. A.S Morris, *"Measurement and Instrumentation Principles"*, Elsevier, 3rd Edition,2006.
2. H.S. Kalsi, *"Electronic Instrumentation"*, Tata McGraw-Hill 3rd Edition, 2010.

COMPUTER ORGANIZATION
(Common to CSE, ECE, EEE, IT)

Course Code : 13CT1105

L	T	P	C
4	0	0	3

Course Educational Objectives:

To give detailed information about the structure of computers and internal organization of different units regarding memory, I/O devices and registers.

- ✤ The internal organization of the computer system
- ✤ The internal operations.
- ✤ To know about register transfer and micro operations.
- ✤ To know about memory organization
- ✤ To know about pipeline and vector processing.

Course Outcomes:

At the end of the course student will be able to

- ✤ Get knowledge on basic structure of computers, register transfer operations.
- ✤ Get knowledge on memory organization and pipe line processing.
- ✤ Get knowledge on Arithmetic operations with float values.
- ✤ Get knowledge on input output devices organization.
- ✤ Get knowledge on vector processing.

UNIT-I (12 Lectures)

BASIC STRUCTURE OF COMPUTERS:

Organization and Architecture, Structure and Function, Computer Components, Computer Function, Bus Interconnection, Processor Organization, Register Organization.

BASIC COMPUTER ORGANIZATION AND DESIGN:

Instruction codes, Computer instructions, Memory reference instructions, Instruction Cycle.

CENTRAL PROCESSING UNIT:

Stack organization, instruction formats, addressing modes, data transfer and manipulation, program control, RISC.

UNIT-II (12 Lectures)

REGISTER TRANSFER AND MICRO OPERATIONS:

Register transfer language, Register transfer, Bus and Memory transfers, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations, Arithmetic Logic Shift Unit.

MICRO PROGRAMMED CONTROL:

Control Memory, Address Sequencing, Micro Program examples, Design of control unit, Hardwired control..

UNIT-III (12 Lectures)

COMPUTER ARITHMETIC:

Data representation- Fixed point representation, Floating point representation, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating-point Representations, Floating-point Arithmetic Operations, Decimal Arithmetic Units, Decimal Arithmetic Operations.

UNIT-IV (12 Lectures)

MEMORY ORGANIZATION:

Memory system overview, Memory Hierarchy, Semi-conductor Main Memory, Cache Memory principle, Elements of cache design, Virtual Memory, Magnetic Disk, Optical Memory, Magnetic Tape, RAID.

INPUT- OUTPUT:

External Devices, I/O modules, Interrupts, Programmed I/O, Interrupt-driven I/O, Direct Memory Access, I/O Channels and Processors, PCI.

Asynchronous Data Transfer, Priority Interrupt, Serial Communication.

UNIT-V (12 Lectures)

PIPELINE AND VECTOR PROCESSING:

Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

MULTI PROCESSORS:

Multiprocessors and Multi computers, Characteristics of Multi-processors, Multiple Processor Organizations, Symmetric Multi-Processors, Cache Coherence, Clusters, Non Uniform Memory Access (NUMA).

TEXT BOOKS:

1. William Stallings, *Computer Organization and Architecture*, 8th Edition, Pearson Education, 2010.
2. M.Moris Mano, *Computer Systems Architecture*, 3rd Edition, Pearson Education, 2007.

REFERENCES:

1. John D. Carpinelli, *Computer Systems Organization and Architecture*, 3rd Edition, Pearson Education, 2001.
2. Carl Hamacher, Zvonks Vranesic, SafeaZak , *Computer Organization* , 5th Edition, TMH,2011.

WEB REFERENCES:

http://nptel.iitm.ac.in/video.php?subjectId=106106092

LINEAR AND DIGITAL IC APPLICATIONS

Course Code:13EC1146

L	T	P	C
4	0	0	3

Pre requisites: Engineering Physics, EDC, ECA, PDC

Course Educational Objectives:

- ✤ To introduce the basic building blocks of linear integrated circuits.
- ✤ To teach the linear and non-linear applications of operational amplifiers.
- ✤ To introduce the theory and applications of PLL.
- ✤ To introduce the concepts of waveform generation and introduce some special function ICs...
- ✤ Exposure to digital IC's

Course Outcomes:

- ✤ Students will develop and build different Electronic circuits.
- ✤ Student will be able to analyze different issues related to the development of Linear and Digital integrated circuits.

UNIT-I (15 Lectures)

OP-AMP &APPLICATIONS:

Op-Amp Block Diagram, Characteristics of OP-Amps, ideal and practical Op-Amp specifications. DC and AC characteristics: 741 op-amps. Inverting and Non-inverting amplifier, Integrator and differentiator, Instrumentation amplifier, Voltage to current and current to Voltage converters ,Comparators, Schmitt Trigger, Multivibrators, Triangular and Square wave generators, Voltage regulators.

UNIT-II (14 Lectures)

TIMER& PHASE LOCKED LOOP:

Introduction to 555 timer, functional diagram, Monostable and Astable operations and applications, 555 timer as Schmitt Trigger. PLL -

introduction, block schematic, principles and description of individual blocks, 565 PLL.

UNIT-III (12 Lectures)

D/A & A/D CONVERTERS:

Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC. DAC and ADC Specifications,

UNIT-IV (15 Lectures)

INTRODUCTION TO LOGIC FAMILIES:

Classification of Integrated circuits, comparison of various logic families, standard RTL, ECL, TTL NAND Gate, NMOS, PMOS & CMOS. Compound CMOS Gates, tri-state device.

UNIT-V (12 Lectures)

COMBINATIONAL & SEQUENTIAL LOGIC CIRCUITS:

Design using Digital ICs: multiplexers, Demultiplexers, decoders, Encoder, priority Encoder, Flip-flops & their conversions, Design of synchronous counters, Decade counter, shift registers.

TEXT BOOKS:

1. Ramakanth A. Gayakwad, *"Op-Amps & Linear ICs"* 4th Edition, PHI, 2002.
2. D. Roy Chowdhury, *"Linear Integrated Circuits"*, New Age International (p) Ltd, 2nd Edition,2003.
3. John F. Wakerley, *"Digital Design Principal"*, Pearson Education, 3rd Edition, 2005.
4. Floyd and Jain, *"Digital Fundamentals"*, Pearson Education, 8th Edition, 2005.

REFERENCES:

1. Sergio Franco, *"Design with Operational Amplifiers & Analog Integrated Circuits"*, McGraw Hill, 1988.

2. R.F.Coughlin & Fredrick Driscoll, *"Operational Amplifiers & Linear Integrated Circuits"*, PHI, 5th Edition, 1998.

3. C.G. Clayton, *"Operational Amplifiers"*, 5th Edition, Newnes Publishers, 2003.

ELECTRICAL MACHINES LAB-II

Course Code: 13EE1115

L	T	P	C
0	0	3	2

Pre requisites:

The students should have undergone a basic course on construction and operation transformers and AC machines

Course Educational Objectives:

The lab is intended for the students to get hands on experience in dealing with AC machines and transformers.

Course outcomes:

Students to get hands on experience in relation to transformers and AC machines in a laboratory setting.

LIST OF EXPERIMENTS:

1. Parallel-operation of single-phase transformers.
2. Polarity test, polyphase connection of transformers using 3 single-phase transformers.
3. Heat run test on a bank of 3 Nos. of single-phase delta connected transformers.
4. Brake test on three-phase induction motor
5. No-load & blocked rotor tests on three- phase induction motor and circle diagram.
6. Regulation of a three-phase alternator by synchronous impedance, M.M.F. and ZPF methods.
7. Determination of X_d and X_q of a salient pole synchronous generator.
8. V and inverted-V curves of a three-phase synchronous motor at finite load.

9. Determination of equivalent circuit parameters of a single-phase induction motor.
10. Open loop v/f control for an inverter fed induction motor.

TECHNICAL COMMUNICATION AND SOFT SKILLS LAB

Course Code : 13HE1103

L	T	P	C
0	0	3	2

Introduction

The introduction of the Advanced English Communication skills Lab is considered essential at B.Tech. level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context. The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

- Gathering ideas and information: organizing ideas relevantly and coherently
- Engaging in debates
- Participating in group discussions
- Facing interviews
- Writing project proposals / technical reports
- Making oral presentations
- Writing formal letters and essays
- Transferring information from non-verbal to verbal texts and vice versa
- Taking part in social and professional communication

Course Educational Objectives

The Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the students' accuracy and fluency in English through a well-developed vocabulary, and enable them to listen to English

spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.

- To enable students face competitive exams such as, GRE, TOEFL, IELTS, UPSC and other Bank examinations.
- To enable them communicate their ideas relevantly and coherently in writing.

Course outcomes:

- Students will be able to use language accurately, fluently and appropriately.
- They will be able to show their skills of listening, understanding and interpreting.
- They will be able to write project reports, reviews and resumes.
- They will be able to express their ideas relevant to given topics.
- Students will also exhibit advanced skills of interview, debating and discussion.

LIST OF TASKS :

1. Listening comprehension – Achieving ability to comprehend material delivered at relatively fast speed; comprehending spoken material in Standard Indian English, British English, and American English; intelligent listening in situations such as interview in which one is a candidate.
2. Vocabulary building, Creativity, using Advertisements, Case Studies etc.
3. Personality Development: Decision-Making, Problem Solving, Goal Setting, Time Management & Positive Thinking
4. Cross-Cultural Communication : Role-Play/ Non-Verbal Communication.
5. Meetings- making meeting effective, chairing a meeting, decision-making, seeking opinions , interrupting and handling interruptions, clarifications, closure- Agenda, Minute writing

6. Group Discussion – dynamics of group discussion, Lateral thinking, Brainstorming and Negotiation skills
7. Resume writing – CV – structural differences, structure and presentation, planning, defining the career objective
8. Interview Skills – formal & informal interviews,concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing
9. Writing Skills - Business Communication, Essays for competitive examinations.
10. Technical Report Writing/ Project Proposals – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.- Feasibility, Progress and Project Reports.

REFERENCES:

1. Simon Sweeny, *"English for Business Communication"*, CUP, First South Asian Edition, 2010.
2. M. Ashraf Rizvi, *"Effective Technical Communication"*, Tata McGraw-Hill Publishing Company Ltd. 2005.
3. Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, *"English Language Communication: A Reader cum Lab Manual"*, Anuradha Publications, Chennai, 2006.
4. Dr. Shalini Verma, *"Body Language- Your Success Mantra"*, S. Chand, 2006.
5. Andrea J. Rutherford, *"Basic Communication Skills for Technology"*, 2nd Edition, Pearson Education, 2007.
6. Sunita Mishra & C. Muralikrishna, *"Communication Skills for Engineers"*, Pearson Education, 2007.
7. Jolene Gear & Robert Gear, *"Cambridge Preparation for the TOEFL Test"*, 2010.
8. Meenakshi Raman & Sangeeta Sharma, *"Technical Communication"*, Oxford University Press, 2011.

9. Nick Ceremilla & Elizabeth Lee- Cambridge *"English for the Media"* CUP, 2010.

10. R.C. Sharma, Krishna Mohan, *"Business Correspondence and Report writing"*, 4th Edition, Tata Mcgraw-Hill Publishing Co. Ltd., 2010.

11. DELTA's key to the Next Generation TOEFL Test: *"Advanced Skill Practice,"* New Age International (P) Ltd., Publishers, New Delhi. 2010.

12. Books on TOEFL/GRE/GMAT/CAT by Barron's/ CUP, 2011.

13. IELTS series with CDs by Cambridge University Press, 2010.

BASIC COMPUTATIONS LAB

Course Code : 13ES11BC

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to enable the student to learn the basics of MATLAB Toolbox and to solve general mathematical problems.

Course Outcomes :

- ✤ Student will able to solve mathematical problems numerically.
- ✤ The student able to solve ODE-IVP, ODE-BVP, Regression using MAT LAB.

LIST OF EXERCISES:

1. Basic commands like representing arrays, matrices, reading elements of a matrix, row and columns of matrices, random numbers.
2. Round, floor ceil, fix commands.
3. Eigen values and Eigen vectors of a matrix.
4. Plotting tools for 2-D and 3-D plots, putting legends, texts, using subplot tool for multiple plots, log-log and semilog plots.
5. Linear Regression and polynomial regression, Interpolation.
6. Non linear regression.
7. Solving non linear algebraic equations.
8. ODE IVP problems using Runge - Kutta method.
9. Using quadrature to evaluate integrals (1-D, 2-D and 3-D cases).
10. Control statements like switch, if else statement etc.
11. Transients in RL,RC,LC,RLC for various values of R,L and C.
12. Resonanat curve for RLC series circuit for various values of Q.

SYLLABI FOR VI SEMESTER

INTRODUCTION TO DIGITAL SIGNAL PROCESSING

Course Code:13EE1116

L	T	P	C
4	1	0	3

Pre requisites: Introduction to Signals & Systems

Course Educational Objectives:

To make the student understand the basic principles of digital signal processing and to gain the necessary background knowledge for the design of digital filters. Also to get basic knowledge about dedicated DSP processors

Course Outcomes:

After completion of the course the student should be able to know how to represent discrete time signals and systems and how periodic and aperiodic discrete signals can be digitally processed. Be able to design simple filters.

UNIT-I (12 Lectures)

INTRODUCTION:

Discrete – time signals and Systems, Representations, Elementary Signals, Basic Operations on signals, Classification of Signals, Classification of Discrete time systems.

Impulse Response and Convolution Sum, Convolution of Infinite sequences, Circular shift and Circular Symmetry. Periodic or Circular Convolution. Methods of obtaining Circular Convolution Examples.

UNIT-II (12 Lectures)

DISCRETE FOURIER SERIES, DISCRETE TIME FOURIER TRANSFORM, DISCRETE FOURIER TRANSFORM & FAST FOURIER TRANSFORM

Introduction, Discrete Fourier series, Properties of DFS. Discrete Time Fourier Transform, Relation between Z-Transform and DTFT, Inverse

DTFT, Properties of DTFT, Frequency Response of DT Systems, Transfer Functions.

Discrete Fourier Transform, IDFT, Properties of DFT, Relation between Z-Transform and DFT, Linear Convolution and Circular Convolution using DFT.

Fast Fourier Transform, Decimation in time radix – 2 FFT, Decimation in frequency radix-2 FFT, Butterfly Diagram, 8 – Point DFT Calculation.

UNIT-III (12 Lectures)

INFINITE IMPULSE RESPONSE FILTERS:

Introduction, Analog Filter Fundamentals, Transformation methods, Design of IIR Filters, Low Pass Filter specifications, Design by approximation of derivatives, Impulse invariant transformation, Bilinear transformation, LP Butterworth digital filter, Chebyshev filter, Inverse Chyebshev filter, Elliptic filters, Frequency transformation.

UNIT-IV (12 Lectures)

FINITE IMPULSE RESPONSE FILTERS:

Introduction, Characteristics of FIR filters with linear phase, Frequency response of linear phase FIR filters, Design of FIR filters using windows (Rectangular, Triangular, Raised Cosine, Hanning, Hamming, Blackman and Kaiser).

UNIT-V (12 Lectures)

INTRODUCTION TO DSP PROCESSORS:

Introduction, MAC operation, Multiple Access Memory, VLIW Architecture, Pipelining, Special Addressing Modes, On-chip peripherals, Architecture of TMS320C5x.

TEXT BOOKS:

1. John G.Proakis, Dimitris G.Manolakis, *"Digital Signal Processing, Principles, Algorithms and Applications"*, Pearson Education / PHI, 3rd Edition, 2007 (UNITS – I, II, III, IV)
2. A.V.Oppenheim and R.W.Schaffer, *"Discrete – Time Signal Processing"*, PHI, 4th Edition, 2007

3. A. Anand kumar, *"Digital Signal Processing"*, PHI, Eastern Economy Edition, 2013. (UNIT – V)

REFERENCES:

1. S.K.Mitra, *"Digital Signal Processing – A practical approach"*, Pearson Education, New Delhi, 2003.
2. M.H.Hayes, *"Digital signal processing: Schaum's Outlines"*, Tata Mc-Graw Hill, 2nd Edition, 2009
3. Robert J.Schilling, Sandra L.Harris, *"Fundamentals of Digital Signal Processing using Matlab"*, Thomson, 2007.
4. Ramesh Babu, *"Digital Signal Processing"*, SCITECH Publications, 4th Edition, 2009.

POWER ELECTRONIC CONVERTER FED DRIVES

Course Code:13EE1117

L	T	P	C
4	1	0	3

Pre requisites: Power Electronics, Electrical Machines – I and II.

Course Educational Objectives:

To familiarize the student with:

- AC and DC drives that find wide application in industry.
- Control of DC motor drives fed from three phase converters and choppers.
- Control of AC motor drives with variable frequency and voltage converters.

Course Outcomes:

After completion of this course the students acquire knowledge in:

- Control of DC motor drive fed from chopper and three phase converter
- Various speed control methods of induction motor drives
- Control of synchronous motor drive.

UNIT-I (13 Lectures)

AN INTRODUCTION TO INDUSTRIAL DRIVES:

Electrical Drives, Advantages of Electrical drives, Parts of Electrical Drives, Choice of electrical Drives, Status of ac and dc drives, Fundamental torque equation, multi-quadrant operation, Components of load torques, Nature and classification of load torques, Braking of DC motor-Dynamic braking, plugging and regenerative braking

CONTROL OF DC MOTORS BY THREE PHASE CONVERTERS:

Three phase semi and fully controlled converters connected to D.C. separately excited and D.C series motors, Output voltage and current waveforms, Speed and Torque expressions, Speed – Torque characteristics, Numerical problems, Four quadrant operation of D.C motors by dual converters, Closed loop operation of DC motor (Block Diagram only).

UNIT-II (12 Lectures)

CONTROL OF CHOPPER-FED DC MOTORS:

Single quadrant, Two quadrant and four quadrant chopper fed dc separately excited and series excited motors, Continuous current operation, Output voltage and current wave forms, Speed torque expressions, Speed-torque characteristics, Problems on Chopper fed D.C Motors, Closed loop operation (Block Diagram Only).

UNIT-III (13 Lectures)

INDUCTION MOTOR DRIVES AND SPEED CONTROL THROUGH STATOR VOLTAGE:

Three phase Induction motor-analysis and performance, Braking-Plugging, Dynamic braking, Speed Control of Induction motor using AC voltage controllers; Soft starting an induction motor, Speed-torque characteristics, Numerical problems.

UNIT-IV (12 Lectures)

CONTROL OF INDUCTION MOTOR THROUGH STATOR FREQUENCY:

Variable frequency characteristics, Variable frequency control of induction motor by voltage source and current source inverter, PWM control, Comparison of VSI and CSI operations, Speed torque characteristics, Numerical problems on induction motor drives, Closed loop operation of induction motor drives (Block Diagram Only).

CONTROL OF INDUCTION MOTOR FROM ROTOR SIDE:

Static rotor resistance control-rotor resistance variation in slip ring Induction motor using a chopper, Slip power recovery scheme, Static Scherbius drive, Static Kramer Drive, their performance and speed torque characteristics, Advantages, Applications, Numerical problems.

UNIT-V (13 Lectures)

CONTROL OF SYNCHRONOUS MOTORS:

Separate control & self control of synchronous motors, Operation of self controlled synchronous motors by VSI & CSI, Load commutated CSI fed Synchronous Motor, Operation, Waveforms, Speed-torque characteristics, Applications, Advantages and Numerical Problems, Closed-loop control operation of synchronous motor drives (Block Diagram Only), Variable frequency control, Cyclo-converter, PWM, VFI, CSI.

TEXT BOOKS :

1. G K Dubey, *"Fundamentals of Electric Drives"*, Narosa Publications, 2nd Edition, 2008.
2. B K Bose, *"Modern Power Electronics & AC Drives"*, PHI learning, 1st Edition, 2010.

REFERENCES:

1. Vedam Subramanyam, *"Electric Drives"*, Tata Mc Graw Hill Publications, 4th Edition, 1999.
2. N.K De and P.K. Sen, *"Electric Drives"*, PH International Publications, 2nd Edition, 2001.
3. MD Singh and K B Khanchandani, *"Power Electronics"*, Tata – McGraw-Hill Publishing company, 2nd Edition,1998.

EMBEDDED PROCESSORS

Course Code: 13EE1118

L	T	P	C
4	0	0	3

Pre requisites: Knowledge of Number systems and Logic Gates.

Course Educational Objectives:

The student learns features of different embedded processors, assembly language programming and interfacing. This syllabus focuses on processors with Harvard architecture with an efficient instruction set. Students should be able to work for Industrial applications by understanding these concepts.

Course Outcomes:

After the completion of the Course, Student is able to

- Choose a suitable processor for any given application.
- Write simple programs in Assembly and C.
- Design a new application using the resources made available by the processor manufacturer.

UNIT-I (12 Lectures)

INTRODUCTION TO EMBEDDED PROCESSORS:

Evolution of Microprocessors & Microcontrollers, Von Neumann and Harvard Architectures and their features. Types of Processors by different Vendors, Types of memory built in with processor numbers and features available in them – Low Pin count, versatility and Peripherals.

Introduction to Classic 8051 family Architecture, Address and data bus with multiplexed I/O pins, Memory Organization, Registers, Instruction set, Addressing Modes - Simple Programs.

Applications using Timers, Counters and I/O programming for external logic sensing and control. Interrupts and its programming, Serial Communication – Simple Programs.

UNIT-II (12 Lectures)

PIC FAMILY OF PROCESSORS:

Introduction to Harvard architecture. Advantages of separate address and data busses, Built in Flash with two wire programming reducing CPU size. Provision of peripherals and flash ROM, EEPROM, and a large special function register work space for application oriented embedded systems. Introduction to PIC family Architecture and instruction set. Introduction to the RISC instruction set and its usage with example programs using integrated development environment MPLAB simulation.

Digital Input and Output Programming, Timers and Counters, Capture Control and PWM, Analog to Digital Converters and their Programming, Simple data acquisition systems and programming. Motor control- BLDC Motors, AC Induction Motor control.

UNIT-III (12 Lectures)

AVR MICROCONTROLLERS:

AVR Microcontrollers – Introduction to Atmega processor family architecture using typical Atmega 8535 processor. Features in the peripherals provided, Introduction to its large instruction set, Using IDE Atmel Studio for programming and simulation.

Peripheral systems in Atmega 8535**-** Digital Input and Output Programming, Timers and Counters, Wave form generation, Interrupts , Capture Control and PWM, Analog to Digital Converters. Simple data acquisition programming, Simple programs using assembly and C.

UNIT-IV (12 Lectures)

ADVANCED MICROCONTROLLERS:

ARM (Advanced Research Microprocessor) – Arm Core Architecture, Bus Architecture, Addressing modes, Peripherals supported, Advantages of 32 bit CPU, Simple programs using timers.

UNIT-V (12 Lectures)

INTERFACING - FOR MEASUREMENT AND CONTROL:

Serial communication busses: USART with addressable feature, SPI Bus, I2C Two wire bus, Introduction to USB bus.

Digital Measurements - Measurement of Current, Voltage, Resistance, Power factor, Power, Energy, Speed, Frequency, Torque.

Motor Control – Control of DC Motor, Stepper motor, DC Servo Motor, AC Induction motor , BLDC Motor.

Emerging Trends - Digitally Enhanced Power Analog Control, Input Sensing - Touch Screens, Single Touch, Multi touch, 3-D tracking and Gesture sensing, Smart Energy, Wireless Connectivity – Bluetooth, Infrared, Zigbee, Wi-Fi (Principles of Operation Only)

TEXT BOOKS:

1. Bendapudy Kanta Rao , " *Embedded Systems*", Prentice Hall India, 1st Edition, 2011.

REFERENCES:

1. Kenneth J Ayala: *"The 8051 Micro Controller"*, 3rd Edition, Thomson Publishers, 2010.

2. Ali Mazidi Mohammed Gillispie, Mazide Janice: *"The 8051 Microcontroller and Embedded Systems"*, 2nd Edition, Pearson Education, 2011.

3. Muhammad Ali Mazidi *"The AVR Microcontroller and Embedded Systems : using Assembly and C"*, 1st Edition, Pearson Education, Indian Edition ©2013

WEB RESOURCES: (For Additional Information Only)

1. www.keil.com
2. www.microchip.com
3. www.atmel.com
4. www.renesas.com
5. www.ti.com
6. www.arm.com

SWITCHGEAR AND PROTECTION

Course Code: 13EE1119

L	T	P	C
4	0	0	3

Pre requisites: Electrical Machines and Power Transmission Engineering

Course Educational Objectives:

- To discuss the need for the protection and various protection schemes.
- To study different relays characteristics
- To understand the method of circuit breaking, arcing phenomena – various arc theories - capacitive and inductive breaking

Course Outcomes:

- Students acquire knowledge in the field of power system protection, circuit breakers and relays.
- Students will gain ability to design the relevant protection systems for the main elements of a power system.

UNIT-I (12 Lectures)

CIRCUIT BREAKERS:

Principle of operation – RRRV – Current chopping- Circuit Breaker ratings and specifications, Testing of Circuit Breakers.

Constructional features and selection of LT breakers (Miniature circuit breakers/Metal clad circuit breakers/Earth leakage circuit breaker) and HT breakers (Air blast circuit breaker-Oil circuit breakers-SF_6 CB-Vacuum Circuit Breakers)

UNIT-II (12 Lectures)

PROTECTIVE RELAYS-I:

Electromagnetic Relays: Principle of Operation and Construction of Attracted armature, Balanced Beam, induction Disc and Induction Cup relays. Relays Classification: Instantaneous, DMT and IDMT types, Application of relays: Over current, Under voltage, Directional, Differential and Percentage Differential.

UNIT-III (12 Lectures)

PROTECTIVE RELAYS-II:

Universal Torque Equation, Distance relays: Impedance, Reactance and Mho and Off-Set Mho relays, Characteristics of Distance Relays and Comparison. Static Relays, Static Relays verses Electromagnetic Relays. Microprocessor Based Relays: impedance, directional, reactance, Mho & offset Mho and mathematical expression for distance relay.

UNIT-IV (12 Lectures)

PROTECTION OF GENERATORS, TRANSFORMERS, FEEDERS AND BUS BARS:

Protection of Generators against Stator faults, Rotor faults, and Abnormal Conditions. Restricted Earth Fault, Numerical Problems on % Winding Unprotected.

Percentage Differential Protection of transformers, Numerical Problems on Design of CT's Ratio, BUCHHOLTZ Relay Protection

Protection of transmission Lines: Over Current, Carrier Current and Three-zone Distance Relay Protection using Impedance Relays. Translay Relay.

Protection of Bus bars – Differential protection.

UNIT-V (12 Lectures)

GROUNDING TECHNIQUES & OVER VOLTAGE PROTECTIONS:

Grounded and Ungrounded Neutral Systems- Effects of Ungrounded Neutral on system performance- Methods of Neutral Grounding, Arcing Grounds and Grounding Practices.

Protection against Over Voltages- Volt-Time Characteristics- Valve type and Zinc-Oxide Lighting Arresters - Insulation Coordination-BIL, Impulse Ratio, Standard Impulse Test Wave.

TEXT BOOKS:

1. C R Mason, *"Art& Science of Protective Relaying"*, Wiley Eastern Ltd.

2. Sunil S Rao, *"Switchgear Protection and Power Systems"*, Khanna Publishers, New Delhi, 11th Edition reprint 3rd Edition, 2008

REFERENCES:

1. Badri Ram, Viswakarma.D.N., *"Power System Protection and Switchgear"*, TMH Publications, 2nd Edition 2011.
2. T. S. MadhavRao, "*Power System Protection Static relays with Microprocessor Applications"*, TMH Publication, 2nd Edition, 2006.
3. C.L. Wadhwa, *"Electrical Power Systems"*, New Age International (P) Limited, Publishers, 5th Edition, 2009.
4. B.L. Soni, Gupta, Bhatnagar, Chakrabarthy, *"A Text book on Power System Engineering"*, DhanpatRai & Co, 2008.
5. Warrington and Coll, *"Protective Relays"*, Vol I & II.

PROGRAMMABLE LOGIC CONTROLLERS

Course Code:13EE1120

L	T	P	C
4	0	0	3

Prerequisites: This course requires knowledge of operation of relays, contactors.

Course Educational Objectives:

This course trains the students on Basics of PLC including Programming and ladder logic and also students get exposure to different Registers of PLC and functions of PLC. Students will understand the applications of PLC and PID principles.

Course Outcomes:

At the end of the course, the students will be able to know about PLC programming and practical application of PLC.

UNIT-I (12 Lectures)

PLC BASICS:

PLC system, I/O modules and interfacing, CPU processor, programming Equipment, Programming formats, construction of PLC ladder diagrams, Devices connected to I/O modules.

UNIT-II (12 Lectures)

PLC PROGRAMMING:

Input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill press operation

UNIT-III (12 Lectures)

Digital logic gates, programming in the Boolean algebra system, conversion examples Ladder Diagrams for process control: Ladder diagrams & sequence listings, ladder diagram construction and flowchart for spray process system.

PLC Registers: Characteristics of Registers, module addressing, holding registers, Input Registers, Output Registers.

UNIT-IV (12 Lectures)

PLC FUNCTIONS:

Timer functions & Industrial applications, counters, counter function industrial applications, Arithmetic functions, Number comparison functions, number conversion functions.

Data Handling functions: SKIP, Master control Relay, Jump, Move, FIFO, FAL, ONS, CLR & Sweep functions and their applications

UNIT-V (12 Lectures)

Bit Pattern and changing a bit shift register, sequence functions and applications, controlling of two-axis & three axis Robots with PLC, Matrix functions.

ANALOG PLC OPERATION:

Analog modules & systems, Analog signal processing, Multi bit Data Processing, Analog output Application Examples, PID principles, position indicator with PID control, PID Modules, PID tuning, PID functions.

TEXT BOOKS:

1. John W. Webb & Ronald A.Reiss, "*Programmable Logic Controllers-Principles and Applications*", Fifth Edition, PHI, 2009.

REFERENCES:

1. Jr. Hackworth & F.D Hackworth Jr., *"Programmable Logic Controllers- Programming Method and Applications"*, Pearson, 2003.
2. Gary Dunning, *"Introduction to Programmable Logic Controllers"*, Delmar Thomas Learning, 3rd Edition, 2005.

POWER SYSTEM DEREGULATION

Course Code:13EE1121

L	T	P	C
4	0	0	3

Pre requisites: Power Systems.

Course Educational Objectives:

- ✤ To provide in-depth understanding of operation of deregulated electricity market systems.
- ✤ To examine typical issues in electricity markets and how these are handled world-wide in various markets.
- ✤ To enable students to analyze various types of electricity market operational and control issues using new mathematical models.

Course Outcomes:

After the completion of the Course, Student is able to

- ✤ Understand of operation of deregulated electricity market systems
- ✤ Typical issues in electricity markets
- ✤ To analyze various types of electricity market operational and control issues using new mathematical models.

UNIT-I **(12 Lectures)**

Deregulation, Reconfiguring Power systems, unbundling of electric utilities, Background to deregulation and the current situation around the world, benefits from a competitive electricity market after effects of deregulation

UNIT-II **(12 Lectures)**

Role of the independent system operator, Operational planning activities of ISO: ISO in Pool markets, ISO in Bilateral markets, Operational planning activities of a GENCO: Genco in Pool and Bilateral markets, market participation issues, competitive bidding

UNIT-III (12 Lectures)

Power wheeling, Transmission open access, pricing of power transactions, security management in deregulated environment, and congestion management in deregulation

UNIT-IV (12 Lectures)

General description of some ancillary services, ancillary services management in various countries, and reactive power management in some deregulated electricity markets.

UNIT-V (12 Lectures)

RELIABILITY ANALYSIS:

Interruption criterion, stochastic components, component models, Calculation methods, Network model: stochastic networks, series and parallel connections, minimum cut sets, reliability cost.

Generation, transmission and distribution reliability, Reliability and deregulation: conflict, reliability analysis, effects on the actual reliability, regulation of the market.

TEXT BOOKS:

1. K. Bhattacharya, MHT Bollen and J.C Doolder, *"Operation of Restructured Power Systems"*, Kluwer Academic Publishers, USA, 2001. [Unit-I, II, III, IV &V]
2. Lei Lee Lai, *"Power System restructuring and deregulation"*, John Wiley and Sons, UK. 2001.
3. Fred I Denny and David E. Dismukes, *"Power System Operations and Electricity Markets"*, CRC Press, LLC, 2002. [Unit-I, II, III, IV &V].

ELECTRICAL ENGINEERING MATERIALS

Course Code:13EE1122

L	T	P	C
4	0	0	3

Pre requisites: Basics of Materials

Course Educational Objectives:

To introduce the student with different materials and their characteristics used in manufacturing various electrical equipment.

Course Outcomes:

On completion of the course the student will be able to:

- ✤ Analyze the characteristics of different types of materials viz. conductors, insulators, semiconductors and magnetic materials etc.
- ✤ Select a suitable material for manufacturing electrical equipment

UNIT-I (12 Lectures)

CONDUCTING MATERIALS:

Introduction of Classification of material into conducting, semi conducting and insulating materials -Resistance and factors affecting it such as alloying and temperature - Classification of conducting material as low resistivity and high resistivity materials - Low resistance materials - Introduction to handle conductors and its applications - Low resistivity copper alloys, their practical applications with reasons for the same - Applications of special metals - High resistivity materials and their applications– Super conductivity.

UNIT-II (10 Lectures)

SEMI- CONDUCTING MATERIALS:

Introduction - Semi-conductors and their properties , Different semi-conducting materials (silicon and germanium) used in manufacture of various semiconductor devices (i.e p-type and n-type semiconductors) , Materials used for electronic components like resistors, capacitors, diodes, transistors and inductors etc.

UNIT-III (14 Lectures)

INSULATING MATERIALS - GENERAL PROPERTIES:

Electrical Properties - Volume resistivity, surface resistance, dielectric loss, dielectric strength (breakdown voltage) dielectric constant, Physical Properties - Hygroscopicity, tensile and compressive strength, abrasive resistance, brittleness, Thermal Properties- Heat resistance, classification according to permissible temperature rise. Effect of overloading on the life of an electrical appliance, increase in rating with the use of insulating materials having higher thermal stability, Thermal conductivity, Electro-thermal breakdown in solid dielectrics, Chemical Properties - Solubility, chemical resistance, weather ability, Mechanical properties - mechanical structure, tensile structure.

UNIT-IV (10 Lectures)

INSULATING MATERIALS AND THEIR APPLICATIONS:

Plastics- Definition and classification, thermosetting materials, Thermo-plastic materials; Natural insulating materials, properties and their applications; Gaseous materials – Ceramics-properties and applications.

UNIT-V (14 Lectures)

MAGNETIC MATERIALS AND SPECIAL MATERIALS:

Introduction and classification - ferromagnetic materials, permeability, B-H curve, magnetic saturation, hysteresis loop (including) coercive force and residual magnetism, concept of eddy current and hysteresis loss, curie temperature, magnetostriction effect, Soft Magnetic Materials, Hard magnetic materials , Hall effect and its applications. Thermocouple, bimetals, leads soldering and fuses Material - their applications.

TEXT BOOKS :

1. SK Bhattacharya, *"Electrical and Electronic Engineering Materials"* 1st edition Khanna Publishers, New Delhi,2006.(Unit 1,2,3)
2. A.J. Dekker *"Electrical Engineering Materials"*, PHI, 2006. (Unit 4,5)

REFERENCES :

1. Grover and Jamwal, *"Electronic Components and Materials"* DhanpatRai and Co., New Delhi.
2. Sahdev, *"Electrical Engineering Materials"*, Unique International Publications
3. C. S. Indulkar& S. Thiruvengadam, *"Electrical Engineering Materials"*, S. Chand & Com. Ltd, New Delhi -55
4. S.P. Seth, P.V. Gupta *"A course in Electrical Engineering Materials"*, DhanpatRai& Sons.

DATA STRUCTURES

(Common to CSE, IT, ECE & EEE)

Course Code : 13CT1106	L	T	P	C
	4	0	0	3

Course Educational Objectives:

Student will be able to

- ✤ Analyze algorithms.
- ✤ Develop software applications which are efficient in terms of space time complexity.
- ✤ Choose suitable Data Structures for different real world applications.
- ✤ Apply best algorithm to sort set of elements.
- ✤ Employ a structured methodology while providing a software solution to an engineering problem.

Course Outcomes:

At the end of the course student will be able to

- ✤ Get knowledge on how to develop algorithms, operations on queues and stacks.
- ✤ Work on different searching methods and graphs.
- ✤ Get knowledge on trees and binary trees.
- ✤ Work on different sorting methods.
- ✤ Get knowledge on different types of linked operations.

UNIT-I (12 Lectures)

ANALYSIS OF ALGORITHMS:

Efficiency of algorithms, apriori analysis, asymptotic notations, time complexity of an algorithm using O notation, polynomial Vs exponential algorithms, average, best and worst case complexities, analyzing recursive programs.

STACKS: Introduction, stack operations, applications.

QUEUES: Introduction, Operations on queues, circular queues, other types of queues, applications.

UNIT-II (12 Lectures)

LINKED LISTS:

Introduction, Singly linked lists, circularly linked lists, doubly linked lists, multiply linked lists, applications.

LINKED STACKS AND LINKED QUEUES:

Introduction, operations on linked stacks and linked queues, dynamic memory management and linked stacks, implementation of linked representations, applications.

UNIT-III (12 Lectures)

SEARCHING:

Introduction, linear search, transpose sequential search, interpolation search, binary search, Fibonacci search.

INTERNAL SORTING:

Introduction, bubble sort, insertion sort, selection sort, merge sort, quick sort.

UNIT-IV (12 Lectures)

TREES AND BINARY TREES:

Introduction, Trees: definition and basic terminologies, representation of trees, binary trees: basic terminologies and types, representation of binary trees, binary tree traversals, threaded binary trees, applications.

BINARY SEARCH TREES AND AVL TREES:

Introduction, binary search trees: definition and operations, AVL Trees: definition and operations, applications.

UNIT-V (12 Lectures)

GRAPHS:

Introduction, definitions and basic terminologies, representations of graphs, graph traversals and applications.

TEXT BOOKS:

1. G A V PAI, *"Data Structures and Algorithms, Concepts, Techniques and Applications"*, Volume 1, 1st Edition, Tata McGraw-Hill, 2008.

2. Richard F. Gilberg & Behrouz A. Forouzan, *"Data Structures, A Pseudo code Approach with C"*, 2nd Edition, Cengage Learning India Edition, 2007.

REFERENCES:

1. Langsam ,M. J. Augenstein, A. M. Tanenbaum, *"Data structures using C and C++"*, 2nd Edition, PHI Education,2008.

2. Sartaj Sahni, Ellis Horowitz, *"Fundamentals of Data Structures in C"*, 2nd Edition, Orient blackswan , 2010.

WEB REFERENCES:

http://nptel.iitm.ac.in/video.php?subjectId=106105085

POWER DISTRIBUTION ENGINEERING

Course Code: 13EE1123

L	T	P	C
4	0	0	3

Pre requisites:

Basic concepts of power system, Network Analysis, Switchgear and Protection.

Course Educational Objectives:

- To study the fundamental principles and various parts/components of power distribution systems.
- Impart knowledge of distribution system protection.
- Understanding protective devices coordination.
- Power factor improvement & Voltage control.

Course Outcomes:

- The student will be able to calculate the distribution voltage drop calculations
- The student can design the required capacitor to compensate the losses in distribution system

UNIT-I **(12 Lectures)**

GENERAL CONCEPTS:

Introduction to distribution systems, Load modelling and characteristics. Coincidence factor, contribution factor, loss factor. Relationship between the load factor and loss factor. Classification of loads (Residential, commercial, Agricultural and Industrial) and their characteristics.

UNIT-II **(12 Lectures)**

DISTRIBUTION FEEDERS:

Design Considerations of Distribution Feeders: Radial and loop types of primary feeders, voltage levels, feeder loading; basic design practice of the secondary distribution system.

SUBSTATIONS: Location of Substations: Rating of distribution substation, service area within primary feeders. Benefits derived through optimal location of substations.

UNIT-III (12 Lectures)

SYSTEM ANALYSIS:

Voltage drop and power-loss calculations: Derivation for voltage drop and power loss in lines, manual methods of solution for radial networks, three phase balanced primary lines.

UNIT-IV (12 Lectures)

PROTECTION:

Objectives of distribution system protection, types of common faults and procedure for fault calculations. Protective Devices: Principle of operation of Fuses, Circuit Reclosures, line sectionalizes, and circuit breakers

COORDINATION:

Coordination of Protective Devices: General coordination procedure.

UNIT-V (12 Lectures)

COMPENSATION FOR POWER FACTOR IMPROVEMENT:

Capacitive compensation for power factor control. Different types of power capacitors,shunt and series capacitors, effect of shunt capacitors (Fixed and switched), Power factor correction, capacitor allocation. Economic justification. Procedure to determine the best capacitor location.

VOLTAGE CONTROL: Equipment for voltage control, effect of series capacitors, effect of AVB/AVR, line drop compensation.

TEXT BOOKS:

1. Turan Gonen, *"Electric Power Distribution system, Engineering"*, 2nd Edition, CRC Press, 2007.

REFERENCES:

1. A.S. Pabla, *"Electric Power Distribution"*, Tata Mc Graw-Hill Publishing company, 5th edition, 1997.
2. Anthony J Pansini, *"Electrical Distribution Engineering"*, The Fairmont Press, INC, 2007.
3. H. Lee Willis, *"Power Distribution Planning Reference Book"*, Power Engineering Series, 2nd Edition, CRC Press, 2004.

ELECTRICAL POWER QUALITY

Course Code:13EE1124

L	T	P	C
4	0	0	3

Pre requisites:

Basic knowledge in Electrical Networks, Machines, Power Electronics.

Course Educational Objectives:

To study and understand, various power quality problems, their mitigation and measuring techniques.

Course Outcomes:

After completion of the course the student should be able to know the various power quality problems like transients and harmonics etc, their mitigation and measuring techniques.

UNIT-I **(12 Lectures)**

INTRODUCTION AND POWER FREQUENCY DISTURBANCE :

Introduction, power quality issues, remedial measures, power quality vs equipment immunity, power quality concerns, power quality standards, power quality monitoring, common power frequency disturbances, source of steady state disturbances, the effect of steady state disturbance on loads, techniques to reduce disturbances.

UNIT-II **(12 Lectures)**

ELECTRICAL TRANSIENTS :

Introduction, Transient System Model, Examples of Transient Models and Their Response, Power System Transient Model, Types and Causes of Transients, Examples of Transient Waveforms,.

UNIT-III **(12 Lectures)**

GROUNDING AND BONDING:

Introduction, Shock And Fire Hazards, National Electrical Code Grounding

Requirements, Essentials of a Grounded System, Ground Electrodes, Earth Resistance Tests, Earth-Ground Grid Systems, Power Ground System, Signal Reference Ground, Signal Reference Ground Methods, Single Point And Multipoint Grounding, Ground Loops, Electrochemical Reactions Due To Ground Grids, Examples of Grounding Anomalies or Problems Electromagnetic Interference Terminology, EMI Mitigation.

UNIT-IV **(12 Lectures)**

HARMONICS:

Definition of Harmonics, harmonic number (h) , odd and even order harmonics, harmonic phase rotation and phase angle relationship, causes of voltage and current harmonics, individual and total harmonic distortion, harmonic signatures, effect of harmonics on power system devices, guidelines for harmonic voltage and current limitation, harmonic current mitigation.

UNIT-V **(12 Lectures)**

MEASURING AND SOLVING POWER QUALITY PROBLEMS AND CUSTOM POWER DEVICES :

Introduction, power quality measurement devices, power quality measurements, number of test locations, test duration, instrument setup and guidelines.

Dynamic Voltage Restorer (DVR), D-STATCOM, Unified Power Quality Conditioner (UPQC), Unified Power Quality Conditioner based on current source convert topology, principles, configuration and types of Uninterruptable Power Supplies (UPS).

TEXT BOOKS:

1. C.Sankaran, *"Power Quality"*, First Indian reprint, CRC press, 2009. (Unit 2,3,4 & 5)
2. J.B Dixit, Amit Yadav, *"Electric Power Quality"*, First Edition, Laxmi Publications Pvt. Ltd 2010.(unit 1 & 5).

REFERENCES:

1. Math H.J. Bollen, *"Understanding Power Quality Problems: Voltage Sags and Interruptions"*, IEEE Press, 2001.

2. Roger Dugan, Surya Santoso, Mark F. Mc Granaghan, H. Beaty, *"Electrical Power Systems Quality"*, McGraw-Hill Professional Publishing, Second Edition, November 2002.

3. J. Arrillaga, N. R. Watson, S. Chen, *"Power System Quality Assessment"*, John Wiley & Sons, 2000.

PULSE AND INTEGRATED CIRCUITS LAB
(Common to ECE & EEE)

Course Code:13EC1112

L	T	P	C
0	0	3	2

Pre-requisites : Pulse and digital circuts, linear IC applications.

Course Educational Objectives:

To confirm theoretical principles in laboratory on Linear ICs& Pulse and digital circuits.

Course Outcomes:

Hands on experience for integration of pulse and digital circuits.

Note: Any TEN of the following experiments are to be conducted.

LIST OF EXPERIMENTS:

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers and Clampers.
3. Astable multivibrator.
4. Monostable multivibrator.
5. Schmitt Trigger.
6. Bootstrap sweep circuit.
7. Integrator, differentiator, Band Pass and Band stop filters using IC 741.
8. Function Generator using IC 741.
9. Astable and Monostable multivibrator using 555 Timer.
10. PLL Using IC 565.
11. Voltage regulator using IC 723.
12. Study of Logic Gates using Discrete components.
13. 4-bit D/A converter & A/D converter
14. Quadrature Oscillator

ELECTRICAL MEASUREMENTS LAB

Course Code:13EE1125

L	T	P	C
0	0	3	2

Pre requisites:

Electrical Measurements, Instrumentation & Illumination Engineering

Course Educational Objectives:

This lab is intended to give exposure on different measuring instruments & bridges and also about different types of instruments.

Course Outcomes:

At the end of the lab the student will be able to

- ✤ Differentiate the working of different meters & bridges.
- ✤ Calculate the breakdown strength of oil used in transformers and in other high voltage testing kits.
- ✤ Calculate the intensity of illumination.
- ✤ Calculate the different errors of the equipment and also will be able to calibrate different equipment's.

LIST OF EXPERIEMENTS

1. Calibration of single phase wattmeter using

   a. Balanced loads

   b. Phantom loading

2. Calibration of dynamometer type power factor meter.
3. Crompton D.C Potentiometer – Calibration of PMMC ammeter and PMMC Voltmeter.
4. Perform an experiment to find very low resistance, medium resistance and "very high resistance" using suitable test.
5. Measurement of 3-phase active and reactive power in balanced & unbalanced loads.

6. Calibration of LPF Wattmeter- by Phantom loading.
7. Measurement of Inductance & Capacitance using Schering Bridge and Anderson Bridge.
8. Resistance Strain Gauge-Strain Measurements and Calibration.

In Addition to the above eight experiments at least any two of the experiments from the following list are required to be conducted

9. Measurement of Dielectric strength of oil using H.T testing kit.
10. Measurement of 3 phase power with single watt meter and 2 No's of C.T.
11. Polar curve using Lux meter, Measurement of intensity of illumination of fluorescent lamp.
12. Measurement of Iron loss in a bar specimen using a CRO and using a wattmeter.
13. Determination of Hysteresis loss and Hysteresis curve.
14. LVDT and capacitance pickup – characteristics and Calibration.

INTELLECTUAL PROPERTY RIGHTS AND PATENTS

(Common to all Branches)

Course Code: 13NM1103

L	T	P	C
2	0	0	0

Course Educational Objectives:

- To acquaint the learners with the basic concepts of Intellectual Property Rights.
- To develop expertise in the learners in IPR related issues and sensitize the learners with the emerging issues in IPR and the rationale for the protection of IPR.

Course Outcomes:

At the end of this course, the student will be able to

- Gain knowledge on Intellectual Property assets and generate economic wealth
- Assist individuals and organizations in capacity building and work as a platform for development, promotion, protection, compliance, and enforcement of Intellectual Property & knowledge.

UNIT-I (7 Lectures)

Introduction to intellectual property Act and Law-the evolutionary past-the IPR tool kit- legal tasks in intellectual property law-ethical obligations in Para legal tasks in intellectual property law

UNIT-II (8 Lectures)

Introduction to trade mark – Trade mark registration process-Post registration procedures-Trade mark maintenance – transfer of rights- inter party's proceeding – Infringement-Dilution ownership of trade mark-likelihood of confusion – trademark claims- trademark litigations

UNIT-III **(6 Lectures)**

Introduction to copy rights- principles of copyright – subjects matter of copy right- rights afforded by copyright law- copyright ownership- transfer and duration – right to prepare derivative works- right of distribution- right to perform the work publicity- copyright formalities and registrations

UNIT-IV **(7 Lectures)**

Introduction to patent law- Rights and limitations- Rights under patent law- patent requirements- ownership – transfer- patent application process- patent infringement- patent litigation

UNIT-V **(6 Lectures)**

Introduction to transactional law- creating wealth and managing risk – employment relationship in the Internet and technologic cal sector- contact for internet and technological sector

TEXT BOOKS:

1 Kompal Bansal and Praishit Bansal, "Fundamentals of IPR for Engineers", 1st Edition, BS Publications, 2012.

2 Prabhuddha Ganguli, *"Intellectual Property Rights"*, 1st Edition, TMH, 2012.

REFERENCES:

1 R Radha Krishnan & S Balasubramanian, *"Intellectual Property Rights"*, 1st Edition, Excel Books, 2012.

2 M Ashok Kumar & mohd Iqbal Ali, *"Intellectual Property Rights"*, 2nd Edition, Serial publications, 2011.

SYLLABI FOR
VII SEMESTER

MANAGEMENT SCIENCE

(Common to Chemical, CSE, IT, ECE, EEE)

Course Code: 13HM1102

L	T	P	C
4	0	0	3

Course Educational Objectives:

To familiarize with the process of management and to provide basic insights into to select contemporary management practices.

Course Outcomes :

To understand the management processes and evolve management levels for effective decision making

UNIT-I (16 Lectures)

INTRODUCTION TO MANAGEMENT:

Concept-nature and importance of management- functions of management- evolution of management thought- decision making process- designing organization structure- principles of organization – types of organization structure

UNIT-II (12 Lectures)

OPERATIONS MANAGEMENT:

Principles and types of plant layout- work study- statistical quality control- control charts(R Chart, P Chart & C Chart- Simple numerical problems) – materials management- Need for Inventory Control- EOQ, ABC Analysis(Simple numerical Analysis)- Types of Inventory Analysis(HML. SDE, VED, FSN Analysis)

UNIT-III (10 Lectures)

HUMAN RESOURCE MANAGEMENT:

Concept of HRM, HRD and PMIR- Functions of HR Manager- theories of motivation and leadership styles- Job Evaluation and Merit Rating,

Welfare measures-statutory and non statutory compliance – grievance handling

UNIT-IV (12 Lectures)

MARKETING MANAGEMENT:

Marketing Management- Functions of Marketing Management- Marketing mix-Market segmentation - Marketing strategies based on product life cycle- Channels of Distribution- Consumer Behavior and marketing research

UNIT-V (14 Lectures)

PROJECT MANAGEMENT:

Project planning and control- Project life cycle- Development of network- Difference between PERT and CPM- Identifying critical path- probability of completing the project within the given time, cost analysis, - project crashing(simple numerical problems)

TEXT BOOKS :

1 Ramanujam Naidu & Sastry, *"Management Science"*, 1st Himalaya Publisher, 2012.

2 Vijaya Kumar & Appa Rao, *"Management Science"*, 1st Cengage Publishers, 2012.

3 AR Aryasri, *"Management Science"*, 4th Edition, Tata McGraw-Hill, 2009.

REFERENCES :

1 O P Khanna, *"Industrial Engineering & Management"*, 2nd Edition, Dhanpat Rai, 2004.

2 Martand Telsang, *"Industrial Engineering & Production Management"*, 2nd Edition, S. Chand & Company, 2008.

POWER SYSTEM ANALYSIS

Course Code:13EE1126

L	T	P	C
4	1	0	3

Pre requisites:

Student should know the basic concepts in Electrical power system networks, concepts to solve linear differential equations.

Course Educational Objectives:

- ✤ To teach students to formulate impedance , admittance matrices for given power system networks and formulate load flow equations .
- ✤ Solve the load flow equations by various numerical methods like Gauss Seidal method, Newton Raphsons methods, modified Newton Raphsons method.
- ✤ To teach students solution for unsymmetrical faults by symmetrical components methods.
- ✤ To introduce students the concepts of steady state stability, transient state stability and methods to improve the steady state stability of given power system networks.

Course Outcomes:

- ✤ Formulate Y_{bus} ,Z_{bus} for a given power system network.
- ✤ Solution to load flow equation for a power system network.
- ✤ Solution for power system network for unsymmetrical faults using symmetrical components.
- ✤ Power system steady state stability and transient state stability analysis

UNIT-I (12 Lectures)

POWER SYSTEM NETWORK MATRICES:

Graph Theory: Definitions, Bus Incidence Matrix, Y_{bus} formation by Direct and Singular Transformation Methods, Numerical Problems.

Formation of Z_{Bus}: Partial network, Algorithm for the Modification of Z_{Bus} Matrix for addition element for the following cases: Addition of element from a new bus to reference, Addition of element from a new bus to an old bus, Addition of element between an old bus to reference and Addition of element between two old busses (Derivations and Numerical Problems).- Modification of ZBus for the changes in network (Problems)

UNIT-II (12 Lectures)

POWER FLOW STUDIES :

Necessity of Power Flow Studies – Data for Power Flow Studies – Derivation of Static load flow equations – Load flow solutions using Gauss Seidel Method: Acceleration Factor, Load flow solution with and without P-V buses, Algorithm and Flowchart. Numerical Load flow Solution for Simple Power Systems (Max. 3-Buses): Determination of Bus Voltages, Injected Active and Reactive Powers (Sample One Iteration only) and finding Line Flows/Losses for the given Bus Voltages. Newton Raphson Method in Rectangular and Polar Co-Ordinates Form: Load Flow Solution with or without PV Busses- Derivation of Jacobian Elements, Algorithm and Flowchart. Decoupled and Fast Decoupled Methods.- Comparison of Different Methods – DC load Flow

UNIT-III (12 Lectures)

SHORT CIRCUIT ANALYSIS-1 :

Per-Unit System of Representation, Per-Unit equivalent reactance network of a three phase Power System, Numerical Problems. Symmetrical fault Analysis: Short Circuit Current and MVA Calculations, Fault levels, Application of Series Reactors, Numerical Problems. Symmetrical Component Theory: Symmetrical Component Transformation, Positive, Negative and Zero sequence components: Voltages, Currents and Impedances. Sequence Networks: Positive, Negative and Zero sequence Networks, Numerical Problems. Unsymmetrical Fault Analysis: LG, LL, LLG faults with and without fault impedance, Numerical Problems.

UNIT-IV (12 Lectures)

POWER SYSTEM STEADY STATE STABILITY ANALYSIS :

Elementary concepts of Steady State, Dynamic and Transient Stabilities. Description of Steady State Stability Power Limit, Transfer Reactance, Synchronizing Power Coefficient, Power Angle Curve and Determination of Steady State Stability and Methods to improve steady state stability.

UNIT-V **(12 Lectures)**

POWER SYSTEM TRANSIENT STATE STABILITY ANALYSIS:

Derivation of Swing Equation. Determination of Transient Stability by Equal Area Criterion, Application of Equal Area Criterion, Critical Clearing Angle Calculation.- Solution of Swing Equation: Point-by-Point Method. Methods to improve Stability - Application of Auto Reclosing and Fast Operating Circuit Breakers.

TEXT BOOKS:

1. John J Grainger, William D Stevenson Jr, *"Power System Analysis"*, Tata Mc Graw–Hill Edition,2003.

2. Hadi Saadat, *"Power System Analysis"*,2nd Edition, TMH Edition, 2003

REFERENCES:

4. I.J.Nagrath &D.P.Kothari , "*Modern Power system Analysis*", 3rd edition, Tata McGraw-Hill Publishing company, 2010

5. M.A.Pai, *"Computer Techniques in Power System Analysis"*, 2nd Edition, Tata McGraw-Hill Edition, 2006

POWER SYSTEM OPERATION AND CONTROL

Course Code: 13EE1127

L	T	P	C
4	1	0	3

Pre requisites:

Power Generation Engineering, Power Transmission Engineering.

Course Educational Objectives:

- This subject deals with Economic Operation of Power Systems, Hydrothermal scheduling and modeling of turbines, generators and automatic controllers.
- It emphasizes on single area and two area load frequency control, Angle Stability, Voltage Stability and reactive power control.

Course Outcomes:

- After completion of the course, the student will be able to design algorithms for economic operation of Power Systems, Hydrothermal scheduling.
- The student will be able to analyze operation of single area and two area load frequency control.

UNIT-I (12 Lectures)

ECONOMIC OPERATION OF POWER SYSTEMS-1:

Introduction, Optimal operation of Generators on Bus Bar, Cost Curve – Incremental fuel Vs Production costs, input-output characteristics, Optimum generation allocation with line losses neglected.

Optimum generation allocation including the effect of transmission line losses – Loss Coefficients, General transmission line loss formula.

UNIT-II (12 Lectures)

HYDROTHERMAL SCHEDULING:

Optimal scheduling of Hydrothermal System: Hydroelectric power plant models, Mathematical formulation, Solution Technique, Algorithm.

UNIT-III (12 Lectures)

AUTOMATIC GENERATOR AND VOLTAGE CONTROL:

Introduction, Load Frequency Control (Single Area Case), Turbine Speed Governing System, Model of Speed Governing System, Turbine Model, Generator Model, Complete Block Diagram Representation of LFC of an Isolated Power System, Steady State Analysis, Dynamic Response, Alternator voltage regulator scheme, Block Diagram representation.

CONTROL AREA CONCEPT:

Proportional plus Integral control of single area and its block diagram representation, steady state response – Load Frequency Control and Economic dispatch control, Two Area Load Frequency Control.

UNIT-IV

POWER SYSTEM SECURITY:

System state classification, security analysis, contingency analysis, sensitivity factors

UNIT-V (12 Lectures)

VOLTAGE STABILITY:

Introduction, Comparison of Angle and Voltage Stability, Reactive Power Flow and Voltage Collapse, Mathematical Formulation of Voltage Stability Problem, Voltage Stability Analysis, Prevention of Voltage Collapse, State of the Art, Future Trends and Challenges.

COMPENSATION IN POWER SYSTEMS:

Introduction, Loading capability, Load compensation, Line compensation, Series compensation, Shunt Compensation, Comparison between STATCOM and SVC, FACTS, FACTS controllers.

TEXT BOOKS:

1. D.P.Kothari and I.J.Nagrath, *"Modern Power System Analysis"*, Tata Mc-Graw Hill Publishing Company, 3rd Edition, 2008.

REFERENCES:

1. C.L.Wadhwa, *"Electrical Power Systems"*, New Age International Publishers, 6th Edition, 2009.
2. O. I. Elgerd, *"Electric Energy Systems Theory"*, Tata McGraw Hill Publishing Company, Second Edition, 2007.
3. A. J. Wood and B.F.Wollenberg, *"Power Generation, Operation and Control"*, John-Wiley & Sons, Second edition, 2006.
4. T.J.E.Miller, *"Reactive Power Control in Electric Systems"*, John Wiley & Co, 1982.
5. Prabha Kundur, *"Power System Stability and Control"*, McGraw Hill Education, 2005.

OPTIMIZATION TECHNIQUES

Course Code: 13EE1128

L	T	P	C
4	0	0	3

Pre requisites: Partial differentiation, Matrices.

Course Educational Objectives:

- The objective of the course is to expose the student to the theory of classical optimization and also to present optimization techniques for solving practical problems in engineering systems
- Optimization Techniques are used to design and produce products and systems both economically and efficiently.
- Solving linear, non linear, dynamic and integer problems by using optimization techniques are to be discussed.

Course Outcomes:

- After the completion of the course, the student will be able to analyze any problem of optimization in an engineering system by formulating a mathematical model to the problem and solving it by the techniques that are presented to him.
- The student will be able to design and produce products and systems both economically and efficiently by using optimization techniques.
- The student will be able to solving linear, non linear, dynamic and integer problems by using optimization techniques.

UNIT-I (12 Lectures)

INTRODUCTION AND CLASSICAL OPTIMIZATION TECHNIQUES:

Statement of an Optimization problem – design vector – design constraints – constraint surface – objective function – objective function surfaces – classification of Optimization problems –Single variable Optimization – multi variable Optimization without constraints – necessary and sufficient conditions for minimum/maximum – multivariable Optimization with equality constraints: Solution by method of Lagrange multipliers – multivariable Optimization with inequality constraints: Kuhn – Tucker conditions.

UNIT-II **(12 Lectures)**

A. LINEAR PROGRAMMING:

Standard form of a linear programming problem – geometry of linear programming problems – motivation to the simplex method – simplex algorithm, dual LP.

B. TRANSPORTATION PROBLEM:

Finding initial basic feasible solution by north – west corner rule, least cost method and Vogel's approximation method – testing for optimality of balanced transportation problems.

C. INTEGER PROGRAMMING:

Gomory's cutting plane method, Branch and bound method.

UNIT-III **(12 Lectures)**

UNCONSTRAINED NONLINEAR PROGRAMMING:

One – dimensional minimization methods:Classification, Fibonacci method and Quadratic interpolation method, Univariate method, Powell'smethod, steepest descent method, Davidon-Fletcher-Powell method.

UNIT-IV **(12 Lectures)**

CONSTRAINED NON LINEAR PROGRAMMING:

Characteristics of a constrained problem, Classification, Basic approach of Penalty Function method; Basic approaches of Interior and Exterior penalty function methods. Introduction to Convex Programming problem.

UNIT-V **(12 Lectures)**

DYNAMIC PROGRAMMING:

Dynamic programming multistage decision processes – types – concept of sub optimization and the principle of optimality – computational procedure in dynamic programming – examples illustrating the calculus method of solution - examples illustrating the tabular method of solution.

TEXT BOOK:

1. S.S.Rao, *"Engineering optimization: Theory and Practice"*, 4th edition, New Age International (P) Limited, 2009.

REFERENCES:

1. K.V. Mital and C. Mohan, *"Optimization Methods in Operations Research and systems Analysis"*, 3rd Edition, New Age International (P) Limited Publishers, 1996.
2. Kanthi Swarup, P.K.Gupta and Man Mohan, *"Operations Research"*, 15th Edition, Sultan Chand & Sons New Delhi, 2010.
3. S.D. Sharma, *"Operations Research"*, 15th Edition, Published by Kedarnath& Ramnath, 2009.
4. G. Hadley, *"Linear Programming"*, 1st Edition Narosa Publishing House 1997.

HIGH VOLTAGE ENGINEERING

Course Code:13EE1129

L	T	P	C
4	0	0	3

Pre requisites:

Power Generation, Switchgear & Protection, Distribution Engineering.

Course Educational Objectives:

Students gets trained in various types of Generation and Measurements of High Voltage AC, DC and Impulse waves along with testing methods of High Voltage Equipment. Students to become aware of the necessity of EHV AC Transmission and appreciate its power handling capacity and major problems like Corona, High Electrostatic Fields, and Power Frequency voltage control.

Course Outcomes:

At the end of the course the student will be able to

- Calculate the Corona, Electric shock Currents and also will be able to know the procedure for measurement of high voltage and current.
- The student will be able to test the insulators and transformer and also would know the procedure for controlling of voltage using power frequency.

UNIT-I **(14 Lectures)**

GENERATION OF HIGH VOLTAGES AND CURRENTS :

Generation of High Direct Current Voltages, Generation of High alternating voltages, Generation of Impulse Voltages, Generation of Impulse currents, Tripping and control of impulse generators.

MEASUREMENT OF HIGH VOLTAGES AND CURRENTS :

Measurement of High Direct Current voltages, Measurement of High Voltages alternating and impulse, Measurement of High Currents-direct, alternating and Impulse, Oscilloscope for impulse voltage and current measurements.

UNIT-II (14 Lectures)

OVER VOLTAGE PHENOMENON AND INSULATION CO-ORDINATION:

Natural causes for over voltages – Lightning phenomenon, Over voltage due to switching surges, system faults and other abnormal conditions, Principles of Insulation Coordination on High voltage and Extra High Voltage power systems.

HIGH VOLTAGE TESTING OF ELECTRICAL APPARATUS:

Testing of Insulators and bushings, Testing of Isolators and circuit breakers, testing of cables, Testing of Transformers, Testing of Surge Arresters, and Radio Interference measurements.

UNIT-III (10 Lectures)

EHV AC TRANSMISSION LINE TRENDS AND PRELIMINARY ASPECTS:

Standard transmission voltages – power handling capacities and line losses – mechanical aspects.

CORONA:

Corona in EHV lines – corona loss formulate – attenuation of traveling waves due to corona.

UNIT-IV (12 Lectures)

CORONA:

Audio noise due to corona, its generation, characteristics and limits measurement of audio noise.

ELECTROSTATIC FIELD AND ITS CALCULATION AND EFFECTS:

Electric Shock Currents and their threshold values**,** Calculation of electro static field of AC lines, Effect of High E.S. field on Humans, Animals, Plants, etc, Meters and Measurement of E.S. fields.

UNIT-V (12 Lectures)

POWER FREQUENCY VOLTAGE CONTROL :

Problems at power frequency, generalized constants, No load voltage conditions and charging currents, voltage control using synchronous conductor, cascade connection of components : Shunt and series compensation, sub synchronous resonance in series – capacitor compensated lines.

TEXT BOOKS:

1. M. S. Naidu and V. Kamaraju, *"High Voltage Engineering"*, TMH Publications, 4th Edition, 2009 [UNITS I,II].
2. Rakosh Das Begamudre, *"Extra High Voltage AC Transmission Engineering"*, New Age International (P) Ltd., New Delhi – 2007 [UNITS III,IV,V].

REFERENCES:

1. C.L. Wadhwa, *"High Voltage Engineering"*, New Age Internationals (P) Limited, 3rd Edition,2010.
2. Ravindra Arora & Wolfgang Mosch , *"High Voltage Insulation Engineering"*, New Age International (P) Limited, 1st Edition, 1995.
3. E. Kuffel, W. S. Zaengl, J. Kuffel, *"High Voltage Engineering: Fundamentals"*, Cbs Publishers New Delhi, 2nd Edition, 2005.
4. Turan Gonen, *"Electric Power Transmission System Engineering"*, John Wiley,1988.
5. EHV Transmission line reference book – Edision Electric Institute (GEC) 1986.

ELECTRIC POWER DISTRIBUTION AUTOMATION

Course Code:13EE1130

L	T	P	C
4	0	0	3

Pre requisites:

Basic knowledge of electrical power distribution systems

Course Educational Objectives:

- To gain the awareness of the problems and challenges of the existing distribution system
- To understand the need for Distribution Automation (DA) and appreciate its role in overcoming existing problems of distribution system
- To gain the knowledge of various aspects of Distribution Automation (SCADA, Substation/ Feeder Automation, Remote Metering)
- To attain the knowledge of Demand Side Management and appreciate its role in improving performance of Demand Side Management.

Course Outcomes:

- To be able to select appropriate Communication Technology for DA
- To be able to reduce loss and improve voltage profile using DA
- To be able to implement DSM.

UNIT-I **(12 Lectures)**

DISTRIBUTION SYSTEM PLANNING AND AUTOMATION:

Power Sector Reforms, Basic Distribution Systems, Short-Term Load Forecasting, Long-Term Energy Forecasting, Technological Forecasting, Problems of existing Distribution System, Need for Distribution Automation, Characteristics of Distribution System, Distribution Automation (Objectives, Functions, Benefits), Feeder Automation, Communication Requirements for DA, Remote Terminal Unit (RTU), Communication Technologies for DA.

UNIT-II (10 Lectures)

SCADA SYSTEM:

Introduction, Block Diagram, Components of SCADA, Functions of SCADA, SCADA applied to Distribution Automation, Advantages of DA through SCADA, Requirements and Feasibility, DA Integration Mechanisms, Communication Protocols in SCADA Systems.

UNIT-III (12 Lectures)

SUBSTATION AUTOMATION :

Introduction, Definition of Substation Automation, Functions of Substation Automation System, State and Trends of Substation Automation, Intelligent Affordable Substation Monitoring and Control, Advantages of an EEM (Enterprise Energy Management) Substation Automation Solution.

UNIT-IV (12 Lectures)

FEEDER AUTOMATION :

Losses in Distribution Systems, System Losses and Loss Reduction, Network Reconfiguration, Improvement in Voltage Profile, Capacitor Placement in Distribution System for Reactive Power Compensation, Algorithm for location of capacitor.

UNIT-V (12 Lectures)

REMOTE METERING AND ENERGY MANAGEMENT:

Background for Automatic Meter Reading (AMR) for Utility, Components of AMR Systems, Communications Methods used for Meter Reading, AMR System, Services and Functions, Financial Analysis, Planning for AMR Implementation. Energy Management, Need Based Energy Management (NBEM), Demand Side Management (DSM).

TEXT BOOK:

Dr M K Khedkar and Dr G M Dhole, *"A Textbook of Electric Power Distribution Automation"*, University Science Press (Laxmi Publications Pvt. Ltd.), 2011.

REFERENCES:

1. D. Bassett, K. Clinard, J. Grainger, S. Purucker, and D. Ward, *"Tutorial Course: Distribution Automation"*, *IEEE Tutorial Publication 88EH0280-8-PWR*, 1988.
2. James Northcote-Green, Robert Wilson, *"Control and Automation of Electrical Power Distribution Systems"* CRC Press, Taylor and Francis Group, 2007
3. James A. Momoh, *"Electric Power Distribution, Automation, Protection, and Control"*, CRC Press, Taylor and Francis Group, 2007

ADVANCED EMBEDDED PROCESSORS

Course Code: 13EE1131

L	T	P	C
4	0	0	3

Pre requisites: Embedded Processors

Course Educational Objectives:

- To acquaint the student with 32-bit Embedded Processor Architectures.
- To help the student become conversant with an integrated development environment (IDE) for development, simulation and debugging of Assembly Language programs.

Course Outcomes:

Students who complete this course will be able to

- Understand ARM7 TDMI and PIC 32 advanced processor architectures.
- Write Assembly language programs for measurement and control applications using 32-bit processors.
- Specify, develop and test Assembly Language Programs using Keil and MPLab IDEs.
- Identify the unique characteristics and challenges of real-time systems

UNIT-I **(12 Lectures)**

ARM ARCHITECTURE:

The ARM Instruction Set Architecture. Bus structure and the peripherals. Register set, Exception modes, Software Interrupt, Memory organization and processor initialization [startup code]. Load store instruction set. Assembly programming using Assemblers, Linkers, Loaders and Debuggers.

UNIT-II (12 Lectures)

PERIPHERALS IN ARM PROCESSORS:

ARM / THUMB architecture. Program structure to Supervisor, Kernel, and User modes. Peripherals and their control: GPIO, Timers, Counters, PWM, ADC and serial communication channels. Application coding examples: Measurement of time, frequency, velocity and acceleration, power control.

UNIT-III (12 Lectures)

COMMUNICATION PROTOCOLS:

Modern communication protocols starting with addressable USART, SPI bus, 12C bus and USB; their characteristics protocols and usage in high speed communication.

UNIT-IV (12 Lectures)

PIC32 ARCHITECTURE:

Introduction to MIPS processor architecture in PIC 32 bit family, CPU architecture and a detailed introduction to peripherals, present. GPIO, timers, capture control and PWM features. Instruction set usage with application examples. Serial Communication, Keyboard Interfacing, LCD Display control , ADC Conversion and control of DC Motors.

(http://ww1.microchip.com/downloads/en/DeviceDoc/61146B.pdf)

UNIT-V (12 Lectures)

IDE AND RTOS CONCEPTS :

Simulation and debugging of programs using MPLAB Integrated Development Environment. Interrupts, modes and vectored interrupt priority processing using the many shadow registers. Challenges in development of intelligent programs. Introduction to In Circuit Emulation techniques using JTAG. Watching CPU activity, and techniques of in circuit flash programming.

Introduction to RTOS and its need in real time applications: in industry, particularly in robots, automobiles and gesture identification.

TEXT BOOKS:

1. B.Kanta Rao, *"Embedded Systems"*, 1st Edition, PHI Learning Private Limited, 2011. (Units 1,2, 3)
2. Lucio Di Jasio, *"Programming 32-bit Microcontrollers in C: Exploring the PIC 32"*, 1st Edition, Newnes, 2008. (Units 4,5)

REFERENCES:

1. A.N.Sloss, D.Symes and C. Wright, *"RM system's Developer Guide, Designing and Optimizing system software"*, 1st Edition,Morgann Kaufmann Publishers, 2004.
2. Steve Furber, *"ARM system on Chip Architecture"*, 2nd Edition, Adison Wesley Publishers, 2000.
3. David Seal, *"ARM Architecture Reference Manual"*, 2nd Edition,Adison Wesley Publishers, 2001.
4. Trevor Martin, *"Introduction to the LPC2000"*, 1st Edition, Hitex (UK) Ltd, 2005.

WEB REFERENCES:

1. www.keil.com
2. www.microchip.com

POWER ELECTRONICS APPLICATIONS TO POWER SYSTEMS

Course Code:13EE1132

L	T	P	C
4	0	0	3

Pre requisites:

Power Electronics & Power Systems.

Course Educational Objectives:

The students shall be exposed to application of power electronics, to High Voltage Direct Current HVDC) and FACTS (Flexible AC Transmission Systems) in the power transmission area.

Course Outcomes: After Completion of this Course the Student will be able to

- Analyze the Operation of the Graetz circuit.
- Design the Filter for Respective Harmonics
- Analyze the Harmonics by Using Fourier Transforms
- Understand the operations of Various FACTS Devices

UNIT-I (12 Lectures)

BASIC CONCEPTS:

Introduction, Comparison of AC and DC Transmission (Economics of power transmission, Technical performance and Reliability), Application of DC transmission, Description of DC transmission system (Types of DC links and Converter station), Planning for HVDC transmission, Modern trends in HVDC technology.

UNIT-II (12 Lectures)

ANALYSIS OF HVDC CONVERTERS:

Introduction**,** Analysis of Graetz circuit – with grid control but no overlap- with grid control and overlap less than 60^0 -relationship between AC and

DC quantities-equivalent circuit of rectifier, Inversion-equation of average direct current and voltage in terms of á, â and ã –equivalent circuit of inverter , 12 Pulse converters-relations between AC and DC quantities-modified equivalent circuit

UNIT-III (12 Lectures)

HVDC SYSTEM CONTROL&HARMONICS AND FILTERS:

Basic means of control-desired features of control-actual control characteristics-constant minimum ignition angle control-constant current control-constant extinction angle control-tap changer control-power control and current limits, System control hierarchy, firing angle control-IPC-EPC. Introduction, Generation of harmonics (Characteristics and Non characteristics harmonics), Design of AC filters (design and types of filters), Passive AC- filters, DC filters (Criteria of Design and Passive DC Filters), Active Filters.

UNIT-IV (12 Lectures)

FACTS CONCEPTS&STATIC SHUNT COMPENSATION:

Transmission interconnections power flow in an AC system, loading capability limits, Dynamic stability considerations, importance of controllable parameters, basic types of FACTS controllers, Benefits from FACTS controllers. Objectives of Shunt Compensation, midpoint voltage regulation voltage instability prevention, Improvement of transient stability, Power oscillation damping, Methods of controllable VAR generation, variable impedance type static VAR generators switching converter type VAR generators hybrid VAR generators.

UNIT-V (12 Lectures)

STATIC SERIES COMPENSATORS:

Concept of series capacitive compensation, Improvement of transient stability, power oscillation damping, subsynchronous oscillation damping. Functional requirements of GTO Thyristor controlled series capacitor(GCSC), Thyristor switched series capacitor(TSSC), and thyristor controlled series capacitor(TCSC) control schemes for GCSC TSSC and TCSC.

TEXT BOOKS:

1. K.R. PADIYAR, "*HVDC Transmission systems*", 2nd edition (in Two Colour), New Age International publishers 2012. (Unit-I,II & III)
2. N.G. Hingorani and L. Gyugui, *"Understanding FACTS Concepts and Technology of Flexible AC Transmission Systems"*, B.S. Publications, Indian Reprint 2000. (Unit-IV & V)

REFERENCES:

1. E.Uhlmann, *"Power Transmission by Direct Current"*, Springer ,1st Edition 2012.
2. Vijay K. Sood, *"HVDC and FACTS Controller: Application of Static Converters in power systems"*, IEEE Power Electronics and Power Systems series, Kluwer Academic publishers, Boston, First edition January 2004.
3. E.W. Kimbark, *"Direct Current Transmission"*, Wiley Inter Science-New York ,1971.
4. R.Mohan Mathur, Rajiv K Varma, *"Thyristor based FACTS Controller for Electrical Power Systems"* , John Wiley Sons,2011
5. X.P.Zhang, C.Rehtanz, B.Pal *"Flexible AC Transmission System Modelling and Control",* Springer, 2006

POWER ELECTRONICS AND SIMULATION LAB

Course Code:13EE1133

L	T	P	C
0	0	3	2

Pre requisites:

Power Electronics, Electrical Machines – I and Electrical Machines – II.

Course Educational Objectives:

The lab is intended for the students to get hands on experience in dealing with:

- Power semiconductor devices,
- Power converter circuits and
- Power converter-fed motor drives

Course Outcomes:

After completion of this lab the students acquire practical knowledge in:

- Study of SCR, MOSFET and IGBT and their firing circuits
- Various converter with R and RL loads
- Converter fed drives

The following experiments are required to be conducted as compulsory experiments:

1. Study of static characteristics of SCR, MOSFET & IGBT
2. SCR firing circuits and driver circuit for MOSFET/IGBT
3. Single Phase AC Voltage Controller with R and RL Loads
4. Single Phase fully controlled bridge converter with R and RL loads
5. Single phase parallel inverter with R & RL loads
6. Simulation of single-phase full converter using RL load.

7. Simulation of three phase AC voltage controller using RL & RLE load.
8. Simulation of buck/boost converters

In addition to the above ten experiments at least any four of the experiments from the following list are required to be conducted:

1. Simulation of single phase Inverter with PWM control
2. Simulation of a DC-DC chopper fed DC drive
3. Simulation of DC-AC Inverter fed Induction motor drive
4. Single Phase Half controlled converter with R and RL load.
5. Three Phase fully controlled bridge converter with RL load.
6. Single Phase series inverter with R and RL loads.
7. Speed Control of D.C. motor using dual AC/DC converter.

EMBEDDED PROCESSORS LAB

Course Code:13EE1134

L	T	P	C
0	0	3	2

Pre requisites:

Embedded Processors theory course.

Course Educational Objectives:

To Provide exposure to the Integrated Development Environment of various processors for writing , simulating and debugging programs in assembly language and to apply microprocessor based techniques to problems in Electrical Engineering in particular and also other disciplines in general.

Course Outcomes:

After successful completion of the this course a student will be familiar with using Integrated Development Environments of various processors and be able to design and write code for embedded applications. Further the student will also be able to also test and analyze applications using the skills learnt during the course.

The Following Experiments are Required to be Conducted as Compulsory Experiments:

1. Evaluation of Arithmetic Expression Using 8051 Kit.
2. Binary , BCD , ASCII Conversions using MPLAB
3. Multi-precision Addition , Subtraction , Multiplication and Division using AVR Studio.
4. Program to generate square wave using 8051 microcontroller.
5. Stepper motor Control using 8051/PIC/AVR microcontroller.
6. Keyboard & LCD interfacing using PIC / AVR processor.
7. Generation of a square wave of given duty cycle using PIC Processor.

8. Generation of Sine Wave of given Frequency using ARM Processor.

   In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted (using PIC/ Atmega /ARM Processors):

9. Generation of FSK using AVR microcontroller.
10. Measurement of voltage , current using ADC channels using Microchip PIC KIT 2.
11. Measurement of Power factor
12. Measurement of speed using optical sensors using Atmel STK500.
13. Real Time Clock Interface to display date and time on LCD Display.
14. Measurement of frequency using counters.
15. Measurement of Power using dual ADC channels.
16. Measurement of Energy using ADC.
17. Measurement of Torque.
18. DC Motor – Speed and Direction Control.
19. Servo motor – Position Control using Fast PWM in AVR microcontroller.
20. BLDC Motor – Speed control using PWM.
21. Touch Screen Interfacing.
22. USART and its programming to communicate with GSM Modem.

NOTES

SYLLABI FOR VIII SEMESTER

UTILIZATION OF ELECTRICAL ENERGY

Course Code:13EE1135

L	T	P	C
4	0	0	3

Pre requisites:

Basic knowledge in physics, kinematics, electrical engineering.

Course Educational Objectives:

The objective of this course is to train students on characteristics of various drives, Heating, Welding methodologies, Illumination methods and traction system.

Course Outcomes:

After completion of the course, the student will be able to

- Choose a right drive for a particular application.
- Understand various types of Heating, Welding and traction system.
- Student will be able to design Illumination systems for various applications.

UNIT-I (12 Lectures)

ELECTRIC DRIVES:

Type of electric drives, choice of motor, starting and running characteristics, speed control, temperature rise, Particular applications of electric drives, Types of industrial loads, continuous, Intermittent and variable loads, load Equalization.

UNIT-II (12 Lectures)

ELECTRIC HEATING:

Advantages and methods of electric heating, resistance heating, induction heating and dielectric heating.

UNIT-III (12 Lectures)

ELECTRIC WELDING:

Electric welding, resistance and arc welding, electric welding equipment, comparison between A.C. and D.C. Welding.

UNIT-IV (12 Lectures)

ILLUMINATION FUNDAMENTALS & VARIOUS ILLUMINATION METHODS:

Introduction, terms used in illumination, laws of illumination, polar curves, photometry, integrating sphere, sources of light.

Discharge lamps, MV and SV lamps – comparison between tungsten filament lamps and fluorescent tubes, Basic principles of light control, Types and design of lighting and flood lighting.

UNIT-V (12 Lectures)

ELECTRIC TRACTION:

System of electric traction and track electrification. Review of existing electric traction systems in India. Special features of traction motor, methods of electric braking-plugging rheostatic braking and regenerative braking, Mechanics of train movement. Speed-time curves for different services – trapezoidal and quadrilateral speed time curves.

Calculations of tractive effort, power, specific energy consumption for given run, effect of varying acceleration and braking retardation, adhesive weight and braking retardation adhesive weight and coefficient of adhesion.

TEXT BOOKS:

1. J.B. Gupta, *"Utilization of Electric Power and Electric Traction"*, Kataria & Sons publishers, Delhi, IX Edtion, 2004. (Units 1-5)
2. C.L. Wadhwa, *"Generation, Distribution and Utilization of electrical Energy"*, New Age International (P) Limited Publishers, 3rd Edition, 2010. (Units 1-5)

REFERENCES:

1. N.V. Suryanarayana, *"Utilization of Electrical Power including Electric drives and Electric traction"*, New Age International (P) Limited Publishers, 1st Edition,1994.
2. E. Open Shaw Taylor, *"Utilization of Electric Energy"*, Orient Longman,1st Edition,1937.

VLSI DESIGN

(Common to ECE and EEE)

Course Code: 13EC1117

L	T	P	C
4	0	0	3

Pre requisites: Electronics Devices and Circuits, Switching Theory and Logic Design.

Course Educational Objectives:

- ✤ To acquire knowledge of fabrication process involved in MOS Devices and to introduce the basic electrical properties of MOS devices and VLSI Circuit Design Processes.

Course Outcomes:

- ✤ Different IC technologies.
- ✤ Students know chip designing, synthesizing and testing.

UNIT-I (15 Lectures)

INTRODUCTION TO MOS TECHNOLOGIES:

VLSI Design Flow, Introduction to IC Technology–MOS, PMOS, NMOS, CMOS & Bi-CMOS technologies.

BASIC ELECTRICAL PROPERTIES:

Basic Electrical Properties of MOS and Bi-CMOS Circuits: I_{ds}-V_{ds} relationships, MOS transistor threshold Voltage, g_m, g_{ds}, figure of merit, Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT-II (12 Lectures)

VLSI CIRCUIT DESIGN PROCESSES:

MOSLayers, Stick Diagrams, Design Rules and Layout, CMOS Design rules for wires, Contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.

UNIT-III (14 Lectures)

GATE LEVEL DESIGN:

Transmission Gates, Alternate gate circuits, Basic circuit concepts: Sheet Resistance R_S and its concept to MOS, Area Capacitance Units, Calculations, Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers.

SUBSYSTEM DESIGN:

Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, High Density Memory Elements.

UNIT-IV (9 Lectures)

SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN:

FPGAs (Xilinx 4000series), CPLDs (Xilinx 9500series), Standard Cells, Design Approach.

UNIT-V (10 Lectures)

DESIGN METHODS AND TESTING:

Design methods, Design capture tools, Design Verification Tools, CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chip level Test Techniques, System-level Test Techniques, Layout Design for Improved Testability.

TEXT BOOKS:

1. Kamran Eshraghian, Eshraghian Dougles and A.Pucknell, *"Essentials of VLSI circuits and systems"*, 3rd Edn, PHI, 2005.
2. Weste and Eshraghian, *"Principles of CMOS VLSI Design"*, Pearson Education, 3rd Edition, 1999.

REFERENCES:

1. John .P. Uyemura, *"Introduction to VLSI Circuits and Systems"*, John Wiley, 1st Edition. 2009.
2. Sabastian smith , *"Application Specific Integrated Circuits"*, Addison Wesley Publishing Company Incorporated, 2008
3. John F.Wakerly, *"Digital Design Principles & Practices"*, PHI/ Pearson Education Asia, 3rd Edition, 2005.

4. John M. Rabaey, *"Digital Integrated Circuits"*, PHI, EEE, 2nd Edition 2003.
5. Wayne Wolf, *"Modern VLSI Design"*, Pearson Education, 3rd Edition, 2008.
6. Behzad Razavi, *"Design of Analog CMOS Integrated Circuits"*, The McGraw Hill, 2001.

DIGITAL CONTROL SYSTEMS
(Elective-IV)

Course Code: 13EE1136

L	T	P	C
4	0	0	3

Pre requisites:

Mathematics, Networks and control systems.

Course Educational Objectives:

- ✤ To equip the students with the basic knowledge of A/D and D/A conversion
- ✤ To understand the basics of Z- Transform
- ✤ To study the stability analysis of digital control system
- ✤ To equip the basic Knowledge about the design of digital control systems for different engineering model
- ✤ Analyze digital control systems using state-space methods.
- ✤ Analyze digital control systems using transform techniques (frequency response) and state-space methods (pole-assignment).

Course Outcomes:

- ✤ This course provides a foundation in discrete-time linear control system theory.
- ✤ Analyze digital control systems using transform techniques (frequency response) and state-space methods (pole-placement).
- ✤ Analyzing and understanding the challenges to interface digital computing devices with the Analog dynamics of most real-world systems.
- ✤ Evaluating and setting the necessary specifications for analog systems that are to be controlled by digital computing devices.

✤ Designing digital devices to satisfy given specifications and to achieve desired system-behavior

UNIT-I (12 Lectures)

SAMPLING AND Z-PLANE ANALYSIS:

Introduction, sample and hold operations, Sampling theorem, Reconstruction of original sampled signal to continuous-time signal.

REVIEW OF Z-TRANSFORMS:

Z-Transform method for solving difference equations; Pulse transforms function, block diagram analysis of sampled – data systems, mapping between s-plane and z-plane: Primary strips and Complementary Strips.

UNIT-II (12 Lectures)

STATE SPACE ANALYSIS:

State Space Representation of discrete time systems, Pulse Transfer Function Matrix solving discrete time state space equations, State transition matrix and it's Properties, Methods for Computation of State Transition Matrix, Discretization of continuous time state – space equations. Concepts of Controllability and Observability, Tests for controllability and Observability. Duality between Controllability and Observability, Controllability and Observability conditions for Pulse Transfer Function.

UNIT-III (12 Lectures)

STABILITY ANALYSIS:

Stability Analysis of closed loop systems in the Z-Plane. Jury stability test – Stability Analysis by use of the Bilinear Transformation and Routh Stability criterion. Stability analysis using Liapunov theorems.

UNIT-IV (12 Lectures)

DESIGN OF DISCRETE TIME CONTROL SYSTEM BY CONVENTIONAL METHODS:

Design of digital control based on the frequency response method – Bilinear Transformation and Design procedure in the w-plane, Lead, Lag and Lead-Lag compensators and digital PID controllers.

UNIT-V (12 Lectures)

STATE FEEDBACK CONTROLLERS AND OBSERVERS:

Design of state feedback controller through pole placement – Necessary and sufficient conditions, Ackerman's formula.

TEXT BOOKS:

1. B.C.Kuo, *"Digital Control Systems"*, 2nd Edition, Oxford University Press, 2003.
2. K. Ogata, *"Discrete-Time Control systems"*, 2nd Edition. PHI, 2002.

REFERENCES:

1. M. Gopal, "*Modern Control Systems Theory"*, Wiley Eastern, 1984
2. M. Gopal, *"Digital control engineering"*, New Age International Publications,2003
3. M.Gopal, *"Digital Control and State Variable Methods"*, 3rd Edition, TMH, Sep-2008.

SMART GRID
(Elective – IV)

Course Code: 13EE1137

L	T	P	C
4	0	0	3

Pre requisites:

Basic knowledge in Power Transmission Engineering, Communication engineering.

Course Educational Objective:

Students get trained in

- ✤ Information and Communication technologies used Smart Grids;
- ✤ Sensing, measurement, control and automation technologies implemented in Smart Grids,
- ✤ Management Systems, Power Electronics and Energy Storage technologies used in Smart Grids.

Course Outcomes :

After completion of the course students will be able to

- ✤ Design and analyze information and Communication Systems for Smart Grids,
- ✤ Analyze Sensing, Measurement, Control and Automation Systems for Smart Grids.

UNIT-I (12 Lectures)

INTRODUCTION TO SMART GRIDS AND COMMUNICATION TECHNOLOGIES:

Introduction, Early Smart Grid initiatives, Overview of the technologies required for the Smart Grid.

Introduction to data communication, Dedicated and Shared communication channels, Switching techniques, Communication channels, Layered

Architecture and Protocols, Communication Technologies for the Smart Grid, Standards for information exchange.

UNIT-II **(12 Lectures)**

INFORMATION SECURITY :

Introduction to information security for the Smart Grid, Encryption and decryption, Authentication, Digital signatures, Cyber Security Standards.

UNIT-III **(12 Lectures)**

SENSING, MEASUREMENT, CONTROL :

Introduction to Smart metering and Demand-side Integration, Smart Metering, Smart meters : An overview of the hardware used, Communication Infrastructure and protocols for smart metering, Demand-side Integration.

AUTOMATION TECHNOLOGIES:

Introduction to distribution automation equipment, Substation automation equipment, Faults in the distribution system, Voltage regulation.

UNIT-IV **(12 Lectures)**

DISTRIBUTION MANAGEMENT SYSTEMS:

Data sources and associated external systems, Modelling and Analysis Tools, Applications

TRANSMISSION SYSTEM OPERATION:

Data sources, Energy Management Systems, Wide Area Applications, Visualisation techniques.

UNIT-V **(12 Lectures)**

POWER ELECTRONICS AND ENERGY STORAGE:

Power electronics in the Smart Grid, Renewable energy generation, Fault current limiting, FACTS, HVDC, Energy storage technologies.

TEXT BOOK :

1. Janaka E., Nick Jenkins, Kithsiri Liynage, Jianzhong Wu, Akihiko Yokoyama, *"The Smart Grid – Technology and Applications"*, John Wiley, 2012

REFERENCES:

1. Clark W. Gellings, *"The Smart Grid"*, CRC Press, 2009.
2. Lars T. Berger, Krzysztof, Iniewski, *"Smart Grid Applications, Communications, and Security"*, John Wiley, 2012.
3. Krzysztof, Iniewski, *"Smart Grid – Infrastructure and Networking"*, Mc-Graw-hill, 2013.

SEMESTER - I

Code	COURSE TITLE	L	T	P	C
13HE1101	English	4	0	0	3
13BM1101	Mathematics-I	4	1	0	3
13BC1101	Chemistry	4	0	0	3
13CT1101	Introduction to Computer Science and Information Technology	4	0	0	3
13EE1142	Basic Electrical Engineering	4	1	0	3
13HE1102	English Language Lab	0	0	3	2
13BC1103	Chemistry Lab	0	0	3	2
13MT1101	Engineering Workshop	0	0	3	2
13NM1101	Professional Ethics	2	0	0	0
	TOTAL	**22**	**2**	**9**	**21**

SEMESTER - II

Code	COURSE TITLE	L	T	P	C
13BM1102	Mathematics-II	4	1	0	3
13BP1101	Physics	4	0	0	3
13CT1102	Computer Programming Through C	4	0	0	3
13ME1102	Engineering Mechanics	4	0	0	3
13EC1142	Electronics Devices and Circuits	4	1	0	3
13BP1102	Physics Lab	0	0	3	2
13CT1103	Computer Programming Lab	0	0	3	2
13EE1143	Basic Electrical Engineering Lab	0	0	3	2
13ME1103	Engineering Drawing	1	0	3	3
	TOTAL	**21**	**2**	**12**	**24**

SEMESTER - III

Code	COURSE TITLE	L	T	P	C
13BM1106	Discrete Mathematical Structures	4	1	0	3
13HM1101	Managerial Economics And Financial Accounting	4	0	0	3
13CT1104	Operating Systems	4	1	0	3
13EC1105	Switching Theory and Logic Design	4	0	0	3
13CT1105	Computer Organization	4	0	0	3
13CT1106	Data Structures	4	0	0	3
13CT1107	Data Structures Lab	0	0	3	2
13EC1143	Analog and Digital Circuits Lab	0	0	3	2
	TOTAL	**24**	**2**	**6**	**22**

SEMESTER - IV

Code	COURSE TITLE	L	T	P	C
13BM1103	Probability Statistics and Numerical methods	4	1	0	3
13CT1108	Design and Analysis of Algorithms	4	1	0	3
13CT1109	Unix and Shell Programming	4	0	0	3
13CT1110	Database Management Systems	4	0	0	3
13CT1111	Object Oriented Programming Through JAVA	4	0	0	3
13CT1112	Computer Graphics	4	0	0	3
13NM1102	Environmental studies	2	0	0	0
13CT1113	Object Oriented Programming Lab	0	0	3	2
13CT1114	Database Management Systems Lab	0	0	3	2
	TOTAL	**26**	**2**	**6**	**22**

SEMESTER - V

Code	COURSE TITLE	L	T	P	C
13EC1145	Communication Systems	4	1	0	3
13CT1115	Formal Languages and Automata Theory	4	1	0	3
13CT1116	Web Programming	4	0	0	3
13CT1117	Embedded Systems-1	4	0	0	3
13CT1118	Object Oriented Analysis and Design	4	0	0	3
13CT1119	Software Engineering	4	0	0	3
13CT1120	Embedded Systems -1 Lab	0	0	3	2
13CT1121	Web Programming Lab	0	0	3	2
13NM1103	Intellectual Property rights and Patents	2	0	0	0
	TOTAL	**26**	**2**	**6**	**22**

SEMESTER-VI

Code	COURSE TITLE	L	T	P	C
13HM1102	Management Science	4	0	0	3
13CT1122	Data Warehousing and Data Mining	4	1	0	3
13CT1123	Compiler Design	4	1	0	3
13CT1124	Computer Networks	4	0	0	3
	ELECTIVE - I	4	0	0	3
13CT1125	Software Testing				
13CT1126	Information Storage Systems				
13CT1127	Artificial Intelligence				
	ELECTIVE - II	4	0	0	3
13CT1128	Mobile Communications				
13IT1101	Enterprise Resource Planning and Supply chain management				
13IT1102	Information Retrieval Systems				
13HE1103	Technical Communication and soft skills Lab	0	0	3	2
13ES11BC	Basic computations lab	0	0	3	2
13IT1103	Computer Networks and Case Tools Lab	0	0	3	2
	TOTAL	**24**	**2**	**9**	**24**

SEMESTER-VII

Code	COURSE TITLE	L	T	P	C
13CT1129	Embedded Systems -2	4	1	0	3
13IT1104	Multimedia and Application Development	4	0	0	3
13CT1130	Unix Network Programming	4	0	0	3
13IT1105	Information Security	4	1	0	3
13CT1131	Middleware Technologies	4	0	0	3
	ELECTIVE - III	4	0	0	3
13CT1132	Software Project Management				
13CT1133	Bio-informatics				
13IT1106	Image processing and Pattern Recognition				
13CT1134	Information Storage Security and Management.				
13CT1135	Cloud Computing				
13IT1107	Multimedia and Application Development Lab	0	0	3	2
13IT1108	Network Programming Lab	0	0	3	2
13IT11MP	Industry oriented Mini-project	0	0	0	2
	TOTAL	**24**	**2**	**6**	**24**

SEMESTER - VIII

Code	COURSE TITLE	L	T	P	C
13IT1109	Distributed Databases	4	0	0	3
	ELECTIVE - IV	4	0	0	3
13CT1136	Big Data and Hadoop				
13IT1110	Ad-hoc networks				
13CT1137	Multi-Core Programming.				
13IT1111	Digital Forensics				
13IT1112	Principles of Digital Signal Processing				
	OPEN ELECTIVE	4	0	0	3
13IT11SM	SEMINAR	0	0	3	2
13IT11CV	COMPREHENSIVE VIVA	0	0	0	2
13IT11PW	PROJECT WORK	0	0	16	8
	TOTAL	**12**	**0**	**19**	**21**

LIST OF OPEN ELECTIVES

CODE	COURSE TITLE	OFFERING DEPARTMENT
13CH1128	Design and Analysis of Experiments*	Chemical Engineering
13CE1155	Green Buildings and Infrastructure	Civil Engineering
13CE1156	Disaster Management	Civil Engineering
13CS1113	E-Commerce	Computer Science and Engineering
13CT1132	Software Project Management*	Computer Science and Engineering
13EC1140	Bio-Medical Instrumentation	Electronics and Communications Engineering
13EE1138	Electrical Safety Management	Electrical and Electronics Engineering
13EE1139	Reliability Evaluation of Engineering Systems	Electrical and Electronics Engineering
13EE1140	Design Concepts for Engineers	Electrical and Electronics Engineering
13EE1141	Special Electrical Machines for Industrial Applications	Electrical and Electronics Engineering
13IT1113	Neural Networks	InformationTechnology
13IT1114	Biometrics	InformationTechnology
13ME1143	Renewable Sources Of Energy*	Mechanical Engineering
13ME1153	Project Management*	Mechanical Engineering
13BP1103	Nano Technology	Physics
13HM 1104	Entrepreneurship and Small Business Management	Management Studies
13HM 1105	Financial Management	Management Studies
13HM 1106	Indian and International Business Environment	Management Studies

*These courses can be taken by the students of respective departments if they are not offered /opted earlier in the structure.

NOTES

SYLLABI FOR I SEMESTER

ENGLISH
(Common to all Branches)

Course Code: 13HE1101

L	T	P	C
4	0	0	3

Course Educational Objectives:

Enabling the students to

- ✤ Understand class room lectures in different subjects
- ✤ Read technical and general materials including literary, scientific, political, economic and cultural topics of interest
- ✤ Develop effective written communication in academic, technical and professional contexts
- ✤ Develop creative and critical thinking skills necessary to become employable

Course Outcomes:

The learners will be able to show:

- ✤ Skills in reading including skimming, scanning, intensive and extensive and comprehension
- ✤ Enriched vocabulary and become better communicators
- ✤ Skills of communicating in descriptive, analytical and narrative modes with felicity
- ✤ Creative and critical thinking skills for employability

Course work:

To achieve the above objectives, instruction will be imparted through relevant ESP materials, articles and editorials from newspapers, technical journals, magazines in classes and laboratory. Students will be given individual and integrated practice in LSRW skills.

Contents:

Reading Comprehension - Reading in various degrees of speed (slow, fast, very fast); reading different kinds of texts for different purposes (for example, for relaxation, for information, for understanding, for discussion at a later stage etc.); reading between the lines, skimming and scanning and so on.

Vocabulary –synonyms, antonyms, prefixes, suffixes, confusables, one-word substitutes, Idioms and phrases

WRITING:

- Grammar: Common errors, articles, prepositions, tenses, concord, phrasal verbs, modal verbs, conditionals, transformation of sentences, punctuation and spelling
- Selecting materials for expository, descriptive, and argumentative pieces summarizing and abstracting
- Paragraph writing with coherence, cohesiveness and clarity,
- Essay writing- variety in sentences and paragraphs, précis writing
- Business letter writing
- Reference skills; use of dictionary, library and internet sources

SYLLABUS

UNIT-I (13 Lectures)

1. Story of Insects (English Today)
2. Bringing up Boys & Girls (Academic Encounters)
3. The Lunatic, the Lover and the Poet (The Siren's Song)
4. Vocabulary Building: Prefixes, Suffixes, One-Word Substitutes etc.

UNIT-II (14 Lectures)

1. Unity of Minds by Dr. A.P.J. Kalam (English Today)
2. On His Blindness (The Siren's Song)
3. Cultural Variation & Change (Academic Encounters)
4. Grammar: Tenses & Concord

UNIT-III **(11 Lectures)**

1. Three Years She Grew in Sun and Shower (The Siren's Song)
2. Advertising in the Media (Academic Encounters)
3. Grammar: Articles & Prepositions
4. Paragraph Writing; Technical Description-Process, Object

UNIT-IV **(12 Lectures)**

1. A Special Kind of Blessing (English Today)
2. Techniques of Solving Crimes (Academic Encounters)
3. La Belle Dame Sans Merci (The Siren's Song)
4. Précis writing &Letter Writing

UNIT-V **(10 Lectures)**

1. I Have A Dream (English Today)
2. Because I Could not Stop for Death (The Siren's Song)
3. Writing: Note Taking & Note Making ,Essay writing
4. Grammar: Simple, Compound & Complex Sentences

TEXTBOOKS:

1. Kristine Brown & Susan Hood, *"Academic Encounters: Life in Society Reading, Study Skills, Writing, London"*, Cambridge University Press/ Foundation Books, 2006.
2. K Durga Bhavani, G. K. Subbarayuydu, C. Vijayasree, D. Prema Kumari & Y. L. Srinivas, *"English Today: A Course in Reading and Writing"*, Foundation Books, 2005.
3. David Murdoch, The Siren's Song, "*An Anthology of British and American Verse"*, Madras, Orient Longman, 1993.

REFERENCES:

1. Alec Fisher, *"Critical Thinking An Introduction"*, New Delhi: CUP, First South Asian Edition, 2011.
2. Bikram K. Das, Kalyani Samantray, Rath Nayak, Susmita Pani & Saveeta Mohanty, "*An Introduction to Professional English and Soft Skills"*, New Delhi, Foundation Books, 2009.

3. *"Regional Institute of English, English for Engineers"*, New Delhi, Foundation Books, 2006.

4. Sharon J.Gerson, Steven M.Gerson, *"Technical Writing"*, New Delhi, Pearson Education, 2007.

SUGGESTED READING:

Stories of humour, adventure, mystery and autobiographies of eminent scientists.

MATHEMATICS-I

(Common to all branches)

Course Code: 13BM1101	L	T	P	C
	4	1	0	3

Pre requisites:

- Basic formulae of differentiation, product rule, and quotient rule.
- Basic Integration formulae, integration by parts, definite integrals and properties.
- Basic concept of partial differentiation.

Course Educational Objectives:

- The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- Solve ordinary differential equations of first, second and higher order.
- Learn the technique of Laplace transform and apply it to solve differential equations.
- Understand the concept of Double and Triple integrals and their applications to calculation of areas, volumes .
- Extend the concept of integration to vector functions, understand the significance of the operators, gradient, divergence and curl.
- Find surface areas and volumes of certain solids using Green, Stokes and Gauss divergence theorems.

UNIT-I (12 Lectures)

ORDINARY DIFFERENTIAL EQUATIONS:

Linear equations of first order, Bernoulli differential equation, Linear differential equations of higher order with constant coefficients, Method of Variation of parameters, Linear differential equations with variable coefficients (Cauchy's homogeneous linear equation, Legendre's linear equation).

Applications of Linear differential equations:

Orthogonal trajectories, Models on R-L-C circuits, Newton's law of cooling.
(11.9, 11.10, 13.1—13.7, 13.8(1), 13.9, 12.3, 12.5, 12.6)

UNIT-II (12 Lectures)

LAPLACE TRANSFORMS:

Laplace transform of elementary functions, properties, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, division by t, evolution of integrals by Laplace transforms.

INVERSE TRANSFORM:

Introduction, Finding inverse transforms by the method of partial fractions, other methods of finding Inverse Transform, Convolution theorem, Unit step function, and Unit impulse function.

APPLICATION OF LAPLACE TRANSFORMS:

Initial and Boundary Value Problems.
(21.1-21.5, 21.7-21.15, 21.17, 21.18

UNIT-III (12 Lectures)

PARTIAL DIFFERENTIATION:

Total derivative, change of variables, Jacobians, Tangent Plane and Normal to the Surface, Taylor's theorem for functions of two variables.

APPLICATIONS OF PARTIAL DIFFERENTIATION:

Maxima and Minima of functions of two variables, Lagrange method of undetermined multipliers.
(5.5 – 5.9, 5.11, 5.12)

UNIT-IV (12 Lectures)

MULTIPLE INTEGRALS:

Introduction to Non-Cartesian Coordinates, Double integrals, Change of order of integration, Double integral in polar co-ordinates, Triple integrals, Change of variables in double integrals, Change of variables in triple integrals. Simple Applications of Multiple Integrals**:** Area enclosed by plane curves, Volumes of solids.
(8.19, 8.21, 7.1, 7.7,)

UNIT-V (12 Lectures)

VECTOR DIFFERENTIATION:

Differentiation of vectors, curves in space, velocity, acceleration, Scalar and Vector point functions. Gradient of a scalar field and directional derivatives- Divergence and curl of a Vector field and it's physical interpretation.

VECTOR INTEGRATION:

Line integral, Circulation, work done, surface and volume integrals.

Vector integral theorems: Green's, Stoke's and Gauss Divergence theorems (without proofs) and related problems.
(8.1- 8.16)

TEXT BOOK:

Dr.B.S.Grewal *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. Kreyszig E, "*Advanced Engineering Mathematics*", 8th Edition, John Wiley, Singapore, 2001.
2. Greenberg M D, "*Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, "*Advanced Engineering Mathematics*", 7th Edition, Cengage Learning, 2011.

CHEMISTRY
(Common to all Branches)

Course Code: 13BC1101

L	T	P	C
4	0`	0	3

Course Eductational Objectives:

The course attempts impart a sound knowledge on the principles of chemistry involving different application oriented topics to requied for all engineering branches.

Course Outcomes :

The student should able to apply

- ✤ The principles involved in corrosion and its control
- ✤ Treatment of water for industrial purpose and concepts of energy storage devices.
- ✤ Utillisation of polymer engineering materials towards different applications.

UNIT-I (10 Lectures)

ELECTROCHEMICAL CELLS:

Electrode potential, Nernst equation, EMF of electrochemical cell, Reference electrodes-Standard hydrogen electrode, calomel electrode. Electrochemical series, Concentration cell, Construction of glass electrode, determination of P^H of given solution using glass electrode

Batteries-Primary cell-Dry or Lachanche cell, alkaline battery; secondary cells (storage batteries or accumulators) – Lead-acid Accumulator, Nickel-cadmium battery, Lithium ion battery (LIB) and redox flow battery.

Fuel cells - hydrogen - oxygen fuel cell, phosphoric acid fuel cell, solid oxide fuel cells

UNIT-II (12 Lectures)

CORROSION AND ITS CONTROL:

Introduction - Direct chemical corrosion and electrochemical corrosion and its mechanisms, Types of electrochemical corrosion-Differential aeration corrosion, galvanic corrosion, concentration cell corrosion, corrosion and pitting, stress corrosion, Galvanic series, passivity, factors influencing corrosion.

Corrosion control-proper designing, cathodic protection-sacrificial anodic protection and impressed current cathodic protection, modifying the environment and use of inhibitors.

Protective coatings- Anodic and cathodic coatings, Hot dipping-Galvanizing and Tinning, Metal cladding, Electroplating, Electroless plating, cementation or diffusion coatings.

UNIT-III (10 Lectures)

POLYMER TECHNOLOGY:

Polymerization, classification, degree of polymerization, functionality and tacticity of polymer, Types of polymerization-addition and condensation polymerization, Mechanism of addition polymerization, Condensation polymerization, Preparation, properties and uses of polythene, PVC, Teflon, nylons-6,6, Polyester, Bakelite and Silicones.

Plastics- Thermo plastics and thermosetting plastics, compounding of plastic.

Elastomers-Natural and synthetic rubbers, Manufacture, properties and applications of natural rubber-vulcanization, compounding of rubber, Synthetic rubbers-Preparation, properties and applications of Buna-S and Buna-N.

UNIT-IV (12 Lectures)

WATER TECHNOLOGY:

Introduction-characteristics imparted by impurities, hardness of water – Temporary and permanent hardness- units, Determination of hardness by EDTA method, Disadvantages of hard water, Chemical aspects of scale and sludge formation in boilers, caustic embrittlement,boiler corrosion, priming and foaming, Municipal water treatment-sedimentation, coagulation,

and filtration, Desalination of brackish water, Water softening methods- lime -soda method, zeolite method and ion exchange process.

UNIT-V (16 Lectures)

ENGINEERING MATERIALS:

Fuels- classification, characteristics of fuel, calorific value –determination of calorific value by bomb calorimeter and Junkers gas calorimeter, theoretical calculation of calorific value, Types and Analysis of coal - Proximate and ultimate analysis of coal, Manufacture of coke- Petroleum- classification based on sources of petroleum, Refining of petroleum, Knocking, octane value, cetane value, Cracking -thermal cracking and catalytic cracking-fixed bed & moving bed catalytic cracking, reforming.

Cement: Classification of cement, chemical composition, functions of ingredients in Portland cement, Manufacture of Portland cement- raw materials, setting and hardening of Portland cement.

Refractories- Classification and properties of refractories, Failures of refractory materials.

Lubricants-friction, lubrication, functions of lubricants, mechanism of lubrication-thick film, thin film and extreme pressure lubrication, types of lubricants- solid, semisolid and liquid lubricants and their properties .

TEXT BOOKS:

1. Jain& Jain, *"A text book of Engineering Chemistry"*, 15th Edition, Dhanapat Roy publishing company, 2010.
2. Sasichawla, *"Engineering Chemistry"*, 3rd Edition, Dhanapat Roy publishing company, 2004.

REFERENCES:

1, S.S. Dara, *"A Text book of Engineering Chemistry"*, 11th Edition, S.Chand & Co, 2006.

2. C. Parameswara Murthy, C.V. Agarwal and Andhra Naidu, *"A Text Book of Engineering Chemistry"*, 1st Edition, B.S. Publications, 2006.

INTRODUCTION TO COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

(Common to CSE& IT)

Course Code : 13CT1101	L	T	P	C
	4	0	0	3

Course Educational Objectives:

To introduce the student to various computer fundamentals. The course will cover all the issues of computer hardware and software with illustrations.

- ✤ To make the student knowledgeable in computer fundamentals.
- ✤ To make the student capable of understanding and analyzing the hardware and software components of a computer.
- ✤ Explains the fundamentals of operating systems.
- ✤ Explains the storage media and data representation.
- ✤ Explains the importance of protecting the system from various attacks and protection.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Gain the knowledge in computer fundamentals
- ✤ Analyze the hardware and software components of a computer
- ✤ Gains the knowledge about the fundamentals of operating systems
- ✤ Gain the knowledge about various storage media and data representation.
- ✤ Gain the knowledge about various components of computers, virus attacks, and their cures.

UNIT-I (12 Lectures)

INTRODUCTION TO COMPUTER CONCEPTS:

What is a computer, definition of computer, importance of computers,

computers history and development, classification of computers, benefits and limitations of computers, components of a pc system – the hardware, a closer look at the hardware, software, popularity of personal computers, uses of computers, summary.

COMPUTER ARCHITECTURE:

Input and output unit, Central Processing Unit, Memory Unit, ALU Organization, Control Unit Organization, Memory System.

UNIT-II (12 Lectures)

DATA REPRESENTATION:

Logic Gates/Circuits, Bits and Bytes, Number system for data representation, Error Detection and correction Codes.

INPUT / OUTPUT DEVICES:

Mother Board, Input Device, Output Device, Storage Devices, Cards, Ports and cords, Power supply.

UNIT-III (10 Lectures)

STORAGE MEDIA:

Floppy Disk and hard Disk, Compact Disc.

SOFTWARE CONCEPTS:

Classification of software, operating systems, concept of programming computer, types of computer languages, language translators, Software tools, windows – A graphical user interfaces(GUI), general purpose application software, special purpose application software.

UNIT-IV (14 Lectures)

OPERATING SYSTEM:

Introduction, introduction to operating system, services of an operating system, components of the operating system software, terminology used in operating system, types of operating systems, classification of operating systems, single user systems, multi-user systems, multi-user systems and networks.

NETWORKING:

Communication, networking, advantages of networking, types of networks, components of a network, standard topologies, access methods, network operating system, LAN expansion, wide area network transmission, sending data across a WAN.

UNIT-V **(12 Lectures)**

COMPUTER VIRUSES: ATTACK, PREVENTION AND CURE:

Definition of a virus, virus characteristics, what is sinister about viruses, virus history, how viruses are spread, different kinds of virus, damage done by viruses, virus prevention, networks and viruses, network protection, things that are not viruses, the future of viruses, anti-virus in the future, summary.

TEXT BOOK:

S. K Bansal, *"Fundamentals of Information Technology"*, 1st Edition, APH Publishing Corporation, 2012.

REFERENCE:

Anita Goel, *"Computer Fundamentals"*, 1st Edition, Pearson Education, 2010.

BASIC ELECTRICAL ENGINEERING

Course Code :13EE1142

L	T	P	C
4	1	0	3

Pre requisites: Basic Electrical Laws.

Course Educational Objectives:

- ✤ Basic Electrical Engineering is a basic fundamental course for the disciplines of CSE, IT and MECHANICAL.
- ✤ Hence it is introduced in I-Year so that the students will have to understand the topics related to Electrical Applications in the later studies.

Course Outcomes:

- ✤ Students acquire knowledge on the basics of electrical engineering and get ability to solve simple electrical network problems.
- ✤ And also will be knowledgeable enough to conduct experiments in electrical machines and miserable instruments.

UNIT-I **(12 Lectures)**

INTRODUCTION TO ELECTRICAL DC CIRCUITS AND THEOREMS:

Introduction, SI units, charge & current, voltage, power & energy, circuit elements. Ohm's law, Nodes, Branches & Loops, Kirchoff's laws, series resistors and voltage division, parallel resistors and current division(simple problems).

Wye–Delta transformation, source transformation, super position, Thevenin's, Norton's, Maximum power transfer theorems (simple problems).

UNIT-II **(12 Lectures)**

MAGNETIC CIRCUITS AND AC CIRCUITS:

Magnetic field due to Electric current, force on current carrying conductor, Electro Magnetic Induction, Direction of Induced EMF's, EMF induced in a coil, comparison of electric, magnetic circuits, self and mutual inductance.

Introduction, Capacitors, series and parallel capacitors, Inductors, series, parallel inductors, sinusoids, Phasors, phasor relationships for circuit elements, impedance, admittance, instantaneous and average power, RMS values, apparent power, power factor, complex power.

UNIT-III (12 Lectures)

TRANSFORMERS AND DC MACHINES:

TRANSFORMERS: Working Principle, construction, types, rating, induced EMF, ideal transformer, magnetizing and core loss current, voltage regulation, efficiency (simple problems), Auto transformer (elementary treatment only).

DC MACHINES : Constructional features, emf and torque, DC machine excitation, characteristics of DC motors and speed control, losses, efficiency (simple problems), (elementary treatment only).

UNIT-IV (12 Lectures)

AC MACHINES

SYNCHRONOUS MACHINE : Constructional details, EMF equation, determination of synchronous reactance, voltage regulation (simple problems), Principle of operation of a synchronous motor.

INDUCTION MOTOR:Constructional details, principle of operation, slip, rotor frequency, torque equation (simple problems) (Elementary treatment only).

UNIT-V (12 Lectures)

BASIC INSTRUMENTS:

Introduction, classification of Instruments, operating Principles, Basic requirements for measurement, Moving Coil Permanent Magnet (PMMC) instruments, Moving Iron of Ammeters and Voltmeters (elementary treatment only).

TEXT BOOKS:

1. Charles k Alexander, Mathew N.O. Sadiku, *“Fundamentals of Electric circuits”*, 4th Edition McGraw-Hill Companies, 2009. (Units 1, 2)
2. D.P. Kothari & I.J. Nagrath , *“Theory and Problems of basic Electrical Engineering”*, 1st Edition, PHI publications, 2010. (Units 3, 4, 5)

REFERENCE:

1. Hughes by I Mckenzie Smith, *“Electrical & Electronic Technology”*, 10th Edition, Pearson Education, 2010.

ENGLISH LANGUAGE LAB
(Common to all Branches)

Course Code : 13HE1102

L	T	P	C
0	0	3	2

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

Course Educational Objectives:

- To make students recognise the sounds of English and Phonemic transcription through Audio-Visual aids and Computer Software.
- To help them overcome their inhibitions and self- consciousness while communicating in English and to build their confidence.
- To enable them to speak English intelligibly with focus on Stress and Intonation.

Course Outcomes:

- Students will be able to recognise the sounds of English and Phonemic transcription, practice Stress & Intonation in speech.
- They will learn to communicate in Oral and Written English forms confidently.
- They will also be able to demonstrate skills like Publik Speaking & Oral Presentations. Students will also exhibit debating and discussion skills.

SYLLABUS:

The following course content is prescribed for the English Language Laboratory sessions:

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Listening for Comprehension

4. Situational Dialogues.
5. Oral Presentations- Prepared & Extempore
6. 'Just A Minute' Sessions (JAM)
7. Telephonic communication
8. Group Discussions
9. Debate
10. Team Presentations (PPTs).
11. Reference Skills

REFERENCES:

1. E. Suresh Kumar , P. Sreehari, *"A Handbook for English Language Laboratories"*, Foundation Books, revised edition 2009.
2. Simon Sweeny, *"English for Business Communication"*, CUP, First South Asian Edition, 2010.
3. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
4. Daniel Jones, English Pronouncing Dictionary with CD.
5. T. Balasubramanian, *"A Text book of English Phonetics for Indian Students"*, Macmillan, 1981.
6. Jeremy Comfort, Pamela Rogerson, Trish Stott & Derek Utley, *"Speaking Effectively : Developing Speaking Skills for Business English"*, Cambridge University Press, First South Asian Edition,2002.Reprint 2011.
7. T Samson, *"Innovate With English"*, New Delhi: Foundation Books, 2010.
8. Meenakshi Raman & Sangeeta Sharma, *"Technical Communication Principles & Practice"*, New Delhi: OUP, 2010.

CHEMISTRY LAB

(Common to all Branches)

Course Code: 13BC1103

L	T	P	C
0	0	3	2

Course Educational Objectives:

The course is to develop the basic experimental skills and analytical thinking.

The course attempt to provide information regarding various chemical techniques used in quantitative chemical analysis.

Course Outcomes:

The student will be able to determine the substance quantitatively and analyse the data obtained to resolve the prolem in their respective areas.

LIST OF EXPERIMENTS:

1. Determination of ferrous iron.
2. Determination of ferric iron.
3. Determination of total hardness of water.
4. Determination of carbonate and bicarbonate of water.
5. Determination of dissolved oxygen.
6. Determination of available chlorine in bleaching powder.
7. Determination of zinc by potassium ferrocyanide.
8. Determination of copper by EDTA method
9. Determination of calcium by permanganate.
10. Determination of iron-II by potentiometric method.
11. Determination of viscosity of lubricant by viscometer.
12. Determination of flash and fire points of lubricant.
13. Determination of percentage residue of carbon in oils.

14. Determination of calorific value of solid fuels.
15. Determination of fluoride by spectrophotometric method.
16. Determination of iron in cement by spectrophotometric method.

REFERENCE:

A.I.Vogel, *"A Text book of quantitive chemical analysis"*, 6th Edition, Pearson Education, Pvt. Ltd., 2002.

ENGINEERING WORKSHOP

(Common to all Branches)

Course Code :13MT1101	L	T	P	C
	0	0	3	2

Course Educational Objectives:

To provide hands on experience on basic Engineering and IT related skills.

- ✤ To train the student in the basics of computer components, maintenance software(s) installation
- ✤ To train the students in office tools.
- ✤ To give the student exposure to DOS commands and LINUX commands.
- ✤ To demonstrate and train the students in basic professional trades.
- ✤ To train the students to know about different system tools in personal computer.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Identify the peripherals of a computer, components in a CPU and its function
- ✤ Work with MS-OFFICE
- ✤ Work with DOS commands
- ✤ Work with LINUX commands
- ✤ Understands different system tools in personal computer.

COMPULSORY EXERCISES:

1. Identification of the peripherals of a computer, components in a CPU and its function – Block diagram of the CPU along with the configuration of each peripheral. Disassembly and assembly of a personal computer.

2. Installation of MS windows on the personal computer.

3. One lamp controlled by a one-way switch and (b) Two-way switching for stair-case lamp.

ANY NINE EXPERIMENTS FROM THE FOLLOWING:

Carpentry: Making a Cross-half lap joint using wooden pieces.

Carpentry: Making a Mortise and Tenon joint using wooden pieces.

Fitting: Preparation of a V-fit between mild steel flat pieces.

Fitting: Preparation of a Square-fit between mild steel flat pieces.

Foundry: Preparation of a sand mould using a single piece pattern

Foundry: Preparation of a sand mould using a split piece pattern.

Tin-Smithy: Preparation of a sheet metal pipe-joint using tin-smithy tools.

Tin-Smithy: Preparation of a sheet metal funnel using tin-smithy tools.

Welding: Making a Lap joint through arc welding.

Lathe Machine: Demonstration of turning related activities on Lathe machine.

Black smithy: Demonstration of Plumbing trade.

Plumbing: Demonstration of plumbing trade

Operating System: Changing Boot Device Priority, Installation of Linux, putting passwords, Enabling and disabling external devices, Connectivity Boot Camp.

Hands on Exposure on Linux shell commands: Using man, info commands for finding information about commands. Using file processing commands (ls, cp, mv, ln, mkdir, rmdir, chmod etc..), Using text processing commands (grep, egrep, sed etc…), Using disk utility commands, mount commands (du, df, mount etc..), Vi-Editor.

MS-Word: Using Ms-Word, creating project abstract, creating newsletter, creating feedback form

MS- Excel: Excel orientation, creating scheduler, calculating CGPA, Performance Analysis

MS-PowerPoint: PPT Orientation, Slide Layouts, Custom Animation, Hyperlinks, inserting Images, Clip Art, Audio, Video, Objects, Tables, Charts.

System tools, Hardware Troubleshooting, Software Troubleshooting and Installations of Anti Virus.

Multimedia Flash (Adobe)

a. Introduction to Flash interface

b. Introducing the tools

c. Putting text into Flash

d. Smoothen/straighten drawings

e. Animation Part 1: Using layers, key frames and motion tweening

f. Animation Part 2: Shape tweening, motion guide and frame by frame animation

PROFESSIONAL ETHICS

(Common to all Branches)

Course Code: 13NM1101

L	T	P	C
2	0	0	0

Course Educational Objectives:

- ✤ To educate and make the young generation students aware of their Social responsibilities make an Endeavour to tell them first we are humans and then we are scientists, engineers, technocrats and professionals.
- ✤ To make students accountable to whatever job they do whether it is less paid or heavily paid.
- ✤ To inculcate a spirit of togetherness, unity and team work in an organization.
- ✤ To make him reasonably a 'good' professional conscious of his duties to the society that graced this wonderful life.
- ✤ To induce the spiritual aspect of life in one's own practical and real life.
- ✤ To give an overview of a decent, dignified, humane, dedicated professional with a sense of social responsibility and security.

Course Outcomes:

By the end of this course, it is expected that the student will be able to

- ✤ Deal with complex situations while dealing with the people in the society (parents, friends, and co-professionals) in making the work environment congenial, encouraging and loving.
- ✤ Discriminate when he is forced through certain undesirable and ambiguous situations either in his day today life as a student and as a professional in his career further.
- ✤ Understand the basics regarding the leadership and to become a conscious professional.

- Be aware of codes of professional bodies.
- Implement these concepts in one's career for achieving excellent job satisfaction.

UNIT-I (6 Lectures)

BASIC HUMAN VALUES:

'Be a Human First and then one can become a good Professional'; so the basic Human Values-Truth, Right Conduct (Righteousness), Love, Non-violence and Peace, Humility and character. What is ethics? Core areas of ethics: Social ethics, personal ethics Integrity and Trustworthiness, Honesty, Loyalty, Courage, Prudence, Confidence, Confidentiality.

Character: definition, 'A bundle of Virtues and weaknesses of Head and Heart- the resulting individuality of a person from the balance sheet of 'good' and 'bad qualities' is his/her character.

TRAITS OF GOOD CHARACTER:

Honesty and integrity, sense of duties and obligations to one's own profession, Adherence to truth and principles, excellent team work with a good rapport with the subordinates and colleagues, self-discipline, Responsibilities and accountability, self-lessness. Unity in thought, word and deed (Case studies relating to these aspects can be drawn from history & epics or from one's own experience)

Human values as practiced in the Indian societal context-past and present. (Examples drawn from any standard scriptures and many other sources available may be illustrated, debated and discussed).

Spirit of Nationalism and Patriotism with examples from 'struggle for Freedom' (Case studies in the lives of Mahatma Gandhi & His team who strived for Freedom from the British, Scientists and Engineers like Bhaha, Sarabhai, Dhavan, Abdul J Kalam, and Benjamin Franklin, Martin Luther King, or any renowned personalities)

UNIT-II (6 Lectures)

What is a profession? Who is a Professional? Special criteria to meet the definition of professional, criteria to be a 'professional engineer (Pages 24-36) of Mike W Martin and Roland Schinzinger)

The 5 Ds (Discipline, Devotion, Dedication, Discrimination and

Determination) against 3 Ps (Pay-Prospects and Promotion)

Personal ethics-Social ethics and professional ethics – are they different- How would you distinguish? –A debate

General and Applied ethics, Relationship between these two in day-to-day functioning of an Engineering Professional- (Pages 10-12 of Mike W Martin and Roland Schinzinger)

PROFESSIONAL AND ENGINEERING ETHICS:

Why Engineering ethics? Moral issues encountered by professional engineers during their day-to-day operations both at home and office/workplace- Moral problems that frequently arise in ones Profession, (case studies from Chapter 1 pages 2-9, analysis of the case studies on pages 13 &14)

MORAL AUTONOMY:

Moral integrity and social and professional behavior. Different theories proposed under moral autonomy-Kohlberg's and Gilligan's Theory. Heinz's Dilemma- Motive behind aggression (16-23 Pages)

LEADERSHIP IN PROFESSIONALISM:

Characteristics of a Leader? Case studies and examples (Leadership by Dr M L Chibber)

UNIT-III (6 Lectures)

Religion and Ethics and Morals-Debate and discussion- Spirituality, social consciousness and ethics

THEORY ABOUT MORALITY:

Virtue ethics, Utilitarianism, Duty ethics, Right ethics based on the concepts of Virtues and vices, most good for most people, Duties to respect for persons, Human rights respectively (pages 53-61, Study Questions for analysis and discussion on pages 60 &61)

Engineering Profession as a social responsibility, His responsibility and accountability while dealing with public issues such as safety, risk, hazards, Risk Analysis and assessment-a brief discussion (risk assessment problem on Page (Chapter 4, specified topics and Case studies)

(Present the case studies on Challenger space shuttle(97), Chernobyl (173), Bhopal tragedy (299), Titanic disaster (p 83), SLV-3, the Indian

Space Shuttle (Wings of Fire) recent nuclear holocaust in Japan recent floods and other man-made and natural calamities or accidents we come across frequently in our society)

Environmental ethics (304-308) & Computer ethics 319-323328-330) (All Pages from Mike W Martin and Roland Schinzinger)

UNIT-IV (6 Lectures)

RESPONSIBILITIES AND RIGHTS OF ENGINEERS:

Collegiality (Ones attitude) towards other engineers working in the same Organization or outside) and Loyalty (to the Employer), obligation of Loyalty and misguided loyalty, Respect for authority and its limitations, Bootlegging, Collective bargaining, Commitments and Convictions (APJ Abdul Kalam's "Wings of Fire") Confidentiality while changing jobs, Conflicts of interests, Gifts, bribes, kickbacks -case studies related, Occupational Crime and industrial espionage

Whistle blowing and moral guide line (case studies), Discrimination, preferential treatment and harassment Rights of Engineers (page 284-286)

Selected topics from Ch 5 and 6 and case studies on pages 200-201,

UNIT-V (6 Lectures)

Engineers as Managers and leaders promoting ethical climate (350-358)

–Ethics in Engineering by Mike W Martin and Roland Schinzinger)

Why a code of Ethics for professional Engineers? ('A code of ethics is not something you post on the Bulletin board; it is something you live every day in your life and career)

Code of ethics for Engineers, Organizational Culture, and Guidelines for use with the Fundamental canons of ethics; (pages 142-162 Indian Culture and Professional Ethics by P S R Murty and 399-414 0f Mike W Martin and Roland Schinzinger)

PROFESSIONAL BODIES:

IEEE, IETE, IE, ASME, ASCE, ABET, NSPE, ISTE Etc…

{** Any topic can be discussed and debated with known live examples and illustrations we find in our day-to-day -living circumstances.}

TEXT BOOKS :

1. Mike W Martin and Ronald Schinzinger : *"Ethics Engineering"*, 3rd Edition, Tata McGraw Hill Education Pvt. Ltd., 2003.
2. P S R Murthy : *"Indian Culture Values and Professional Ethics"*, 2nd Edition, B S Publications, Hyderabad. 2013.

REFERENCES:

1. M. Govindarajan, S Natarajan and V.S. Senthil Kumar : *"Engineering Ethics and Human Values"*, 1st Edition, PHI Publications , 2013.
2. A. Alavudden, R. Kalil Rahaman & M . Jayakumaran : *"Professional Ethics & Human Values"*, 1st Edition, University Science Press (An Imprint of Laxmi Publications Pvt Ltd., Chennai, Bangalore. 2008.
3. Lieunt Gen Dr. M. L. Chibber : *"Leadership-Education in Human Values"*, Sri Sathya Sai Books and Publications Trust, Prasantinilayam, 1st Edition, 2009.
4. Kalam A P J : *"Wings of Fire"*, Universities Press Publications, 2013.
5. Charles B. Fleddermann : *"Engineering Ethics"*, 4th Edition, PHI, 2012.

SYLLABI FOR II SEMESTER

MATHEMATICS-II
(Common to all branches)

Course Code:13BM1102

L	T	P	C
4	1	0	3

Pre requisites:

- ✤ Basic formulae of differentiation and integrations.
- ✤ Basic terminology and elementary operations on Matrices.
- ✤ Basic concept of partial differentiation.

Course Educational Objectives:

- ✤ The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- ✤ The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.
- ✤ Understand the most basic numerical methods to solve simultaneous linear equations.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- ✤ Solve simultaneous linear equations using matrix methods.
- ✤ Calculate eigenvalues and eigen vectors of matrices that are essential for vibration/design analysis.
- ✤ Understand Fourier series, integral ,transforms and they are provided with practice in their application and interpretation in a range of situations.
- ✤ Identify/classify and solve the different types of partial differential equations.

UNIT-I (12 Lectures)

MATRICES:

Rank, Normal form, Echelon form, Consistency and Solution of system of simultaneous linear homogeneous and non-homogeneous equations. Finding eigenvalues and eigen vectors, properties, Cayley-Hamilton theorem, computing inverse and powers of a matrix by applying Cayley-Hamilton theorem, Diagonalisation of matrix.
(2.7, 2.10, 2.13 -2.16)

UNIT-II (12 Lectures)

NUMERICAL METHODS IN LINEAR ALGEBRA:

Solution of linear simultaneous equations: LU decomposition, Jacobi iteration and Gauss-Seidel methods. Determination of eigenvalues and eigen vectors by iteration (Rayleigh's Power Method) .

(28.5, 28.6(3), 28.7(1)(2), 28.9)

UNIT-III (12 Lectures)

DIFFERENCE EQUATIONS AND APPLICATIONS:

Difference operators (forward, backward and shift operators), Introduction to difference equation, formation of difference equation, Linear difference equations and it's complete solution. Rules for finding the complementary function and complete integral, Deflection of a loaded string.
(29.1, 29.4, 31.1 - 31.6, 31.8)

UNIT-IV (12 Lectures)

FOURIER SERIES:

Euler's formulae, Dirichlet's Conditions for a Fourier expansion, functions having points of discontinuities, Change of interval, even and odd functions, half range series, wave forms.

FOURIER TRANSFORMS :

Fourier integral theorem, Fourier transform and inverse Fourier transform, Fourier sine and cosine integrals. – Fourier sine and cosine transforms – properties of Fourier Transforms – Finite Fourier transforms.
(10.1 – 10.9, 22.1 – 22.5)

UNIT-V (12 Lectures)

PARTIAL DIFFERENTIAL EQUATIONS:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – solutions of first order linear (Lagrange) equation and nonlinear first order (standard type) equations.

APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS:

Method of separation of variables, Classification of second order linear Partial Differential Equations. Solutions of one dimensional heat equation, wave equation and two-dimensional Laplace's equation under initial and boundary conditions. (17.1 – 17.3, 17.5, 17.6, 18.1-18.7)

TEXT BOOK:

Dr.B.S.Grewal *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. Kreyszig E, "*Advanced Engineering Mathematics*", 8th Edition, John Wiley, Singapore, 2001.
2. Greenberg M D, "*Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, "*Advanced Engineering Mathematics*", 7th Edition, Cengage Learning, 2011.

PHYSICS

(Common to all Branches)

Course Code: 13BP1101

L	T	P	C
4	0	0	3

Course Educational Objectives:

The aim and objective of the course curriculum is to impart learners the basic knowledge that enables effective understanding of various core subjects of engineering branches through principles of physics such as architectural acoustics, wave mechanics, dielectrics, fiber optics, Electromagnetism and so on.

Course Outcomes:

- ✤ Students will acquire knowledge of basic physical principles and they can correlate the same to natural environment and social concern.
- ✤ Students will be able to apply the knowledge in the selection of materials for various engineering applications.
- ✤ Enables students to learn the characteristics and applications of laser devices and enhances information levels on fiber optic communications.
- ✤ Enables the students gain a research orientation and innovative spirit.

UNIT-I (10 Lectures)

ELASTIC PROPERTIES OF MATERIALS & ARCHITECTURAL ACOUSTICS:

Introduction – classification of stress, strain and Hooke's law – Elastic behavior of materials – Poisson's ratio and relationship between modulus of elasticity – Twisting couple on a solid shaft – bending of beams – bending moment - Y by cantilever – Uniform bending - Reverberation and reverberation time – absorption coefficient – Sabine's law (quantitative treatment) – Factors affecting the acoustics of buildings and their remedies – Acoustical design of a hall.

UNIT-II **(15 Lectures)**

ELECTROSTATICS AND DIELECTRICS:

Vectors - unit vectors - Gradient of a scalar field – divergence & curl of a vector field – Coulombs law - Electric flux - Gauss law in electrostatics – differential form of Gauss law – derivation of Coulombs law from Gauss Law – Applications of Gauss Law (Electric Field due to a solid charged sphere and thin sheet of charge) - Gauss law in dielectric medium - Dipole - Electric displacement vector - Dielectric permittivity and susceptibility- Dielectric constant and dielectric polarization in materials - Types of polarizabilities - Electronic polarizability derivation - Internal fields in solids and Claussius - Mosotti equation - frequency dependence of dielectric constant - Dielectric loss - Dielectric Strength and dielectric breakdown - important dielectric materials in electrical engineering.

UNIT-III **(10 Lectures)**

ELECTROMAGNETICS:

Biot-Savart Law - Magnetic flux – Magnetic scalar potential - Magnetic Vector Potential - Ampere's law – Force and torque on a magnetic dipole due to external magnetic field, Magnetization - Bound volume and surface current densities - auxiliary field H (Ampere's law in magnetized materials) - Magnetic susceptibility and permeability - Force on charged particle under electric and magnetic fields - Faraday's law of electromagnetic induction - Self and mutual Inductances - Displacement current density - Maxwell's equations – Physical Significance of Maxwell's equations.

UNIT-IV **(10 Lectures)**

WAVE MECHANICS & BAND THEORY OF SOLIDS :

Introduction to wave mechanics – wave particle duality – de-Broglie matter waves – Wave function characteristics and significance – Schrodinger's time independent wave equation – particle in one dimensional rigid box - Fermi-Dirac distribution function – Fermi level - Effect of temperature on Fermi function - Bloch theorem (Qualitative), Kronig - Penny model (Qualitative treatment) – Concept of effective mass, Origin of energy band formation in solids – Classification of materials in to conductors, semi-conductors and insulators based on number of effective electrons.

UNIT-V (15 Lectures)

OPTICS & LASERS:

Introduction to optics – Interference phenomenon - interference through thin films in reflected light – Newton's rings – determination of wave length of a source – Diffraction due to single slit – intensity pattern discussion – Diffraction grating – Resolving Power of grating (qualitative) - Polarization – Law of Malus - Brewster's law – double refraction – Nicol prism - Basic principle of a LASER – Induced absorption, spontaneous and stimulated emissions – Einstein's coefficients – Population inversion – Ruby laser, CO_2 laser and Semiconductor laser – Laser Applications – Introduction to optical fibers – Classification of fibers on the basis of refractive index profile – Acceptance angle and numerical aperture definitions and expression for Numerical aperture – Applications relating to communication and sensors (force and temperature).

TEXT BOOKS:

1. D.J. Griffiths, *"Introduction to Electrodynamics"*, 3rd Edition, PHI (EEE series), 2009.
2. M.N. Avadhanulu, P.G. Kshirasagar, *"A Text book of Engineering Physics"*, 10th Edition, S. Chand & Company Limited, 2013.
3. V. Rajendran, *"Engineering Physics"*. 2011 Edition, TMH Publishing Company, 2011.

REFERENCES:

1. A.J. Dekker, *"Electrical Engineering Materials"*, 1st Edition, Macmillan Publishers, 2007.
2. C. Kittel, *"Introduction to Solid State Physics"*, John Wiley Publishers, 2007.
3. M.N.Sadiku, *"Elements of Electromagnetics"*, 4th Edition, Oxford University Press, 2007.
4. V. Raghavan, *"Materials Science"*, 5th Edition, PHI Publishers, 2007.
5. R.K. Gaur, S.L. Gupta, *"Engineering Physics"*, 8th Edition, Dhanapat Rai Publishers, 2003.

6. P.K. Palanisamy, *"Applied Physics"*, 2nd Edition, Scitech Publishers, 2010.

7. M. R. Srinivasan, *"Engineering Physics"*, New Age Publishers, 2012.

COMPUTER PROGRAMMING THROUGH C
(Common to all Branches)

Course Code : 13CT1102

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course helps the student in understanding Computer Programming concepts. An individual will have ability to:

- ✤ Design Algorithmic solution for various problems and convert algorithms to C programs
- ✤ Design programs with Interactive Input and Output
- ✤ Design programs utilizing arithmetic expressions
- ✤ Design programs utilizing repetition and decision making
- ✤ Design programs utilizing arrays and structures
- ✤ Design programs using file Input and Output
- ✤ Test and verifying programs

Course Outcomes:

At the end of the course the student will be able to

- ✤ Know how to write algorithms and draw flowcharts and develop programs
- ✤ Write programs using sequential, condition, iterative control statements
- ✤ Write programs using derived data types like arrays, functions, pointers, strings, structures, unions
- ✤ Define user defined data types like type- def, enum
- ✤ Learn about files, their creation, and various operations that can be performed on files

UNIT-I (12 Lectures)

Introduction to Computers , Algorithm/ Pseudo code, Flow chart, Program Development steps, Basic structure of C Program, Input and Output statements (printf() & scanf()), A Simple C Program, Identifiers, Basic data types and sizes, Constants, Variables, Operators, Type Conversion, Expression Evaluation, Precedence & Associativity of operators.

CONTROL STATEMENTS:

If, switch, for, while and do- while statements, break, continue and goto statements.Sample programs covering all the above topics.

UNIT-II (12 Lectures)

FUNCTIONS:

Definition, Advantages, types of functions- user defined and standard library functions, categories of functions , scope rules, recursion, storage classes. Sample programs covering all the above topics.

UNIT-III (12 Lectures)

ARRAYS:

Introduction to arrays, 1 D Arrays: Definition, Declaration, Initialization, Accessing & storing the elements, 2 D Arrays: Definition, Declaration, Initialization, Accessing & storing the elements C Pre processors.

STRINGS:

String- Declaration, Initialization, pointers and strings, standard library string functions, array of pointers to strings. Sample programs covering all the above topics.

UNIT-IV (12 Lectures)

POINTERS:

Definition, Declaration of Pointer variables, the & and * operators, Pointer Expressions, Char, int, and float pointers, Pointer arithmetic, Passing addresses to functions, Functions returning pointers, Pointers & Arrays: Passing array elements to functions, pointer to pointer, array of pointers, Dynamic memory allocation functions, Sample programs covering all the above topics

UNIT-V (12 Lectures)

STRUCTURES & UNIONS:

Structures: Definition, Initialization, Accessing structures, nested structures, array of structures, additional features of structures, self referential structures, unions, type-def, bit fields, enum data type.

FILES:

Concept of a file, Text and Binary files, file I/O operations, Command line arguments. (Let Us C, Yashavant Kanetkar)

Sample programs covering all the above topics.

TEXT BOOKS:

1. B.A Forouzan and R.F. Gilberg, *"Computer science, A structured programming approach using C"*, 3rd Edition, Cengage Learning.
2. Yashavant Kanetkar, *"Let Us C"*, 12th Edition, BPB Publications, 2012.
3. Yashavant Kanetkar, *"Understanding pointers in C"*, 4th Edition, BPB Publications, 2009.

REFERENCES:

1. N. B. Venkateswarlu, E.V. Prasad, *"C & Data Structures"*, 1st Edition, S. Chand Publications, 2010.
2. K.R.Venugopal, S.R.Prasad, *"Mastering C"*, 1st Edition, TMH, 2007.

ENGINEERING MECHANICS

(Common to all Branches)

Course Code: 13ME1102

L	T	P	C
4	0	0	3

Course Educational Objectives:

To develop

- ✤ The skill of converting a physical problem into a suitable mathematical model
- ✤ Analytical skills of solving the mathematical model
- ✤ The skill of interpreting the results in terms of the given physical situation
- ✤ The skills of optimization

Course Outcomes:

The student will be able to

- ✤ Identify and list , for a given physical problem, all known's, intermediate unknowns, and final results
- ✤ Formulate suitable mathematical equations and the constraints.
- ✤ Resolve a given force into rectangular components, find the moment of a force about a given point and find the resultant of a set of forces
- ✤ Solve problems involving static and dynamic friction
- ✤ Locate the centroid and calculate the moments of inertia of a given plane area
- ✤ Find the resulting acceleration of a body subjected to a set of forces and moments
- ✤ Calculate the work done, energy, power and efficiency

UNIT-I (13 Lectures)

RESULTANTS OF FORCE SYSTEM:

Parallelogram law, forces and components, resultant of coplanar concurrent forces, components of forces in space, moment of force, principle of moments, coplanar applications, couples, resultant of any force system (coplanar concurrent cases only).

Equilibrium of force systems: Free body diagram, equations of equilibrium, equilibrium of planar systems, further discussion of planar equilibrium.

UNIT-II (09 Lectures)

FRICTION:

Theory of friction, angle of friction, laws of friction, static friction, kinetic friction, friction in bodies moving up or down on an inclined plane, wedge friction, screw friction and screw jack.

UNIT-III (14 Lectures)

CENTROIDS AND CENTERS OF GRAVITY:

Center of gravity of flat plate, centroids of areas and lines, importance of centroids of areas and lines, importance of centroids and moments of area, centroids determined by integration, centroids of composite figures, theorem of Pappus, center of gravity of bodies.

MOMENT OF INERTIA:

Definition of moment of inertia, polar moment of inertia, radius of gyration, parallel axis theorem, moments of inertia by integration, moments of inertia for composite areas.

UNIT-IV (12 Lectures)

MASS MOMENT OF INERTIA:

Introduction, radius of gyration, parallel axis theorem, mass moments of inertia by integration, moments of inertia of composite bodies.

KINEMATICS AND KINETICS OF A PARTICLE:

Motion of a particle, rectilinear motion, rectangular components of curvilinear motion, normal and tangential components of acceleration, radial and transverse components, cylindrical coordinates translation-analysis as a particle, further discussion of particle kinematics.

UNIT-V (10 Lectures)

KINEMATICS AND KINETICS OF A BODY UNDERGOING FIXED AXIS ROTATION:

Types of rigid-body motion, angular motion-fixed axis rotation, application of kinematic equations, kinetics of fixed axis rotation.

WORK-ENERGY METHOD:

Work-energy equation for translation, interpretation and computation of work, work-energy applied to particle motion, power, efficiency, applied to fixed-axis rotation, work-energy applied to connected systems, work-energy method.

TEXT BOOK:

Vijaya Kumar Reddy K and Suresh Kumar J(Adapters), "*Singer`s Engineering Mechanics : Statics and Dynamics*", Third edition (SI Units), BS Publications, Hyderabad, 2011

REFERENCES:

1. Timoshenko SP and Young DH, Rao and Pytel, "*Engineering Mechanics*", 4th Edition, McGraw Hill international editions, 2013.
2. Hibbeler RC, " *Engineering Mechanics : Statics* ", Low Price Edition, Pearson Education,2000.
3. Hibbeler RC, " *Engineering Mechanics : Dynamics* ", Low Price Edition, Pearson Education,2000.
4. Tayal AK "*Engineering Mechanics: Statics and Dynamics*", Thirteenth edition, Umesh Publications, Delhi, 2005

ELECTRONIC DEVICES AND CIRCUITS

(Common to EEE, CSE, IT)

Course Code: 13EC1142	**L**	**T**	**P**	**C**
	4	**1**	**0**	**3**

Pre requisites:

Basic Electrical Engineering, Network Analysis, Engineering Physics,and Basics of Mathematics

Course Educational Objectives:

- To study the principles of electronics Engineering
- To study the operation and characteristics of different semiconductor devices.
- To study the basic design concepts of low frequency amplifiers & oscillators circuits using various transmissions for different applications.

Course Outcomes:

Upon completion of the course, students will:

- State the operating principles of major electronic devices, circuit models and connection to the physical operation of device
- Be able to apply this knowledge to the analysis and design of basic circuits

UNIT-I (14 Lectures)

DIODE CHARACTERISTICS:

Introduction to semiconductor materials, V-I Characteristics of Diode, Zener Diode Characteristics, Zener Diode as Voltage Regulator, Tunnel diode, LED.

RECTIFIERS AND FILTERS:

Half wave rectifier, Full wave rectifier, Advantages of full wave rectifier over Half Wave rectifier, C- Filter, Inductor filter, LC- Filter, ð- - filter.

UNIT-II (12 Lectures)

TRANSISTOR CHARACTERISTICS:

Bipolar junction transistors (BJT) - input & output Characteristics of transistor in CB, CE, CC configurations, Relations between á,â,ã. Characteristics of JFET, MOSFET (Enhancement and depletion), Characteristics of UJT .

UNIT-III (10 Lectures)

BIASING AND STABILITY:

Need for biasing, criteria for fixing the operating point, thermal run away, thermal stability, stabilization techniques.

UNIT-IV (10 Lectures)

SMALL SIGNAL AMPLIFIERS:

h-parameter representation of a Transistor, Analysis of single stage transistor amplifier using h-parameters, comparison of transistor configurations in terms of A_V , A_I , R_i ,R_o.

UNIT-V (14 Lectures)

FEEDBACK AMPLIFIERS:

Concept of feedback, classification of feedback amplifiers, general characteristics of negative feedback amplifiers, effect of negative feedback on input and output Resistances.

OSCILLATORS:

Condition for oscillations, RC Phase shift oscillator with Transistor, Wein bridge oscillator, Hartley and Colpitts oscillator.

TEXT BOOKS:

1. Millman Jacob Halkias C Christos: Electronic Devices and Circuits, 2nd Edition, Tata Mcgrawhill Publications, 2007.
2. Boylestad.Robert “Electronic Devices and Circuits Theory” PHI Publications, 10th Edition, 2008.

REFERENCES:

1. B.Visweswara Rao, K.Bhaskarram Murthy, K.Raja Rajeswari, P.Chalam Raju Pantulu. *"Electronic Devices and Circuits"*, Pearson Publications, 2nd Edition, 2009.
2. Raju GSN *"Electronic Devices Electronic Devices And Circuits"*, IK International Publishing House, 1st Edition, 2006.
3. Lal Kishore *"Electronic Devices & Circuits"*, BSP publications, 2nd Edition, 2005.

PHYSICS LAB

(Common to all Branches)

Course Code: 13BP1102

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to involve the students to learn the subject and gain knowledge in handling the apparatus which will help them in designing devices and to trouble shoot the problems in their future professional work. The experiments are designed to cater to the needs of the students of all branches.

Course Outcomes:

The course will help the student in handling different apparatus for conducting various experiments in different fields which enables the student to trouble shoot the problems in their future professional work.

ANY TEN OF THE FOLLOWING 15 EXPERIMENTS

ERROR ANALYSIS AND GRAPH DRAWING (LECTURE - DEMO).

1. Bending of beams – Elliptical and Hyperbolic fringes - Determination of 'Y'.
2. Torsional pendulum - comparison of rigidity modulii of various wires.
3. Melde's experiment – determination of frequency of electrically maintained tuning fork.
4. Determination of wavelength of laser light using diffraction through a graded scale.
5. Particle size determination using He-Ne laser (Lycopodium powder).
6. Diffraction grating – determination of wavelengths of spectral lines of Mercury spectrum by minimum deviation method.
7. Spectrometer – determination of dispersive power of the material of a prism.

8. Polarization of light – verification of Malu's law and to determine the Brewster's Angle for glass.
9. Determination of Planck's constant.
10. Solar cell characteristics – I-V characteristics, measurement of efficiency and Fill factor.
11. Stewart – Gee apparatus – study of variation of magnetic field along the axis of circular current carrying loop.
12. LCR series and parallel resonance circuit study the frequency response.
13. Familiarity of CRO – Lissajjou's figures - determination of time period, voltage, frequency and phase of a wave.
14. Newton's Rings- determination of wavelength of the source/radius of curvature of given convex lens.
15. Optical fibres- determination of Numerical aperture, acceptance angle and bending losses.

COMPUTER PROGRAMMING LAB

(Common to all Branches)

Course Code : 13CT1103	L	T	P	C
	0	0	3	2

Course Educational Objectives:

The main objectives of the course are to give the basic knowledge of C Language with practical orientation of various features present in this language.

- To give exposure about RAPTOR tool to design flow charts.
- To give hands on exposure to the students in developing the programs.
- Develop programs by using simple and optimized logic.
- Maximizing the usage of various C programming features.
- To give hands on exposure to the students to work with files.

Course Outcomes:

Upon completion of the course the student will be able to

- Gets exposure on RAPTOR tool.
- Learn how to program basic mathematical operation using various loops like for, while, do while, and switch statement.
- Program various string handling functions.
- Program various file operations.
- Gets an idea on maximizing the usage of various C programming features.

LIST OF PROGRAMS:

1. Demonstration of RAPTOR Tool to generate flowcharts by considering simple algorithms. Generation of flow charts to solve problems such as Temperature Conversion, Swapping of Two numbers etc. using RAPTOR Tool.

2. Write C Programs to solve problems such as Student Grading, Income Tax Calculation, and Largest of three Numbers etc., which expose students to various categories of IF Statements. Generate flowcharts using RAPTOR Tool.

3. a) Write a C program to find the roots of a quadratic equation.

   b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

4. a) The total distance travelled by vehicle in't' seconds is given by distance = $ut+1/2at^2$

   where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write a C

   program to find the distance travelled at regular intervals of time given the values of

   'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

   b) Write a C program to determine whether a given number is an Armstrong or not.

   (If the sum of the cubes of the number is equal to the original number, then the number

   Is called Armstrong number. Eg: 371 is Armstrong number ($3^3+7^3+1^3= 371$))

5. a) Write a C program to find the sum of individual digits of a positive integer.

   b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

6. a) Write a C program to calculate the following sum:

   $Sum=1-x^2/2! +x^4/4!-x^6/6! +x^8/8! -x^{10}/10!$

b) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

7. a) Write a C program to generate Pascal's Triangle.

   b) Write a C program to construct a Pyramid of Numbers.

8. Write C programs that use both recursive and non-recursive functions for the following

   a) To find the factorial of a given integer.

   b) To find the GCD (greatest common divisor) of two given integers.

9. a) Write a C function to read in two numbers, x and n, and then compute the sum of this geometric progression:

   $1+x+x^2+x^3+\ldots\ldots\ldots\ldots + x^n$. Also perform error checking by considering negative values for n and also check for illegal values of x.

   b) Write a C function to read in two numbers, x and n (no. of terms), and then compute sin(x) and cos(x).

10. a) Write a C program to find the largest and smallest number in a list of integers.

    b) Write a C program to perform Matrix Addition & Matrix Multiplication.

    c) Write a C program to compute Transpose of a Matrix.

11. a) Write a C program to exchange value of two integers using call by value and call by reference.

    b) Write C programs to demonstrate the use of Pointers.

12. Write user defined string handling functions to implement the following standard library functions: strlen(), strcpy(), strcat(), strrev(), strcmp().

13. a) Write a C program that displays the position/ index in the string S where the string T begins, or –1 if S doesn't contain T.

    c) Write a C program to determine whether a given string is Palindrome or not.

14. Write a C program that uses functions to perform the following operations:

    a) To insert a sub-string in to given main string from a given position.

    b) To delete n Characters from a given position in a given string.

    c) To replace a character of string either from beginning or ending or at a specified location.

15. a) Write a C program to find the two's complement of a binary number.

    b) Write a C program to convert a Roman numeral to its Decimal Equivalent.

16. Write a C program that uses functions to perform the following operations using Structures:

    a) Reading a complex number.

    b) Writing a complex number.

    c) Addition of two complex numbers.

    d) Multiplication of two complex numbers.

17. a) Write a C program which copies one file to another.

    b) Write a C program to count the number of characters, lines, words, tabs and spaces in a given file.

BASIC ELECTRICAL ENGINEERING LAB

Course Code :13EE1143

L	T	P	C
0	0	3	2

Course Educational Objectives:

To impart experimental skills and also to verify the theoretical principles learned in the subject of BEE.

Course Outcomes:

After this lab course, the student will be able to design a circuit for any kind of experiment in the syllabus and will get the confidence to understand the practical circuits in an industry.

THE FOLLOWING EXPERIMENTS ARE REQUIRED TO BE CONDUCTED AS COMPULSORY EXPERIMENTS:

1. Verification of KCL and KVL.
2. Verification of Superposition theorem.
3. Verification of Thevenin's theorem.
4. Verification of Maximum power transformer theorem.
5. Speed control of DC shunt motor.
6. OC and SC Test on a single phase transformer.
7. Brake Test on 3- Phase Induction motor.
8. Regulation of Alternator by Synchronous Impedance Method.

   In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted:

9. Verification of Norton's theorem.
10. Measurement of Impedance, p.f, and power in a 1-ph RLC series circuit.
11. Calibration of Ammeter and Voltmeter.

12. Experimental illustration of Faraday's laws (Demonstration Experiment).
13. OCC of a DC Separately excited generator.
14. Calibration of a Wattmeter in DC circuits.

ENGINEERING DRAWING
(Common to all Branches)

Course Code:13ME1103

L	T	P	C
1	0	3	3

Course Educational Objectives:

To make the student

- ✤ Familiar with the drawing practices and conventions.
- ✤ Familiar with projections of points, lines, planes and solids
- ✤ Familiar with isometric views

Course Outcomes:

Student will be able to

- ✤ Draw various types of engineering curves
- ✤ Draw orthographic projections of points, lines, planes and solids inclined to one plane or both the planes
- ✤ Draw isometric views of simple solids

LIST OF EXERCISES:

1. Introduction to engineering drawing & basics of geometrical construction
2. Construction of parabola, ellipse, hyperbola- general method
3. Cycloid, epicycloids, hypocycloid, involutes of circle and square
4. Projections of points
5. Projections of lines inclined to one plane
6. Projections of lines inclined to both the planes
7. Projections of planes inclined to one plane
8. Projections of planes inclined to both the planes
9. Projections of solids in simple positions

10. Projections of solids inclined to both the planes

11. Isometric views

TEXT BOOK:

N.D. Bhatt and V.M. Panchal, *"Engineering Drawing"*, Charotar Publication House, 49th Edition, 2008.

SYLLABI FOR III SEMESTER

DISCRETE MATHEMATICAL STRUCTURES
(Common to CSE & IT)

Course Code:13BM1106

L	T	P	C
4	1	0	3

Pre requisites:

- Fundamentals of Set theory.
- Elementary algebra and Calculus.

Course Educational Objectives:

To impart the necessary fundamental principles that are essential to study courses in computer science and related fields.To develop logical thinking and prerequisite knowledge necessary for skilled software engineer.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- Explain and apply the basic methods of discrete mathematics in Computer Science.
- Use these methods in subsequent courses in the design and analysis of algorithms, Computability theory, software engineering, and computer systems.

UNIT-I (12 Lectures)

MATHEMATICAL LOGIC:

Statements and notations, connectives, well formed formulas, tautologies, equivalence of formulas, Duality law, Tautological Implications, other connectives, Normal forms, Rules of inference, consistency of premises and indirect method of proof, Predicates, the statement function, variables and quantifiers, predicate formula, free and bound variables, universe of discourse, inference theory of the predicate calculus. (1-1, 1-2.1 to 1-2.4, 1-2.6 to 1-2.11, 1-2.14, 1-3.1 to 1-3.4, 1-4.2, 1-4.3, 1-5.1 to 1-5.5, 1-6.1 to 1-6.4 of Text book[1])

UNIT-II (12 Lectures)

RELATIONS:

Definition, properties of binary relations in a set, Relation matrix and Graph of a relation, Partition and covering of set, equivalence relations, partial ordering, partially ordered set.

ALGEBRAIC SYSTEMS:

Definition and examples, Semi groups and monoids: Definitions and examples, Some simple algebraic systems and general properties. Groups: Definitions and examples.

(2-3.1 to 2-3.5, 2-3.8, 2-3.9, 3-1.1, 3-1.2, 3-5.1 of Text book [1])

UNIT-III (12 Lectures)

COMBINATORICS :

Basics of counting, Combinations and permutations, Enumerating Combinations and permutations with repetitions, Multinomial theorems, Generating Functions of sequences, Calculating coefficients of generating functions, Recurrence relations, Solving Recurrence relations by substitution and generating functions, the method of characteristic roots.

(2.1, 2.2, 2.4, 2.7(Multinomial theorem only), 3.1 to3.5 of Text book [2])

UNIT-IV (12 Lectures)

GRAPH THEORY:

Basic concepts: Graph, Directed Graph, Multi Graph, Degree of vertex and their properties, Adjacency Matrix, Cycle Graph, Biparatite graphs, Isomorphism and Subgraphs, Trees and their properties,

SPANNING TREES:

DFS, BFS, Kruskal's Algorithm for finding minimal Spanning tree. (5.1-5.4 of Text book [2])

UNIT-V (12 Lectures)

Representation and Manipulation of Imprecision

Fuzzy sets, Possibility theory, Applications of Fuzzy sets to Expert Systems.

(8.1 to 8.3 of Text book [2])

TEXT BOOKS:

1. J.P Tremblay, R.Manohar, *"Discrete Mathematical Structures with Applications to Computer Science"*, Tata McGraw-Hill Publishing Company Limited, 1997.
2. J.L. Mott, A. Kandel, T.P. Baker, *"Discrete Maths for Computer Scientists & Mathematicians"*, Second Edition, Prentice Hall of India Pvt Limited, New Delhi, 2009.

REFERENCE:

Kenneth Bogart, Clifford Stein, Robert L.Drysdale, *"Discrete Mathematics for Computer Science"*, Springer International Edition, 2006.

MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTING

Course Code : 13HM1101

L	T	P	C
4	0	0	3

Course Educational Objectives:

To explain the basic principles of managerial economics, accounting practices and financial management techniques for effective business decision making and to promote entrepreneurial abilities among the budding engineers.

Course Outcomes:

To understand the economic environment and to give an idea on various accounting concepts and financial management techniques for effective utilization of economic resources.

UNIT-I (12 Lectures)

INTRODUCTION TO MANAGERIAL ECONOMICS & DEMAND:

Definition, Nature and Scope of Managerial Economics, Factors influencing managerial decision making process

Demand Analysis: Definition-types of demand - Demand Determinants, Law of Demand and its exceptions.

Elasticity of Demand: Definition, Types, Significance of Elasticity of Demand. Demand Forecasting: definition, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

UNIT-II (12 Lectures)

THEORY OF PRODUCTION AND COST ANALYSIS:

Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Types of Cost, Break-even Analysis (BEA)-Determination of Break-Even Point (Simple numerical problems) - Managerial Significance and limitations of BEA.

UNIT-III (10 Lectures)

BUSINESS & ENVIRONMENT:

Features of Business Organization, Features, Advantages & limitations of Sole Proprietorship, Partnership, and Joint Stock Company, Steps for formation and Registration of the company- Internal and External factors affecting business environment (PESTLE analysis)- Impact of environment on business

UNIT-IV (12 Lectures)

INTRODUCTION TO FINANCIAL ACCOUNTING:

Accounting Principles, Concepts & conventions, Double-Entry Book Keeping, Journal, Ledger, Trial Balance

UNIT-V (18 Lectures)

PREPARATION AND ANALYSIS OF FINANCIAL STATEMENTS:

Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments) - Financial statement Analysis (Comparative and Common Size Statements)- Ratio analysis (Liquidity Ratios, Activity ratios, Solvency and Profitability ratios)

TEXT BOOKS :

1 A R Aryasri, *"Managerial Economics and Financial Analysis"*, 2nd Edition, TMH, 2009

2 S A Siddiqui & A. S. Siddiqui, *"Managerial Economics & Financial Analysis"*, 1st Edition, New Age Publishers, 2005.

3 P Venkata Rao, J.V.Prabhakar Rao *"Managerial Economics and Financial Analysis"*, 1st Edition, Maruti Publications, 2012.

4 R.L.Varshney & K.L Maheswari, *"Managerial Economics"*, 5th Edition, S.Chand Publishers, 2005.

REFERENCES:

1 D N Dwivedi, *"Managerial Economics"*, 8th Edition, PHI, 2010.

2 S P Jain & KL Narang, *"Cost and Management Accounting"*, 3rd Edition Kalyani Publishers, 2004.

3 P.K.Sharma & Shashi K. Gupta, *"Management Accounting Principles and Practice"*, 1st Edition, Kalyani Publishers, 2004.

OPERATING SYSTEMS

(Common to CSE&IT)

Course Code : 13CT1104

L	T	P	C
4	1	0	3

Course Educational Objectives:

The main objective of the course is to expose the students to different CPU scheduling, Memory Management and File Management Techniques. Upon completion of this course, the student should be able to:

- Select and apply best scheduling algorithm to schedule the CPU for given set of processes.
- Solve synchronization problems among the processes
- Understand the Page Table Structure stored in Memory and its implementation
- Solve the Deadlock situations.
- Understand the Secondary storage structure and File Management.

Course Outcomes:

At the end of the course the student will be able to

- Acquire the knowledge of Managing the Memory in an efficient manner,
- Solving Deadlock situations.
- Files and File System Structure, Disks and its Internal Structure, how to protect the system.
- Understand the concepts of paging and different Page Replacement algorithms, of I/O systems, Directory Implementation and File allocation methods, RAID and stable storage.
- System and Network Threats, Firewalls

UNIT-I (10 Lectures)

INTRODUCTION & SYSTEM STRUCTURES:

Overview of computer operating systems, computer system organization, computer system architecture, operating systems operations, protection and security, distributed systems, special purpose systems, operating systems services, systems calls and its types, operating systems structure, operating systems generation.

UNIT-II (14 Lectures)

PROCESS CONCEPT:

Process, Process Control Blocks, Operations on Processes,Interprocess Communication, Scheduling Criteria, scheduling-criteria algorithms(FCFS, SJF, Round Robin, Priority) and their evaluation, Multiprocessor scheduling, Thread scheduling. Case Study: Linux

SYNCHRONIZATION:

The Critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples, atomic transactions. Case Study: Linux

UNIT-III (14 Lectures)

MEMORY MANAGEMENT STRATEGIES:

Swapping, contiguous memory allocation, paging, structure of the page table, segmentation.

VIRTUAL-MEMORY MANAGEMENT:

Virtual memory, demand paging, Copy on write, page-Replacement algorithms (FIFO, LRU, LFU, Optimal Page Replacement)

DEADLOCKS:

System model, deadlock characterization, Methods for Handling Deadlock, deadlock prevention, detection and Avoidance, recovery form deadlock.

UNIT-IV (12 Lectures)

I/O SYSTEMS:

I/O Hardware, application interface, kernel I/O subsystem, Transforming I/O requests, Hardware operations, STREAMS, performance.

FILE SYSTEMS:

File Concept, Access Methods, Directory Structure, File System Mounting.

IMPLEMENTING FILE SYSTEMS:

File system structure, File System Implementation, Directory Implementation, Allocation Methods, Free-space Management, Efficiency and performance, Log-Structured File Systems, Network File Systems. Case Study: Linux

UNIT-V (10 Lectures)

SECONDARY-STORAGE STRUCTURE:

Overview of Mass-storage structure, disk structure, disk attachment, disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure.

PROTECTION:

Goals of Protection, Principles of Protection, Domain of protection,Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability- Based systems, Language – Based Protection.

SYSTEM SECURITY:

The Security problem, program threats, system and network threats cryptography as a security tool, user authentication, implementing security defenses, firewalling to protect systems and networks, computer–security classifications. Case Study: Linux

TEXT BOOK:

Abraham Silberchatz, Peter B. Galvin, Greg Gagne, *Operating System Principles*, 8thEdition, John Wiley & Sons, 2010.

REFERENCES:

1. William Stallings, *“Operating Systems – Internal and Design Principles”*, 6th Edition, Pearson education/PHI, 2011.
2. D.M. Dhamdhere, *“Operating systems - A Concept based Approach”*, 2nd Edition, TMH, 2010.
3. Charles Crowley, *“Operating Systems - A Design Approach”*, 1stEdition, TMH, 2011.

4. Andrew S Tanenbaum, *"Modern Operating Systems"*, 3rd Edition, Pearson, PHI, 2010.

WEB REFERENCES:

http://nptel.iitm.ac.in/courses/Webcoursecontents/IIScBANG/Operating%20Systems/New_index1.html

SWITCHING THEORY AND LOGIC DESIGN

(Common to ECE, EEE, CSE, IT)

Course Code: 13EC1105

L	T	P	C
4	0	0	3

Course Educational Objectives:

- To familiarize students with different number systems, digital logic, simplification and minimization of Boolean functions.
- To design combinational & sequential digital circuits and state machines.
- To introduce programmable logic devices.

Course Outcomes:

Students can design optimized logic circuits through combinational and sequential logic.

UNIT-I (10 Lectures)

NUMBER SYSTEMS & CODES:

Introduction to number systems, Complement representation of negative numbers, binary arithmetic, binary codes, Error detecting & correcting codes.

UNIT-II (15 Lectures)

BOOLEAN ALGEBRA AND SWITCHING FUNCTION

Fundamental postulates of Boolean algebra, Basic theorems and properties, switching functions, Simplification of Boolean equations, Digital logic gates, properties of XOR gates, universal gates - NAND/NOR realizations. K-map method, Prime implicants, don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime –Implicant chart, simplification rules.

UNIT-III (13 Lectures)

COMBINATIONAL LOGIC DESIGN:

Adders, Subtractor, Multiplexer, De-Multiplexer, MUX Realization of

switching functions, Encoder, Decoder, Parity bit generator, Code-converters, Basic PLD's-ROM, PROM, PLA, PAL Realizations.

UNIT-IV (13 Lectures)

SEQUENTIAL CIRCUITS:

Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples) Latches and Flip-flops-Triggering and excitation tables, registers, shift registers, Steps in synchronous sequential circuit design, synchronous counters, ripple counters, Design of modulo-N Ring & Shift counters, Serial binary adder, sequence detector.

UNIT-V (9 Lectures)

FINITE STATE MACHINES:

Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified sequential machines, Partition techniques, incompletely specified sequential machines using merger table.

ALGORITHMIC STATE MACHINES:

Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.

TEXT BOOKS:

1. Morris Mano, *"Digital Design"* PHI, 3rd Edition, 2006.
2. Anand Kumar, *"Switching Theory and Logic Design"* PHI, 2008

REFERENCES:

1. Zvi Kohavi, *"Switching & Finite Automata theory"* TMH, 2nd Edition,
2. R.P.Jain. *"Modern Digital Electronics"*, 4th ed., TMH, 2009.
3. John M. Yarbrough, *"Digital Logic Applications and Design"* Thomson Publications, 2006.
4. Charles H. Roth, *"Fundamentals of Logic Design"* Thomson Publications, 5th Edition, 2004.

COMPUTER ORGANIZATION
(Common to CSE, ECE, EEE, IT)

Course Code : 13CT1105

L	T	P	C
4	0	0	3

Course Educational Objectives:

To give detailed information about the structure of computers and internal organization of different units regarding memory, I/O devices and registers.

- The internal organization of the computer system
- The internal operations.
- To know about register transfer and micro operations.
- To know about memory organization
- To know about pipeline and vector processing.

Course Outcomes:

At the end of the course student will be able to

- Get knowledge on basic structure of computers, register transfer operations.
- Get knowledge on memory organization and pipe line processing.
- Get knowledge on Arithmetic operations with float values.
- Get knowledge on input output devices organization.
- Get knowledge on vector processing.

UNIT-I (12 Lectures)

BASIC STRUCTURE OF COMPUTERS:

Organization and Architecture, Structure and Function, Computer Components, Computer Function, Bus Interconnection, Processor Organization, Register Organization.

BASIC COMPUTER ORGANIZATION AND DESIGN:

Instruction codes, Computer instructions, Memory reference instructions, Instruction Cycle.

CENTRAL PROCESSING UNIT:

Stack organization, instruction formats, addressing modes, data transfer and manipulation, program control, RISC.

UNIT-II (12 Lectures)

REGISTER TRANSFER AND MICRO OPERATIONS:

Register transfer language, Register transfer, Bus and Memory transfers, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations, Arithmetic Logic Shift Unit.

MICRO PROGRAMMED CONTROL:

Control Memory, Address Sequencing, Micro Program examples, Design of control unit, Hardwired control..

UNIT-III (12 Lectures)

COMPUTER ARITHMETIC:

Data representation- Fixed point representation, Floating point representation, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating-point Representations, Floating-point Arithmetic Operations, Decimal Arithmetic Units, Decimal Arithmetic Operations.

UNIT-IV (12 Lectures)

MEMORY ORGANIZATION:

Memory system overview, Memory Hierarchy, Semi-conductor Main Memory, Cache Memory principle, Elements of cache design, Virtual Memory, Magnetic Disk, Optical Memory, Magnetic Tape, RAID.

INPUT- OUTPUT:

External Devices, I/O modules, Interrupts, Programmed I/O, Interrupt-driven I/O, Direct Memory Access, I/O Channels and Processors, PCI.

Asynchronous Data Transfer, Priority Interrupt, Serial Communication.

UNIT-V (12 Lectures)

PIPELINE AND VECTOR PROCESSING:

Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

MULTI PROCESSORS:

Multiprocessors and Multi computers, Characteristics of Multi-processors, Multiple Processor Organizations, Symmetric Multi-Processors, Cache Coherence, Clusters, Non Uniform Memory Access (NUMA).

TEXT BOOKS:

1. William Stallings, *"Computer Organization and Architecture"*, 8th Edition, Pearson Education, 2010.
2. M.Moris Mano, *"Computer Systems Architecture"*, 3rd Edition, Pearson Education, 2007.

REFERENCES:

1. John D. Carpinelli, *"Computer Systems Organization and Architecture"*, 3rd Edition, Pearson Education, 2001.
2. Carl Hamacher, Zvonks Vranesic, SafeaZak , *"Computer Organization"*, 5th Edition, TMH,2011.

WEB REFERENCES:

http://nptel.iitm.ac.in/video.php?subjectId=106106092

DATA STRUCTURES

(Common to CSE, IT, ECE & EEE)

Course Code : 13CT1106	L	T	P	C
	4	0	0	3

Course Educational Objectives:

Student will be able to

- ✤ Analyze algorithms.
- ✤ Develop software applications which are efficient in terms of space time complexity.
- ✤ Choose suitable Data Structures for different real world applications.
- ✤ Apply best algorithm to sort set of elements.
- ✤ Employ a structured methodology while providing a software solution to an engineering problem.

Course Outcomes:

At the end of the course student will be able to

- ✤ Get knowledge on how to develop algorithms, operations on queues and stacks.
- ✤ Work on different searching methods and graphs.
- ✤ Get knowledge on trees and binary trees.
- ✤ Work on different sorting methods.
- ✤ Get knowledge on different types of linked operations.

UNIT-I (12 Lectures)

ANALYSIS OF ALGORITHMS:

Efficiency of algorithms, apriori analysis, asymptotic notations, time complexity of an algorithm using O notation, polynomial Vs exponential algorithms, average, best and worst case complexities, analyzing recursive programs.

STACKS: Introduction, stack operations, applications.

QUEUES: Introduction, Operations on queues, circular queues, other types of queues, applications.

UNIT-II (12 Lectures)

LINKED LISTS:

Introduction, Singly linked lists, circularly linked lists, doubly linked lists, multiply linked lists, applications.

LINKED STACKS AND LINKED QUEUES:

Introduction, operations on linked stacks and linked queues, dynamic memory management and linked stacks, implementation of linked representations, applications.

UNIT-III (12 Lectures)

SEARCHING:

Introduction, linear search, transpose sequential search, interpolation search, binary search, Fibonacci search.

INTERNAL SORTING:

Introduction, bubble sort, insertion sort, selection sort, merge sort, quick sort.

UNIT-IV (12 Lectures)

TREES AND BINARY TREES:

Introduction, Trees: definition and basic terminologies, representation of trees, binary trees: basic terminologies and types, representation of binary trees, binary tree traversals, threaded binary trees, applications.

BINARY SEARCH TREES AND AVL TREES:

Introduction, binary search trees: definition and operations, AVL Trees: definition and operations, applications.

UNIT-V (12 Lectures)

GRAPHS:

Introduction, definitions and basic terminologies, representations of graphs, graph traversals and applications.

TEXT BOOKS:

1. G A V PAI, *Data Structures and Algorithms, Concepts, Techniques and Applications*, Volume 1, 1st Edition, Tata McGraw-Hill, 2008.
2. Richard F. Gilberg & Behrouz A. Forouzan, *Data Structures, A Pseudo code Approach with C*, 2nd Edition, Cengage Learning India Edition, 2007.

REFERENCES:

1. Langsam, M. J. Augenstein, A. M. Tanenbaum ,*Data structures using C and C++*, 2ndEdition, PHI Education,2008.
2. Sartaj Sahni, Ellis Horowitz ,*Fundamentals of Data Structures in C*, 2ndEdition, Orient blackswan , 2010.

WEB REFERENCES:

http://nptel.iitm.ac.in/video.php?subjectId=106105085

DATA STRUCTURES LAB
(Common to CSE&IT)

Course Code :13CT1107

L	T	P	C
0	0	3	2

Course Educational Objectives:

To teach the students how to write programs that implement data structures concepts.

- ✤ Write programs to implement various data structures concepts like Searching, Sorting, Trees, and Graphs.
- ✤ Solving the problems regarding large data structures like stack and queue.
- ✤ To know programming about linked stacks and linked queues.
- ✤ Advanced programming
- ✤ Solve the problem regarding memory locations practically so that the student will be benefitted in the usage of pointers.

Course Outcomes:

At the end of the course student will be able to

- ✤ Gain knowledge on how to develop programs using c .
- ✤ Implement various data structures using arrays.
- ✤ Implement linked lists , queues, trees and graphs.
- ✤ To obtain minimum cost spanning tree.
- ✤ Find shortest path using algorithms.

List of Programmes :

1. Write C programs that uses recursive function to:i) Compute factorial of a given number ii) Solve the towers of Hanoi problem.
2. Write C programs that implement the following data structures using arrays:i) Stack ii) Queue.

3. Write C programs to implement the following Stack applications i) Factorial ii) Evaluations of postfix expression.
4. Write C programto implement the following types of queues i) Priority Queue ii) Circular Queue.
5. Write C programs to implement the following types of Lists i) Singly linked list ii) Circularly Linked list iii) Doubly linked list.
6. Write C programs to implement the following data structures using Lists i) Stack ii) Queue.
7. Write C programsto implement the following search algorithms: i) Linear Search iv) Binary Search v) Fibonacci Search.
8. Write C programs to implement the following sorting algorithms i) Bubble Sort ii) Insertion Sort iii) Selection Sort.
9. Write C programs to implement the following sorting algorithms i) Merge Sort ii) Quick Sort.
10. Write a Cprogram to implement binary tree using arrays and to perform binary tree traversals i) inorder ii) postorder iii) preorder.
11. Write a C program to perform the following operations using linked lists: i)insert an element into a binary search tree. ii) Delete an elementfrom a binary search tree. iii) Search for a key element in abinary search tree.
12. Write a C program to perform the following operations using linked lists :i) Insert an element into an AVL tree. ii) Delete an element from an AVL tree.
13. Write C programs for the implementation of bfs and dfs fora given graph.
14. Write a C program for the implementation of Prim's algorithm to obtain the minimum cost spanning tree from a connected undirected graph.
15. Write a C program to implement Dijkstra's algorithm for the single source shortest path problem.

REFERENCES:

1. G A V PAI, *"Data Structures and Algorithms, Concepts, Techniques and Applications"*, Volume 1, 1st Edition, Tata McGraw-Hill, 2008.

2. Richard F. Gilberg & Behrouz A. Forouzan, *"Data Structures, A Pseudo code Approach with C"*, 2nd Edition, Cengage Learning India Edition, 2007.

ANALOG AND DIGITAL CIRCUITS LAB

(Common to CSE, IT)

Course Code: 13EC1143	L	T	P	C
	0	0	3	2

Pre requisites:

Electronic Devices &Circuits, Digital Logic Design

Course Educational Objectives :

- ✤ To impart the practical knowledge in semiconductor diodes characteristics and applications of diodes as regulators, rectifiers.
- ✤ To measure the V-I characteristics of various devices that are used in the electronic equipment.
- ✤ Practical & functional verification through V-I characteristics of active devices like BJT, JFET, MOSFETS and applications.
- ✤ To have an idea of Digital Circuits

Course Outcomes :

- ✤ Student comprehends the depth of semiconductor devices like diodes, transistor, JFET characteristics are verified. Student gains hands on experience in handling electronic components and devices.
- ✤ Student gets the knowledge about PN junction diodes, zener & transistor configurations, and v-I characteristics.
- ✤ To impart the practical knowledge in various amplifiers design &verification ofimpedances, and band width calculations.
- ✤ Design different combinational and Sequential circuits

Note: Any FIVE experiments from PART –A and FIVE experiments from Part- B are to be conducted.

LIST OF EXPERIMENTS:

Part- A

1. PN Junction diode characteristics.
2. Zener Diode Characteristics.
3. Rectifiers without filters (Full wave & half wave).
4. Transistor CE characteristics.
5. FET Characteristics.
6. CE Amplifier.
7. FET Amplifier.
8. RC Phase shift oscillator.

Part –B

1. Study of Logic Gates using Discrete Components.
2. Half Adder and Full Adder.
3. Encoder and Decoder.
4. Multiplexer and Demultiplexer.
5. Flip-flops.
6. Asynchronous Counter.
7. Synchronous Counter.
8. Shift Registers.

SYLLABI FOR IV SEMESTER

PROBABILITY, STATISTICS AND NUMERICAL METHODS
(Common to CSE, IT & CE)

Course Code: 13BM1103

L	T	P	C
4	1	0	3

Pre requisites:

- ✤ Fundamentals of Set theory and calculus.
- ✤ Basic concepts of Probability and Discrete Random Variables.

Course Educational Objectives:

To acquaint students with the fundamental concepts of probability and statistics and to develop an understanding of the role of statistics in engineering. Also to introduce Numerical techniques to solve the real world applications.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- ✤ Calculate fundamental concepts such as the cumulative distribution function, expectations, and distributions of random variables.
- ✤ Evaluate estimators, construct confidence intervals, and perform hypothesis tests.
- ✤ Solve engineering problems using Numerical techniques.

UNIT-I **(12 Lectures)**

Review of basic concepts in Probability and Discrete Random variables, Continuous Random variables - Probability density, Distribution. Calculating probabilities from Probability density, Determining Mean and Variance using Probability density, Normal Distribution- Density and Properties. Calculating Normal Probabilities, Normal Approximation to Binomial Distribution, Uniform Distribution.

(5.1, 5.2, 5.3, 5.5 of [1])

UNIT-II **(12 Lectures)**

Population and sample, Sampling distribution of the mean(s known), Central Limit theorem (without Proof) and Problems, Sampling distribution of the mean(s unknown), Point Estimation, Maximum error and determination of sample size, Interval Estimation (Large sample and small sample)

(6.1, 6.2, 6.3, 7.1, 7.2 of [1])

UNIT-III **(12 Lectures)**

Tests of Hypotheses (Introduction, Null hypotheses, Alternative hypotheses, Type –I,II errors, Level of significance, Hypotheses concerning one mean (Large and Small samples), Inference concerning two means (Large and Small samples), Paired t-test.

Estimation of Variances (point and Interval estimation), Hypotheses concerning one variance, Hypotheses concerning two variance, Estimation of Proportions, Hypotheses concerning one Proportion, Hypotheses concerning several Proportions.

(7.3, 7.4, 7.5, 7.8, 8.1, 8.2, 8.3, 9.1, 9.2, 9.3 of [1])

UNIT-IV **(12 Lectures)**

Introduction to Numerical Methods, Solution of algebraic and transcendental equations-Bisection method, Method of false position Newton's method.

Finite differences-Forward differences Backward differences, Central differences, Differences of a polynomial, Other Difference operators – Shift operator, Average operator, Relations between the operators.

(28.1 to 28.3, 29.1 to 29.5 of Text book [2])

UNIT-V **(12 Lectures)**

Newton's interpolation formulae- Newton's forward interpolation formula Newton's backward interpolation formula, Interpolation with un equal intervals: Lagrange interpolation, Divided differences, Newton's divided difference formula Difference formula, Inverse interpolation.

Numerical solutions of Ordinary differential equations: Euler's Method, Modified Euler's Method, Runge-Kutta method of order 4.

(29.6, 29.9 - 29.13, 32.4, 32.5, 32.7 of Text book [2])

TEXT BOOKS:

1. Richard A.Johnson, C.B.Gupta, "*Miller. Freund's Probability and Statistics for Engineers*", Seventh edition, Pearson education, 2005.
2. Dr.B.S.Grewal, *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. S. S. Sastry, *"Introductory Methods of Numerical Analysis"*, 4th Edition, Prentice Hall India Pvt., Limited, 2005.
2. S.C. Gupta and V.K. Kapoor, *"Fundamentals of Mathematical Statistics"*, Ninth Revised Edition , Sultan Chand & Sons Educational Publishers, 2007.

DESIGN AND ANALYSIS OF ALGORITHMS

(Common to CSE & IT)

Course Code :13CT1108

L	T	P	C
4	1	0	3

Course Educational Objectives:

This course aims to introduce the classic algorithms in various domains, and techniques for designing efficient algorithms, apply the algorithms and design techniques to solve problems and also analyze the complexities of various problems in different domains.

- ✤ The objective of this course is to cover key techniques for designing and analyzing algorithms.
- ✤ To implement various searching ,sorting and back tracking, dynamic programming algorithms with the knowledge of algorithm implementation
- ✤ Major techniques for algorithm design and analysis are introduced through the study of various algorithms.
- ✤ To design and analyze an algorithm for all kinds of real time problems.
- ✤ To analyze complex non deterministic problems.

Course Outcomes :

At the end of the course the student will be able to

- ✤ Measure the complexity of an algorithm, including best-case, worst-case, and average complexities as functions of the input size
- ✤ Classification in terms of asymptotic complexity classes.
- ✤ Learn the basic algorithmic design strategies, including recursion, divide-and-conquer, the greedy method, dynamic programming, and backtracking and branch-and bound.
- ✤ Know the different strategies that are known to be useful in finding efficient algorithms to solve problems and to be able to apply them.
- ✤ Know about non deterministic problems.

UNIT-I (15 Lectures)

INTRODUCTION:

Algorithm, Psuedocode for expressing algorithms, Performance Analysis-Space complexity,Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little ohnotation,Probabilistic analysis, Amortized analysis.

Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected componentsand biconnected components.

UNIT-II (12 Lectures)

DIVIDE AND CONQUER:

General method, applications-Binary search, Quick sort, Merge sort, Strassen'smatrix multiplication.

GREEDY METHOD: General method, applications-Job sequencing with dead lines, 0/1 knapsack problem,Minimum cost spanning trees, Single source shortest path problem.

UNIT-III (12 Lectures)

DYNAMIC PROGRAMMING:

General method, applications-Matrix chain multiplication, Optimal binary searchtrees, 0/1 knapsack problem, All pairs shortest path problem,Travelling sales person problem, Reliabilitydesign.

UNIT-IV (12 Lectures)

BACKTRACKING:

General method, applications-n-queen problem, sum of subsets problem, graph coloring,Hamiltonian cycles.

Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsackproblem- LC Branch and Bound solution, FIFO Branch and Bound solution.

UNIT-V (10 Lectures)

NP-HARD AND NP-COMPLETE PROBLEMS:

Basic concepts, non deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem.

TEXT BOOKS:

1. Ellis Horowitz,Satraj Sahni and Rajasekharam, *"Fundamentals of Computer Algorithms"*, 2nd Edition,Univesity Press,2008.
2. M.T.Goodrich and R.Tomassia: *"Algorithm Design Foundations, Analysis and Internet examples"*, 1st Edition, John wiley and sons, 2006.

REFERENCES:

1. T.H.Cormen,C.E.Leiserson,R.L.Rivest,and C.Stein, "*Introduction to Algorithms"*, 3rd Edition, PHI / Pearson Education,2009.
2. R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, *"Introduction to Design and Analysis of Algorithms A strategic approach"*, 2nd Edition , Tata Mc Graw Hill,2009.
3. Allen Weiss, *"Data structures and Algorithm Analysis in C++"*, 2nd Edition, Pearson Education, 2009.
4. Aho, Ullman and Hopcroft, *"Design and Analysis of algorithms"*, 3rd Edition, Pearson Education, 2008.

WEB REFERENCES:

http://nptel.iitm.ac.in/courses/106101060/

UNIX AND SHELL PROGRAMMING

(Common to CSE&IT)

Course Code :13CT1109

L	T	P	C
4	0	0	3

Course Educational Objectives:

The main object of this subject is to teach the students

- ✤ To use the commands according to user requirements.
- ✤ To write Shell scripts to perform the given task.
- ✤ To write their own programs in UNIX.
- ✤ To write AWK programs.
- ✤ It is powerful O.S. which will be used in servers, hence while working in industry this knowledge should be helpful.

Course Outcomes:

At the end of the course student would be able to

- ✤ Work on unix operating system.
- ✤ Develop programs that run on unix operating system.
- ✤ Develop shell programs in UNIX.
- ✤ Use unix operating system on servers.
- ✤ Use the system calls for file management.

UNIT-I (12 Lectures)

INTRODUCTION TO UNIX:

The UNIX Operating System, The UNIX Architecture, Features of UNIX, Internal And External Commands, Command Structure.

GENERAL-PURPOSE UTILITIES:

cal, date, echo, printf, bc, script, passwd,PATH, who, uname, tty, stty, pwd, cd, mkdir, rmdir, od.

HANDLING FILES:

The File System, cat, cp, rm, mv, more, file, ls, wc, pg, cmp, comm, diff, gzip, tar, zip, df, du, mount, umount, chmod, The vi editor ,security by file Permissions.

NETWORKING COMMANDS:

ping, telnet, ftp, finger, arp, rlogin.

UNIT-II (12 Lectures)

INTRODUCTION TO SHELLS:

Unix Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell Edition Environment Customization.FILTERS: Filters, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters,Ordering a File, uniq.

UNIT-III (12 Lectures)

REGULAR EXPRESSIONS: Atoms,operators

GREP: Operation, grep Family, Searching for File Content.

SED: Scripts, Operation, Addresses, commands, Applications, grep and sed.

AWK: Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, String Functions, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk, Applications, awk and grep, sed and awk.

UNIT-IV (12 Lectures)

INTERACTIVE KORN SHELL:

Korn Shell Features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, Options, Startup Scripts, Command History, Command Execution Process.

KORN SHELL PROGRAMMING:

Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

UNIT-V (12 Lectures)

INTERACTIVE C SHELL:

C shell features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, On-Off Variables, Startup and Shutdown Scripts, Command History, Command Execution Scripts.

C SHELL PROGRAMMING:

Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

FILE MANAGEMENT:

File Structures, System Calls for File Management – create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir,closedir, mkdir, rmdir, umask.

TEXT BOOKS:

1. Sumitabha Das, *"Unix Concepts And Applications"*, 4th Edition. TMH, 2006. (1, 2 units)
2. Behrouz A. Forouzan, Richard F. Gilbery, *"Unix and shell Programming"*, 1st Edition, Cengage Learning India, 2003.

REFERENCES:

1. Graham Glass, King Ables, *"Unix for programmers and users"*, 3rd Edition, Pearson Education, 2009.
2. N.B Venkateswarlu, *"Advanced Unix programming"*, 2nd Edition, BS Publications, 2010.
3. Yashwanth Kanitkar, *"Unix Shell programming"*, 1st Edition, BPB Publisher, 2010.

DATABASE MANAGEMENT SYSTEMS
(Common to CSE&IT)

Course Code :13CT1110

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student confident in maintaining huge amount of data by creating tables, and accessing them.

- Capability of maintaining huge amount of data
- Design various database system and learn about different database models and their relationships
- To reduce the redundancy of data using the normal forms
- To learn external storage file organization and data indexing.
- To learn about transaction management
- To know about recovery mechanism

Course Outcomes:

At the end of the course student would be able to

- Learn about the basics of databases.
- Learn about Structured Query language(SQL) to manipulate data available in the databases.
- Learn about how to normalize the tables in a database.
- Learn about PL/SQL.
- Learn about transaction management.

UNIT-I (12 Lectures)

History of Data base Systems. Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor.

Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Conceptual Design for Large enterprises.

UNIT-II **(12 Lectures)**

Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views. Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus –Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

UNIT-III **(12 Lectures)**

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – FORTH Normal Form.

UNIT-IV **(12 Lectures)**

Transaction Concept- Simple Transaction Model-Storage Structure-Transaction State- Implementation of Atomicity and Durability, Isolation– Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation-Transactions as SQL Statements– Test for serializability.

Concurrency Control: Lock – Based Protocols-Dead lock Handling– Timestamp Based Protocols- Validation- Based Protocols-Multi version schemes-insert, delete and predicate operations– Multiple Granularity-weak levels of consistency-concurrency in index structures.

UNIT-V **(14 Lectures)**

Recovery System: Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- ARIES-Remote Backup systems.

Data on External Storage – overview of physical storage media-RAID-File Organization and Indexing-Data Dictionary Storage– Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning- Intuitions for tree Indexes –B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:

1. Raghurama Krishnan, Johannes Gehrke, *"Data base Management Systems"*, 3rd Edition, TATA McGrawHill, 2008.
2. Silberschatz, Korth, *"Data base System Concepts"*, 6th Edition, McGraw Hill, 2010.
3. C.J.Date, *"Introduction to Database Systems"*, 7th Edition, Pearson Education, 2002.

REFERENCES:

1. Peter Rob & Carlos Coronel, *"Data base Systems design, Implementation, and Management"*, 7thEdition, Pearson Education, 2000.
2. Elmasri Navrate, *"Fundamentals of Database Systems"*, 5th Edition, Pearson Education, 2007.

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

(Common to CSE, IT & ECE)

Course Code :13CT1111

L	T	P	C
4	0	0	3

Course Educational Objectives:

The main objective of the course is to expose the students to object oriented programming principles and how these principles can be applied with JAVA programming language. Upon completion of the course, the student should be able to:

- ✤ Understand fundamentals of programming such as variables, conditional and
- ✤ iterative execution, methods, etc.
- ✤ Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- ✤ Have the ability to write a computer program using JAVA to solve specified problems.
- ✤ Have the ability to write multithread programs.
- ✤ Develop GUI based applications.
- ✤ Write small network based programs.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Learn a new way of approaching the job of programming.
- ✤ Employ techniques for developing robust, reusable software.
- ✤ Learn the concept of algorithm design and implementation.
- ✤ Write Java codes using both console or command-line and dialog box or graphical user interface styles.
- ✤ Write, compile, execute, and debug their Java programs.

UNIT-I (12 Lectures)

FUNDAMENTALS OF OBJECT-ORIENTED PROGRAMMING:

Introduction, Object-Oriented Paradigm, Basic concepts of Object-Oriented Programming, Benefits of Object-Oriented Programming, Applications of Object-Oriented Programming

THE HISTORY AND EVOLUTION OF JAVA:

creation of Java, Java's Bytecode, Javas buzzwords, evolution of Java. An overview of Java- Simple Java Program. Date types, variables, automatic type conversion, Arrays, operators,expressions, control statements.

UNIT-II (12 Lectures)

INTRODUCING CLASSES:

Class fundamentals, declaring objects, assigning object reference variables, introducing methods- overloading methods,argument passing,recursion, access control,static keyword, final keyword, using command line arguments, variable length arguments.

Constructors, this keyword, garbage collection, finalize() method.

STRING HANDLING:

String class, String Buffer class, StringBuilder class.

INHERITANCE:

Inheritance basics, using super, creating a multilevel hierarchy, how constructors are called, Method overriding, dynamic method dispatch, using abstract classes, using final with inheritance, the Object class.

UNIT-III (14 Lectures)

PACKAGES AND INTERFACES: Packages, access protection, importing packages, interfaces.

Exploring java.lang package: Wrapper classes, Math class.

Exploring java.util package: Vector, Scanner, Date, Calendar, StringTokenizer, Random.

Exploring java.io package: Byte streams, Character streams, File, RandomAccessFile.

EXCEPTION HANDLING:

Exception-handling fundamentals, Exception types, uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws, finally, Java's built-in exceptions, creating your exception subclasses, using exceptions.

MULTITHREADING:

Java thread model, Main thread, creating a thread, creating multiple threads, using isAlive() and join(), thread priorities, synchronization, Interthread communication, suspending, resuming and stopping threads, using multithreading.

UNIT-IV (12 Lectures)

APPLETS:

Applet basics, architecture, skeleton, simple applet display methods, repainting, status window, HTML applet tag, passing parameters to applets.

AWT:

AWT classes, window fundamentals, working with frame windows, creating a frame window in an applet, creating a windowed program, displaying information within a window, working with graphics, working with color, working with fonts, AWT control fundamentals, Labels, using buttons, applying checkboxes, checkboxgroup, choice controls, using lists, scrollbars, textfield, text area, using layout managers, Menu bars and menus, dialog boxes.

UNIT-V (10 Lectures)

EVENT HANDLING:

Two event handling mechanisms, delegation event model, event classes, sources of events, event listeners interfaces, using the delegation event model, adapter classes, inner classes, handling events by extending AWT components.

SWINGS:

origin of swings, swings built on AWT, two key swing features, MVC architecture, components and containers, swing packages, simple swing application, event handling, painting in swing, JLabel, JTextField, JTabbedPane, JScrollPane,JList,JComboBox,Trees,JTable.

NETWORKING:

Basics,networking classes and interfaces,InetAddress,TCP/IP,URL

TEXT BOOKS:

1. E.Balaguruswamy, *"Programming with Java A Primer"*, 4th Edition, TataMcGraw-Hill, 2009.
2. Herbert Schildt, *"Java The complete reference"*, 8thEdition, McGrawHill, 2011.

REFERENCES:

1 Timothy budd, *"An introduction to object-oriented programming"*, 3rdEdition, Pearson Education, 2009.

2. Y. Daniel Liang, "*Introduction to Java programming*", 9thEdition, Pearson education, 2012.
3. Ivor Horton, *"Beginning Java"*, 7thEdition, Wrox Publications, 2011.
4. Cay.S.Horstmann and Gary Cornell "*Core Java 2, Vol I, Fundamentals*", 9thEdition, Pearson Education, 2012.
5. Cay.S.Horstmann and Gary Cornell, "*Core Java 2, Vol II, Fundamentals*", 9thEdition, Pearson Education, 2012.

COMPUTER GRAPHICS

(Common to CSE&IT)

Course Code :13CT1112

L	T	P	C
4	0	0	3

Course Educational Objectives:

To teach the students how to write programs that are related to different graphics like lines, polygons, circles and ellipse, also projecting 3D solids.

- ✤ To get awareness about different graphical devices used for personal computers.
- ✤ The algorithms that are adopted by different devices in line, and ellipse drawing and filling which improves the programming capabilities in graphics.
- ✤ The algorithms that are adopted by different devices in polygon, and circle drawing and filling which improves the programming capabilities in graphics.
- ✤ This subject also gives the awareness about creating message box and windows using C.
- ✤ This subject mainly deals with the different objects used in animations both 2D and 3D.

Course Outcomes:

At the end of the course student will be able to

- ✤ Acquire the knowledge about working principles of different Output devices.
- ✤ Different types of 2D and 3D graphics along with transformation techniques.
- ✤ Get the idea about projections of different views of objects along with elimination of invisible components (points, lines and surfaces).
- ✤ Motion oriented graphics will give the idea about implementing different animation sequences.
- ✤ Get knowledge on visible surface detection methods .

UNIT-I (12 Lectures)

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster - scan systems, random scan systems, graphics monitors and work stations and input devices.

OUTPUT PRIMITIVES :

Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

UNIT-II (12 Lectures)

2-D GEOMETRICAL TRANSFORMS:

Translation, scaling, rotation, reflection and shear transformations, matrix homogeneous coordinates, composite transforms. transformations between coordinate systems.

2-D VIEWING:

The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm.

UNIT-III (12 Lectures)

3-D GEOMETRIC TRANSFORMATIONS:

Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D VIEWING:

Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping, Introduction to curves: spline and Bezier curve.

UNIT-IV (12 Lectures)

VISIBLE SURFACE DETECTION METHODS:

Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods.

WINDOWS PROGRAMMING:

Dos Programming Model, Windows Programming Model, Sample Window Program, Message Box, Creation and Display of Window, Interaction with Window, Reacting to Messages.

UNIT-V (12 Lectures)

COMPUTER ANIMATION:

Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications

TEXT BOOKS:

1. Donald Hearn and M.Pauline Baker, *"Computer Graphics C version"*, 2nd Edition, Pearson Education, 2011.
2. Yaswanth Kanetkar: *"Let Us C"*, 9th Edition, Infinity Science Press, 2009.
3. Foley, VanDam, Feiner and Hughes, *"Computer Graphics Principles & Practice in C"*, 2nd Edition, Pearson Education, 2002.

REFERENCES:

1. Donald Hearn and M.Pauline Baker, *"Computer Graphics"*, 2nd Edition, PHI/Pearson Education, 2008.
2. Zhigand xiang, Roy Plastock, *"Computer Graphics, Schaum's outlines"*, 2ndEdition, Tata Mc- Graw Hill Edition, 2007.
3. David F Rogers, *"Procedural elements for Computer Graphics"*, 2nd Edition, Tata Mc Graw Hill, 2008.
4. Neuman and Sproul, *"Principles of Interactive Computer Graphics"*, 2nd Edition, TMH, 2008.
5. Shalini Govil, Pai, *"Principles of Computer Graphics"*, 1st Edition, Springer International Edition, 2005.
6. Steven Harrington, *"Computer Graphics - A Programming approach"*, 1st Edition TMH, 2010.

WEB REFERENCES:

http://nptel.iitm.ac.in/courses/Webcourse-contents/IITDelhi/Computer%20Graphics/csmain.html

ENVIRONMENTAL STUDIES

(Common to all Branches)

Course Code: 13NM1102

L	T	P	C
2	0	0	0

Course Educational Objectives:

This course introduces the students to the following

- ✤ Important & Scope of the Environment.
- ✤ Awareness about the resources and their limitations.
- ✤ Appreciate the variedness of nature and role of different species in nature.
- ✤ The importance of understanding the impact of any development of nature.
- ✤ Population control and its importance.

Course Outcomes:

After studying the course the student will have good understanding of

- ✤ Environment and its conservation.
- ✤ The impacts of human action on nature and remedial measures.
- ✤ Being proactive instead of reactive.

UNIT-I (8 Lectures)

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES & NATURAL RESOURCES

Definition, Scope and Importance – Need for Public Awareness.

Renewable and non-renewable resources– Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems -Mineral resources: Use and

exploitation, environmental effects of extracting and using mineral resources, case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Case studies. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT-II (7 Lectures)

ECOSYSTEMS, BIODIVERSITY AND ITS CONSERVATION:

Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Definition: genetic, species and ecosystem diversity.- Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a mega diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. - Endangered and endemic species of India Conservation of biodiversity: In-situ and Exsitu conservation of biodiversity.

UNIT-III (7 Lectures)

ENVIRONMENTAL POLLUTION:

Definition, Cause, effects and control measures of a) Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards.

SOLID WASTE MANAGEMENT:

Causes, effects and control measures of urban and industrial wastes. – Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT-IV (6 Lectures)

SOCIAL ISSUES AND THE ENVIRONMENT:

From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, and watershed management -Resettlement and rehabilitation of people; its problems and concerns. Case Studies Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. -Wasteland reclamation. -Consumerism and waste products. –Environment.

Protection Act. -Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution)

Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

UNIT-V (8 Lectures)

HUMAN POPULATION AND THE ENVIRONMENT:

Population growth, variation among nations. Population explosion - Family Welfare Programme. -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. -Women and Child Welfare. -Role of information Technology in Environment and human health. – Case Studies.

FIELD WORK:

Visit to a local area to document environmental assets

River /forest grassland/hill/mountain -Visit to a local polluted site-

Urban/ Rural/industrial/ Agricultural Study of common plants, insects, birds. - Study of simple ecosystems-pond, river, hill slopes, etc.

TEXT BOOKS:

1. Bharucha. E., "*Textbook of Environmental Studies for Undergraduate Courses*", University Press, 2005.
2. Rajagopalan. R., "*Environmental Studies*", Oxford University Press, 2005.

REFERENCE:

AnjiReddy. M., "*Textbook of Environmental Sciences and Technology*", BS Publications, 2010.

OBJECT ORIENTED PROGRAMMING LAB
(Common to CSE & IT)

Course Code :13CT1113

L	T	P	C
0	0	3	2

Course Educational Objectives:

To write various application programs using JAVA programming language.

- ✤ Develop small applications using JAVA programming language.
- ✤ Write multithreaded programs
- ✤ Build Graphical User Interfaces based applications.
- ✤ Write applet applications
- ✤ Write small network based programs

Course Outcomes:

Atthe end of the course the student would be able to

- ✤ Write simple java programs.
- ✤ Develop java programs using different oop principles
- ✤ Use different packages available in java.
- ✤ Create window based programs and applet driven programs.
- ✤ Write simple client/server program.

LIST OF PROGRAMMES :

1. a. Write a program that displays welcome dear user followed by user name. Accept username from the user.

   b. Write a program to print the multiplication table (till 20) of a given number.

   c. Write a program that prompts the user for an integer and then prints out all the prime numbers up to that Integer.

2. a. Create a class Rectangle. The class has attributes length and width. It should have methods that calculate the perimeter and area

of the rectangle. It should have readAttributes method to read length and width from user.

b. The Fibonacci sequence is defined by the following rule: The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it.

Write a Java program that uses both recursive and non recursive functions to print the n^{th} value in the Fibonacci sequence.

3. a. Write a program to check the compatibility for multiplication, if compatible multiply two matrices and find its transpose.

   b.Write a program that checks whether a given string is a palindrome or not. Ex: MALAYALAM is a palindrome. Accept the string as command line argument.

   c. Write a program for sorting a given list of names in ascending order

4. a. Create an inheritance hierarchy of Rodent, Mouse, Gerbil, Hamster etc. In the base class provide methods that are common to all Rodents and override these in the derived classes to perform different behaviors, depending on the specific type of Rodent. Create an array of Rodent, fill it with different specific types of Rodents and call your base class methods.

   b. Write a program to create an abstract class named Shape that contains an empty method named numberOfSides( ).Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method numberOfSides ( ) that shows the number of sides in the given geometrical figures.(Use Runtimepolymorphism).

5. Design a package to contain the class Student that contains data members such as name, roll number and another package contains the interface Sports which contains some sports information. Import these two packages in a package called Report which process both Student and Sport and give the report.

6. a. Write a program to demonstrate wrapper classes, and to fix the precision.

b. Write a program that calculates roots of a quadratic equation.

c. Write a program that illustrates Vector class.

7. a. Write a program that reads on file name from the user then displays information about whether the file exists, whether the file is readable/ writable, the type of file and the length of the file in bytes and display the content of the using *FileInputStream* class.

b. Write a program that displays the number of characters, lines and words in a text file.

c. Write a program that copies contents from one file to another file.(Using character streams).

8. a. Write a program to generate a set of random numbers between two numbers x1 and x2, and x1>0.

b. Write a program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use StringTokenizer class of java.util)

c. Using the Java API write a program to obtain the following output:

Today’s date is <<today’s date>>

The month is <<current month>>

The year is <<current year>>

<<number of days passed in year>> days have passed in this year so far.

9. a. Write a program that reads two numbers from the user to perform integer division into Num1 and Num2 variables. The division of Num1 and Num2 is displayed if they are integers. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException.

b. Create a user defined exception.

10. a. Write a program that creates 3 threads by extending Thread class. First thread displays “Good Morning” every 1 sec, the second thread displays “Hello” every 2 seconds and the third displays Welcome” every 3 seconds. (Repeat the same by implementing Runnable).

b. Write a program that correctly implements Producer-Consumer problem using the concept of Inter ThreadCommunication.

11. a. Develop an applet that displays a simple message.

    b. Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.

12. a. Write a program that allows user to draw lines, rectangles and ovals.

    b. Write a program that illustrates different AWT controls.

13. a. Write a program for handling mouse events with adapter classes.

    b. Write a program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the+, -,*, % operations. Add a text field to display the result.

    c. Write a program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time No light is on when the program starts.

14. Write a program that illustrates JTabbedPane, JScrollPane and JTable.

15. Write a program that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result, and then sends the result back to the client. The client displays the result on the console. For ex: The data sent from the client is the radius of a circle, and the result produced by the server is the area of the circle.

REFERENCES:

1. E.Balaguruswamy, *"Programming with Java A Primer"*, 4th Edition, TataMcGraw-Hill, 2009.

2. Herbert Schildt, *"Java The complete reference"*, 8th Edition, McGrawHill, 2011.

DATABASE MANAGEMENT SYSTEMS LAB

(Common to CSE & IT)

Course Code :13CT1114

L	T	P	C
0	0	3	2

Course Educational Objectives:

The main objective of the lab course is to expose the students to:

- ✤ Teach the student logical database design and querying the database using SQL & PL/SQL. Upon completion of this course, the student should be able to:
- ✤ Create and maintain tables of a database using SQL
- ✤ Handle all types of SQL Queries.
- ✤ Write all kinds of programming scripts in PL/SQL and transaction managements
- ✤ Create stored procedures, functions, cursors & triggers.

Course Outcomes:

At the end of this course student would be able to

- ✤ Create his own database.
- ✤ Manipulate data in database using SQL language.
- ✤ Experiment with various SQL queries with database created
- ✤ Write programs using PL/SQL language.
- ✤ Create triggers using SQL.

LIST OF PROGRAMMES :

1. Introduction to Oracle, Creation of table, data types, Displaying table definition using DESCRIBE, inserting rows into table and SELECT command.

2. Projection, ORDER BY clause, Altering and dropping of tables (use constraints while creating tables) examples using SELECT command.

3. Queries using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.

4. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

5. Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date).

6. SUBQUERIES(Multiple Subqueries, Nested subqueries)

7. Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found).

a. Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.

8. CONTROL STRUCTURES (IF statement, Loop…End Loop, Exit command, While Loop, For loop, Goto statement).

9. Nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE- APPLICATION ERROR.

10. Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.

11. Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.

12. Program development using creation of package specification, package bodies, private objects, package variables and cursors and calling stored packages.

13. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.

14. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers.

REFERENCES:

1. Raghurama Krishnan, Johannes Gehrke, *"Data base Management Systems"*, 3rd Edition, TATA McGrawHill, 2008.

2. Silberschatz, Korth, *"Data base System Concepts"*, 6th Edition, McGraw Hill, 2010.

3. C.J.Date, *"Introduction to Database Systems"*, 7th Edition, Pearson Education, 2002.

NOTES

SYLLABI FOR V SEMESTER

COMMUNICATION SYSTEMS

(Common to EEE & IT)

Course Code : 13EC1145	**L**	**T**	**P**	**C**
	4	**1**	**0**	**3**

Prerequistes:

Course Educational Objectives:

This syllabus was designed to provide a comprehensive exposure on To introduce basic concepts of satellite communication and cellular communication. The student will be able

- ✤ To understand the fundamentals concepts of various communication systems.
- ✤ To understand different modulation techniques for analog and digital communication.
- ✤ To understand fundamentals of television.
- ✤ To understand interlaced scanning, production and specifications of composite video signal.
- ✤ To describe the basic concepts of wireless telephone networks.

Course Outcomes:

After completion of the course, students shall be able to understand

- ✤ The basics of various communication systems
- ✤ Modulation schemes
- ✤ Principles of TV and satellite communication.
- ✤ pulse digital and pulse analog modulation techniques.
- ✤ probability of error, bit error rate and error performance.

UNIT-I **(12 lectures)**

ANALOG MODULATION :

Introduction to communication systems, Bandwidth requirements, Need for modulation, Amplitude modulation, AM transmitters and receivers, Single sideband systems, Balanced Modulator, Single sideband transmitters and receivers, Frequency and Phase Modulation: Mathematical representation, Frequency spectrum, Pre-emphasis and De-emphasis, FM transmitters and receivers.

UNIT-II (12 lectures)

PULSE AND DIGITAL MODULATION:

Pulse modulation-Pulse amplitude modulation, Pulse width modulation, Pulse position modulation, Pulse code modulation, Sampling and Quantization. Information capacity, Amplitude shift keying, phase shift keying, Quadrature amplitude modulation, Differential phase shift keying,

UNIT-III (12 lectures)

PRINCIPLES OF TV & BROADCASTING:

Gross structure, Image continuity, scanning, flicker, interlaced scanning, number of scanning lines, Fine structure, Tonal Gradation. Video signal dimensions, Horizontal sync. Details, Vertical sync. Details, Scanning sequence details, Functions of vertical pulse train, Channel bandwidth, vestigial side band transmission, Colour transmission and Reception.

UNIT-IV (12 lectures)

SATELLITE COMMUNICATIONS:

History of satellites, Kepler's laws, Satellite orbits, Geo synchronous satellites, Antenna look angles, satellite system link models, Link equations and Link Budget.

UNIT-V (12 lectures)

CELLULAR COMMUNICATIONS:

Mobile telephone service, Evolution of cellular telephone, channel allocation, frequency reuse, cellular capacity, Roaming and Handoffs, GSM, CDMA,

TEXT BOOKS:

1. Wayne Tomasi, *"Electronic Communications systems"*, 2nd Ed., Pearson Publications, 2009.
2. George Kennedy and Bernard Davis, *"Electronic Communication Systems"*, TMH, 2006.

REFERENCES:

1. Dennis Roddy, *"Satellite Communication"*, McGraw Hill International, 4th Edition, 2006.
2. R R Gulati, *"Monochrome and Colour Television"*, New Age International, 2007

FORMAL LANGUAGES AND AUTOMATA THEORY
(Common to CSE & IT)

Course Code :13CT1115

L	T	P	C
4	1	0	3

Course Educational Objectives:

The course aims to develop an appreciation of the theoretical foundations of computer science through study of mathematical and abstract models of computers and the theory of formal languages.

- ✤ Theory of formal languages and use of various abstract machines as 'recognizers' and parsing will be studied for identifying the synthetic characteristics of programming languages.
- ✤ To understand the fundamental models of computation that underlies modern computer hardware, software, and programming languages.
- ✤ Explain computational thinking
- ✤ Learn the foundations of automata theory, computability theory.
- ✤ Discuss the applications of theory to other areas of computer science such as algorithms, programming languages, compilers, natural language translation, operating systems, and software verification.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Design deterministic and non-deterministic machines.
- ✤ Design the pushdown automata.
- ✤ Comprehend the hierarchy of problems arising in the computer sciences.
- ✤ The Student will get an idea for designing Compiler Design.
- ✤ The students will get knowledge about regular expressions and computability theory .

UNIT-I (14 Lectures)

FUNDAMENTALS & FINITE AUTOMATA:

Basic concepts, Formal languages, Strings, Alphabets, Languages, Finite state machine, definitions, Finite automaton model, Acceptance of strings and languages, Deterministic finite automaton (DFA) and Non-deterministic finite automaton (NFA), Transition diagrams and Language recognizers.Acceptance of languages, Equivalence of NFA and DFA, NFA to DFA conversion(Proof needed), NFA with $\in$ - transitions, Significance, Conversion of NFA with - transitions to NFA without - transitions, Minimization of finite automata, Equivalence between two DFA's, Finite automata with output - Moore and Mealy machines, Equivalence between Moore and Mealy machines, conversion of Moore to Mealy and Mealy to Moore.

UNIT-II (8 Lectures)

REGULAR LANGUAGES:

Regular sets, Regular expressions, Operations and applications of regular expressions, Identity rules, Conversion of a given regular expression into a finite automaton, Conversion of finite automata into a regular expression (Arden's theorem Proof) , Pumping lemma for regular sets (Proof needed), Closure properties of regular sets (proofs not required).

UNIT-III (14 Lectures)

GRAMMAR FORMALISM:

Definition of a grammar, Language of a grammar, Types of grammars, Chomsky classification of languages, Regular grammars, Right linear and left linear grammars, Conversion from left linear to right linear grammars, Equivalence of regular grammar and finite automata, Inter conversion, Context sensitive grammars and languages, Linear bounded automata, Context free grammars and languages, Derivation trees, Leftmost and rightmost derivation of strings and Sentential forms.

CONTEXT FREE GRAMMARS:

Ambiguity, left recursion and left factoring in context free grammars, Minimization of context free grammars, Normal forms for context free grammars, Chomsky normal form, Greibach normal form, Pumping lemma for context free languages(Proof), Closure and decision properties of context free languages(Proofs needed), Applications of context free languages. (Proofs omitted).

UNIT-IV (12 Lectures)

PUSHDOWN AUTOMATA:

Pushdown automata, definition, model, Graphical notation, Instantaneous descriptions, Acceptance of context free languages, Acceptance by final state and acceptance by empty state and its equivalence, Equivalence of context free grammars and pushdown automata, Inter-conversion(Proofs not required), Introduction to deterministic pushdown automata.

TURING MACHINE:

Turing Machine, definition, model, Instantaneous descriptions, Representation of Turing machines, Design of Turing machines, Types of Turing machines, Computable functions, Unrestricted grammar, Recursive and recursively enumerable languages and Church's hypothesis. (Proofs required)

UNIT-V (8 Lectures)

COMPUTABILITY THEORY:

LR(0) grammar, Decidable and un-decidable problems, Universal Turing machine, Halting problem of a Turing machine, Un-decidability of post's correspondence problem(Proof needed) and modified post's correspondence problem, Turing reducibility, Definition of classes P and NP problems, NP complete and NP hard problems.

TEXT BOOKS:

1. Hopcroft H.E. and Ullman J. D, *"Introduction to Automata Theory Languages and Computation"*, 3rd Edition, Pearson Education, 2011.

REFERENCES:

1. Daniel I.A. Cohen, *"Introduction to Computer Theory"*, 2nd Edition, John Wiley Publication, 2007
2. Mishra and Chandrashekaran, *"Theory of Computer Science –Automata Languages and Computation"*, 3rd Edition, PHI, 2009.

3. John C Martin, *"Introduction to languages and the Theory of Computation"*, 3rd Edition, TMH, 2010.
4. Michel Sipser, *"Introduction to Theory of Computation"*, 2nd Edition, Thomson, 2012.
5. J.E.Hopcraft and JefferyD.Ulman,S.N.Maheswari, *"Introduction to Automata Theory, Languages & Computation"*, 2nd Edition, Narosa publishing company, 2011.
6. K.V.N.Sunitha , N.Kalyani, *"Formal Languages and Automata Theory"*, 1st Edition, TMH, 2010.
7. Rajendra Kumar, *"Theory of Automata, Languages & Computations"*, 1st Edition, TMH, 2010.

WEB REFERENECES:

http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-%20Guwahati/afl/index.htm

WEB PROGRAMMING
(Common to CSE & IT)

Course Code :13CT1116

L	T	P	C
4	0	0	3

Course Educational Objectives:

The main objective of the course is to expose the students to different web technologies and prepare him to design , develop and maintain a web site .

- ✤ Describe and explain the relationship among HTML, XHTML, CSS, JavaScript, XML and other web technologies.
- ✤ Create and publish advanced HTML pages with the help of frames, scripting languages, and CSS.
- ✤ understand and use JavaScript variables, control structures, functions, arrays, and objects.
- ✤ Understand and develop XML Technologies such as XML Schemas, XSLT.
- ✤ Understand and develop Server-Side Programming using Servlets and JSP's.
- ✤ Develop web pages using AJAX and PHP.

Course Outcomes:

At the end of the course the student should be able to

- ✤ Describe and explain the relationship among HTML, XHTML, CSS, JavaScript, XML and other web technologies.
- ✤ Create and publish advanced HTML pages with the help of frames, scripting languages, and CSS.
- ✤ Understand and use JavaScript variables, control structures, functions, arrays, and objects. Understand and develop XML Technologies such as XML Schemas, XSLT.

- Understand and develop Server-Side Programming using Servlets and JSP's.
- Develop web pages using AJAX and PHP.

UNIT-I (14 Lectures)

INTRODUCTION TO HTML5:

Part 1, Introduction to HTML5: Part 2: New HTML5 Form input Types, Introduction to Cascading Style Sheets: Part 1: Inline Styles, Embedded Style Sheets , Conflicting Styles , Linking External Style Sheets (Text Book : 1)

Java Script: Introduction to scripting, Control Structures-I, Control Structures-II, Functions, Arrays, Objects. (Text Book: 1)

UNIT-II (8 Lectures)

XML: Introduction, XML Basics, Structuring Data, XML Namespaces, Document Type Definitions (DTDs), W3C XML Schema Documents, XML Vocabularies, Extensible Stylesheet Language and XSL Transformations, Document Object Model (DOM): Objects and Collections(Text Book : 1)

UNIT-III (14 Lectures)

DATABASE ACCESS:

Overview of JDBC, JDBC Drivers, Connecting to a Database, The Statement Interfaces, Result Sets, Using Metadata (Text Book: 3)

SERVLETS :

The Life Cycle of a Servlet, Using Tomcat for Servlet Development, A Simple Servlet, The Servlet API, The javax.servlet Package , Reading Servlet Parameters, The javax.servlet.http Package, Handling HTTP Requests and Responses, Cookies, Session Tracking(Text Book : 2)

UNIT-IV (12 Lectures)

JSP:

JSP Overview, How JSP Works , A Basic Example, JSP Syntax and Semantics: The JSP Development Model, Components of a JSP Page: Directives, Comments, Expressions, Scriptlets, Declarations, implicit objects, Standard Actions, Tag Extensions, A Complete Example (Text

Book : 3)Expressions , Scriptlets, Expression and Scriptlet Handling by the JSP Container, Implicit Objects and the JSP Environment, Initialization Parameters,

Request Dispatching: Anatomy of Request Processing, include Directive, The <jsp:include> Action, Forwarding Requests , RequestDispatcher Object (Text Book : 3)

UNIT-V (12 Lectures)

AJAX-ENABLED RICH INTERNET APPLICATIONS WITH XML AND JSON:

Traditional Web Applications vs. Ajax Applications, Rich Internet Applications (RIAs) with Ajax, History of Ajax, Ajax Example Using the XMLHttpRequest Object, Using XML and the DOM, Creating a Full-Scale Ajax-Enabled Application

PHP: Introduction, Simple PHP Program, Converting Between Data Types, Arithmetic Operators, Initializing and Manipulating Arrays, String Comparisons, String Processing with Regular Expressions, Form Processing and Business Logic, Reading from a Database (Text Book : 1)

TEXT BOOKS :

1. Dietel and Dietel : *"Internet and World Wide Web - How to Program"*, 5th Edition, PHI/Pearson Education, 2011
2. Herbert Schildt, *"The complete Reference Java 2"*, 8th Edition, TMH, 2011.
3. Phil Hanna: *"The Complete Reference JSP"*, 1st Edition, TMH, 2003.

REFERENCES:

1. Hans Bergsten : *"Java Server Pages"*, 3rdEdition, O'Reilly publication, 2008.
2. Raj Kamal, *"Internet & Web technologies"*, 8th Edition , Tata McGraw-Hill, 2007.
3. Chris Bates, *"Web Programming, building internet applications"*, 2ndEdition, WILEY, Dreamtech, 2008.

4. Xavier. C, *"Web technology and design"*, 1st Edition, New Age International, 2011.

5. Marty Hall and larry Brown, *"Core servlets and java Server pages volume 1: core technologies"*, 2nd Edition, Pearson Eduacation, 2007.

EMBEDDED SYSTEMS - 1
(Common to CSE & IT)

Course Code :13CT1117

L	T	P	C
4	0	0	3

Course Educational Objectives:

This syllabus was designed to provide a comprehensive exposure on popular 8-bit embedded processors and their programming.

- ✤ To expose 8-bit Embedded-processors, and their versatility in programming.
- ✤ To gain hands on experience of peripheral systems builtin in these processors.
- ✤ To enable a student the confidence to writing application programs.
- ✤ To provide alternate ways of building solutions to the given practical exercises so that they understand creative solutions to applications.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Understand the essentials of the INTEL 8051, PIC16F877 and Atmega8535 architectures
- ✤ Understand the instruction sets , its registers.
- ✤ Write programs in assembly language for real time problems.
- ✤ Understand the serial communication buses.
- ✤ Understand the peripheral systems in atmega 8535.

UNIT-I (12 Lectures)

Introduction to Classic 8051 family Architecture. Address and data bus with multiplexed I/O pins. Registers Examples with arithmetic and Boolean instruction set. Applications using, Timers, Counters and I/O programming for external logic sensing and control.Interrupts and their reatime programming in all applications. This processor is based on the classic architecture the Von Neumann Architecture.

UNIT-II (15 Lectures)

Introduction to the advanced Harvard architecture for faster instructions. Introduction to PIC family Architecture and instruction set. Introduction to the shorter RISC instruction set and its usage with example programs. Interrupts using change of state on ports and its use in all application programming.

PERIPHERAL SYSTEMS IN PIC 16F877A PROCESSOR.

(a) Digital Input and Output Programming,

(b) Timers and Counters

(c) Capture Control and PWM

(d) Analog to Digital Converters and their Programming

(e) Simple data acquisition systems and programming.

UNIT-III (9 Lectures)

Introduction to Atmega processor with a large register set. Family architecture exposes Accumulator free programming, with advanced addressing modes and faster Cache memory controlled I/O . Programming using the popular Atmega 8535 processor and instruction set. The versatile peripherals and their applications in 8535.

Logical sequence of steps to design a program to suit an objective. Examples in Robotics, Motor control, Display control will be exposed.

UNIT-IV (12 Lectures)

PERIPHERAL SYSTEMS IN ATMEGA 8535

(a) Digital Input and Output Programming

(b) Timers and Counters wave form generation.

(c) Capture Control and PWM

(d) Analog to Digital Converters and their Programming

(e) Simple data acquisition programming.

UNIT-V (12 Lectures)

SERIAL COMMUNICATION BUSSES

(a) USART, with addressable communication feature

(b) SPI bus, ants speed and versatility

(c) 12c {inter integrated bus] the two wire communication bus .

(d) Introduction to USB bus and its features for fast synchronous communication.

TEXT BOOKS:

1. Bendapudy Kanta Rao, *"Embedded Systems, Prentice Hall India"*, 1st Edition, 2011.
2. Milan Verle, *"PIC microcontrollers, MikroElektronika"*, 1st Edition,2008
3. Muhammad Ali Mazidi, Sarmad Naimi, Sepehar Naimi, *"The AVR Microcontroller and Embedded systems using assembly & C"*, 1st Edition, Prentice Hall, Pearson education, 2009.

REFERENCES:

1. Ali Mazidi Mohammed Gillispie, Mazide Janice, *"The 8051Microcontroller and Embedded Systems using assembly & C"*, 2nd Edition, Pearson Education, 2009
2. Timothy D.Green, *"Embedded Systems Programming with the PIC16F877"*, 2nd Edition,2008
3. Kenneth J Ayala, *"The 8051 Micro Controller"*, 3rd Edition, Thomson Publishers, 2009.

OBJECT ORIENTED ANALYSIS AND DESIGN

(Common to CSE& IT)

Course Code :13CT1118

L	T	P	C
4	0	0	3

Course Educational Objectives:

The main objective of the course is to expose the students to model the software architecture using different UML diagrams.

- Giving basics Designing a product or a system.
- Giving idea about things, relationships and diagrams.
- Giving idea about Structural things.
- Giving idea about Behavioral things & Architectural Modeling.
- Giving practice with the help of a Case Study.

Course Outcomes:

At the end of the course the student will be able to

- Understand the Object Oriented Systems Development.
- Understand the Basic & Advanced Structural Modeling.
- Understand the Basic & Advanced Behavioral.
- Understand the Architectural Modeling.
- Understand the concepts required for implementing ATM and railway reservation system.

UNIT-I (15 Lectures)

AN OVERVIEW OF OBJECT ORIENTED SYSTEMS DEVELOPMENT:

Introduction, Two Orthogonal Views of the Software, Object Oriented Systems Development Methodology, Why an Object Orientation?

WHY WE MODEL:

The Importance of Modeling, Principles of Modeling, Object Oriented Modeling

INTRODUCING THE UML:

An overview of the UML, A Conceptual Model of the UML, Architecture, Software Development Life Cycle

UNIT-II (12 Lectures)

BASIC STRUCTURAL MODELING:

Classes, Relationships, Common Mechanisms, and diagrams, class diagrams

ADVANCED STRUCTURAL MODELING:

Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages, Object Diagrams

UNIT-III (10 Lectures)

BASIC BEHAVIORAL MODELING:

Interactions, Interaction diagrams, Use cases, Use case diagrams, Activity Diagrams

ADVANCED BEHAVIORAL MODELING:

Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

UNIT-IV (11 Lectures)

ARCHITECTURAL MODELING I:

Component, Deployment, Component diagrams and Deployment diagrams

ARCHITECTURAL MODELING II:

Patterns and Frameworks, Collaborations, Systems and Models.

UNIT-V (10 Lectures)

CASE STUDY:

Bank ATM Application, Railway Reservation System.

TEXT BOOKS:

1. Grady Booch, James Rumbaugh, Ivar Jacobson, *"The Unified Modeling Language User Guide"*, 2nd Edition, Pearson Education, 2007.
2. Ali Bahrami, *"Object Oriented Systems Development using the unified modeling language"*, 1st Edition, TMH, 2008.

REFERENCES:

1. Meilir Page-Jones, *"Fundamentals of Object Oriented Design in UML"*, 1st Edition, Pearson Education, 2006.
2. Pascal Roques, *"Modeling Software Systems Using UML2"*, 1st Edition, WILEY Dreamtech, 2007.
3. Atul Kahate, *"Object Oriented Analysis & Design"*, 1st Edition, TMH, 2007.
4. Mark Priestley, *"Practical Object-Oriented Design with UML"*, 2nd Edition, TMH, 2005.
5. Craig Larman, *"Appling UML and Patterns: An introduction to Object"*, Oriented Analysis and Design and Unified Process, 3rd Edition, Pearson Education, 2007.

SOFTWARE ENGINEERING
(Common to CSE & IT)

Course Code :13CT1119	L	T	P	C
	4	0	0	3

Course Educational Objectives:

The main objective of the course is to give an overall idea about the software development process.

- ✤ To Analyze, Design, Test and Maintain Software Systems.
- ✤ To develop Software Using good Quality Concepts.
- ✤ Use Cost Estimation Techniques to estimate the cost of the software
- ✤ To avoid risks by using Risk Management Techniques.
- ✤ Understands various project , process and product metrics.

Course Outcomes:

At the end of the course the student should be able to

- ✤ Analyze and Design Software Systems.
- ✤ Test and MaintainSoftware Systems.
- ✤ Develop Software Using good Quality Concepts.
- ✤ Understand the risk management.
- ✤ Use Cost Estimation Techniques to estimate the cost of the software and avoid risks by using Risk Management Techniques.

UNIT-I (12 Lectures)

INTRODUCTION TO SOFTWARE ENGINEERING:

Software, The Nature of Software, Software Engineering, The Software Process, Software Engineering practice, Software Myths, A Generic Process Model, Process Assessment and Improvement, Product and Process, CMMI. (Text Book-1)

PROCESS MODELS:

Prescriptive Process Models- The Waterfall Model, Incremental Process

Models, Evolutionary Process Models, Concurrent Models. Specialized Process Models.The Unified Process, Personal and Team Process Models.(Text Book-1)

UNIT-II (12 Lectures)

SOFTWARE REQUIREMENTS:

Functional and Non-functional Requirements, User Requirements, Interface Specification, the Software requirements document.

REQUIREMENTS ENGINEERING PROCESS:

Feasibility Studies, Requirements Elicitation and Analysis, Requirements Validation, Requirements Management. (Text Book-2)

UNIT-III (12 Lectures)

DESIGN ENGINEERING:

The Design Process, Design Concepts, the Design Model.

ARCHITECTURAL DESIGN:

Software Architecture, Architectural Genres, Architectural Styles, Architectural Design, Architectural Mapping using Data Flow. (Text Book-1)

SYSTEM MODELS:

Context Models, Behavioral Models, Data Models, Object Models, Structured Methods.

OBJECT ORIENTED DESIGN:

Objects and Object Classes, an Object Oriented Design Process, Design Evolution. (Text Book-2)

UNIT-IV (12 Lectures)

USER-INTERFACE DESIGN:

The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation.

SOFTWARE TESTING STRATEGIES:

A Strategic Approach to Software Testing, Test Strategies for Conventional Software and Object Oriented Software, Validation Testing, White- Box Testing, Basis Path Testing, Black-Box Testing, System Testing. (Text Book-1)

PRODUCT METRICS:

A Framework for Product Metrics, Metrics for Requirements Model, Metrics for Design Model, Metrics for Source Code, Metrics for Testing, Metrics for Maintenance.

PROCESS AND PROJECT METRICS:

Software Measurement, Metrics for Software Quality. (Text Book-1)

UNIT-V (12 Lectures)

RISK MANAGEMENT:

Reactive versus Proactive Risk Strategies, Software Risks, Risk Identification, Risk Projection, Risk Refinement, RMMM, RMMM Plan.

QUALITY MANAGEMENT:

Software Quality, Informal Reviews, Formal Technical Reviews, Statistical Software Quality Assurance, Software Reliability, the ISO 9000 Quality Standards. (Text Book-1)

TEXT BOOKS:

1. Roger S. Pressman, *"Software Engineering- A Practitioner's Approach"*, 6thEdition , TMH, 2010.
2. Sommerville, *"Software Engineering"*, 9th Edition, Pearson Education, 2011.

REFERENCES:

1. K.K.Agarwal & Yogesh Singh, *"Software Engineering"*, 3rd Edition, New Age International Publishers, 2008.
2. Shely Cashman Rosenblatt, *"System Analysis and Design"*, 2nd Edition, Thomson Publications, 2011.
3. PankajJalote, *"An Integrated Approach to Software Engineering"*, 3rd Edition, Narosa Publishing House, 2011.

WEB REFERENCES:

1. http://nptel.iitm.ac.in/courses/106101061/
2. http://nptel.iitm.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Soft%20Engg/New_index1.html

EMBEDDED SYSTEMS-1 LAB
(Common to CSE & IT)

Course Code :13CT1120

L	T	P	C
0	0	3	2

Course Educational Objectives:

To explore the different embedded processors and its programming that are adopted in different real time systems.

- It exposes students to the field of Embedded Systems and gives them a chance to hear and read about embedded system topics, and then put those concepts to work by developing and debugging embedded system hardware and firmware.
- To exposure Integrated development for the different embedded processors.
- To use these programs, students are encouraged to suggest new scope for applications.

Course Outcomes:

At the end of the course the student will be able to

- Understand the different IDE tools for different embedded processors
- Write programs in assembly language for real time problems
- Design the application by interfacing System Peripherals

LIST OF PROGRAMS:

1. ELEMENTARY OPERATIONS :

i. Multi precision Addition, Subtraction, and Multiplication.

ii. Handling Fractional numbers

iii. BCD-Binary Conversion examples

iv. ASCII to BCD conversion

v. Binary to ASCII conversion

2. **INPUT OUTPUT CONTROL PROGRAMMING.**

ith direction control. Individual pin control, and drive capability. Using the I/O the following programs are practiced.

i. Controlling the external logical switching, for DC motors, Steppers

ii. Clock generation and timing using Timers ad Counters

iii. Pulse width modulation s for DAC application.

iv. Capture control of external events

3. **ANALOG TO DIGITAL CONVERTERS:**

Usage of multiplexed channels for in fast data acquisition and storage. Learn about acquisition speed, and waveform storage by sampling. interrupt driven data acquisition.

4. **PROGRAMMING USING BUILT IN TIMERS:**

i. As Event Timers

ii. As fast Counters

iii. Frequency Generation

iv. Simple programs to generate FSK

5. **CAPTURE CONTROL AND ITS APPLICATION EXAMPLES:**

i. Measurement of pulse width using I/O

ii. Measurement of Duty cycle, power factor etc

iii. Measurement of velocity and acceleration.

iv. Sensing touch.

6. **SERIAL COMMUNICATION METHODS:**

i. USART and its programming

ii. SPI bus and its programming

7. **WAVE FORM GENERATION USING PWM METHODS:**

i. Generation of Sine wave

ii. Generation of FSK

REFERENCES:

1. Bendapudy Kanta Rao, *"Embedded Systems"*, Prentice Hall India, 1st Edition, 2011.
2. Milan Verle, *"PIC microcontrollers"*, MikroElektronika, 1st Edition,2008
3. Muhammad Ali Mazidi, Sarmad Naimi, Sepehar Naimi, *"The AVR Microcontroller and Embedded systems using assembly & C"*, 1st Edition , Prentice Hall, Pearson education, 2009.

WEB PROGRAMMING LAB
(Common to CSE & IT)

Course Code :13CT1121

L	T	P	C
0	0	3	2

Course Educational Objectives:

The main objective of the lab course is to expose the students to different programming aspects related to web designing using different technologies. Upon completion of this course, the student should be able to:

1. Understand web page site planning, designing, and maintenance.
2. Develop web sites which are secure and dynamic in nature and writing scripts which get executed on server as well.
3. Study the actual advanced Web methodologies, specifications and techniques.
4. Acquire the skills necessary to design, implement and deploy complex Web sites and applications.
5. Understands the concepts of PHP and AJAX to develop web pages

Course Outcomes:

At the end of the course the student should be able to

1. Get practical exposure on HTML, XHTML, CSS, JavaScript, XML and other web technologies.
2. Get practical exposure to develop XML Technologies such as XML Schemas, XSLT.
3. Get practical exposure to develop Server-Side Programming using Servlets and JSP's.
4. Develop web pages using AJAX and PHP.
5. Develop a website using the above technologies.

LIST OF PROGRAMS:

WEEK-1 & 2:

Design the following static web pages required for an online book store web site.

1) HOME PAGE:

The static home page must contain three **frames**.

Top frame : Logo and the college name and links to Home page, Login page, Registration page,

Catalogue page and Cart page (the description of these pages will be given below).

Left frame : At least four links for navigation, which will display the catalogue of respective links. For e.g.: When you click the link **"CSE"** the catalogue for **CSE** Books should be displayed in the Right frame.

Right frame: The *pages to the links in the left frame must be loaded here*. Initially this page containms description of the web site.

Logo	Web Site		Name	
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Description of the website			

2) Login Page

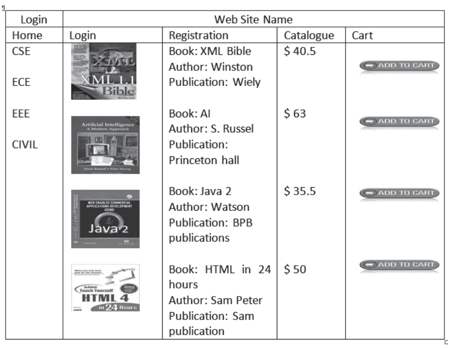
Logo	Web Site		Name	
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Log in [ ] Password [ ] Submit [ ] Reset [ ]			

3) CATALOGUE PAGE:

The catalogue page should contain the details of all the books available in the web site in a table.

The details should contain the following:

1. Snap shot of Cover Page.
2. Author Name.
3. Publisher.
4. Price.
5. Add to cart button.



Login	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE		Book: XML Bible Author: Winston Publication: Wiely	$ 40.5	ADD TO CART
EEE CIVIL		Book: AI Author: S. Russel Publication: Princeton hall	$ 63	ADD TO CART
		Book: Java 2 Author: Watson Publication: BPB publications	$ 35.5	ADD TO CART
		Book: HTML in 24 hours Author: Sam Peter Publication: Sam publication	$ 50	ADD TO CART

Note: Week 2 contains the remaining pages and their description.

4) CART PAGE:

The cart page contains the details about the books which are added to the cart.

The cart page should look like this:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE				
ECE	Book name	Price	Quantity	Amount
EEE	Java 2	$ 35.5	2	$ 70
CIVIL	XML bible	$ 40.5	1	$ 40.5
			Total amount- $130.5	

5) REGISTRATION PAGE:

Create a "*registration form* "with the following fields

1) Name (Text field)

2) Password (password field)

3) E-mail id (text field)

4) Phone number (text field)

5) Sex (radio button)

6) Date of birth (3 select boxes)

7) Languages known (check boxes – English, Telugu, Hindi, Tamil)

8) Address (text area)

WEEK 3:

VALIDATION:

Write *JavaScript* to validate the following fields of the above registration page.

1. Name (Name should contains alphabets and the length should not be less than 6 characters).
2. Password (Password should not be less than 6 characters length).
3. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)
4. Phone number (Phone number should contain 10 digits only).

Note : You can also validate the login page with these parameters.

WEEK 4:

Design a web page using **CSS (C**ascading **S**tyle **S**heets**)** which includes the following:

1) Use different font, styles: In the style definition you define how each selector should work

(font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles.

For example:

```
<HTML>
<HEAD>
<style type=”text/css”>
B.headline {color:red; font-size:22px; font-family:arial; textdecoration:
underline}
</style>
</HEAD>
<BODY>
<b>This is normal bold</b><br>
```

Selector {cursor:value}

For example:

```
<html>
<head>
<style type=”text/css”>
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>
<body>
<b>
<a href=”mypage.htm” class=”xlink”>CROSS LINK</a>
<br>
<a href=”mypage.htm” class=”hlink”>HELP LINK</a>
</b>
</body>
</html>
```

<b class="headline">This is headline style bold

</BODY>

</HTML>

2) Set a background image for both the page and single elements on the page. You can define the background image for the page like this:

BODY {background-image:url(myimage.gif);}

3) Control the repetition of the image with the background-repeat property. As background-repeat: repeat Tiles the image until the entire page is filled, just like an ordinary background image in plain HTML.

4) Define styles for links as

A:link

A:visited

A:active

A:hover

Example:

<style type="text/css">

A:link {text-decoration: none}

A:visited {text-decoration: none}

A:active {text-decoration: none}

A:hover {text-decoration: underline; color: red;}

</style>

5) Work with layers:

For example:

LAYER 1 ON TOP:

<div style="position:relative; font-size:50px; z-index:2;">LAYER 1</div>

<div style="position:relative; top:-50; left:5; color:red; font-size:80px; z-index:1">LAYER 2</div>

LAYER 2 ON TOP:

```
<div style=”position:relative; font-size:50px; z-index:3;”>LAYER1</div>
<div style=”position:relative; top:-50; left:5; color:red; fontsize:80px; zindex:4">LAYER 2</div>
```

6) Add a customized cursor:

Selector {cursor:value}

For example:

```
<html>
<head>
<style type=”text/css”>
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>
<body>
<b>
<a href=”mypage.htm” class=”xlink”>CROSS LINK</a>
<br>
<a href=”mypage.htm” class=”hlink”>HELP LINK</a>
</b>
</body>
</html>
```

WEEK 5:

Write an XML file which will display the Book information which includes the following:

1) Title of the book

2) Author Name

3) ISBN number

4) Publisher name

5) Edition

6) Price

Write a Document Type Definition (DTD) to validate the above XML file. Display the XML file as follows. The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns. Use XML schemas XSL and CSS for the above purpose.

Note: Give at least for 4 books. It should be valid syntactically.

Hint: You can use some xml editors like XML-spy

WEEK 6:

1) Install TOMCAT web server and APACHE. While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port.

2) Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root. Access the pages by using the urls : http://localhost:4040/rama/books.html (for tomcat) http://localhost:8080/books.html (for Apache)

WEEK 7:

USER AUTHENTICATION :

Assume four users user1,user2,user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a servelet for doing the following.

1. Create a Cookie and add these four user id's and passwords to this Cookie.
2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.

If he is a valid user(i.e., user-name and password match) you should welcome him by name(user-name) else you should display " You are not an authenticated user ". Use init-parameters to do this. Store the user-names and passwords in the webinf.xml and access them in the servlet by using the getInitParameters() method.

WEEK 8:

Install a database(Mysql or Oracle). Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form).

Practice 'JDBC' connectivity. Write a java program/servlet/JSP to connect to that database and extract

data from the tables and display them. Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week1).

WEEK 9:

Write a JSP which does the following job: Insert the details of the 3 or 4 users who register with the web site (week7) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies)

WEEK 10:

1. Create a simple XMLHttpRequest, and retrieve data from a TXT file using AJAX
2. Create an XMLHttpRequest to retrieve data from an XML file using AJAX

WEEK 11:

1. How a web page can communicate with a web server while a user type characters in an input field. (Retrieve the content of an JSP file)
2. Retrieve content from a database using AJAX.

WEEK 12:

Design the web pages required for an online book store web site using PHP, AJAX, and HTML5.

REFERENCES:

1. Dietel and Dietel, *"Internet and World Wide Web - How to Program"*, 5th Edition, PHI/Pearson Education, 2011
2. Herbert Schildt, *"The complete Reference Java 2"*, 8th Edition, TMH, 2011.
3. Phil Hanna, *"The Complete Reference JSP"*, 1st Edition, TMH, 2003.

INTELLECTUAL PROPERTY RIGHTS AND PATENTS

(Common to all Branches)

Course Code: 13NM1103

L	T	P	C
2	0	0	0

Course Educational Objectives:

- ✤ To acquaint the learners with the basic concepts of Intellectual Property Rights.
- ✤ To develop expertise in the learners in IPR related issues and sensitize the learners with the emerging issues in IPR and the rationale for the protection of IPR.

Course Outcomes:

At the end of this course, the student will be able to

- ✤ Gain knowledge on Intellectual Property assets and generate economic wealth
- ✤ Assist individuals and organizations in capacity building and work as a platform for development, promotion, protection, compliance, and enforcement of Intellectual Property & knowledge.

UNIT-I **(7 Lectures)**

Introduction to intellectual property Act and Law-the evolutionary past-the IPR tool kit- legal tasks in intellectual property law-ethical obligations in Para legal tasks in intellectual property law

UNIT-II **(8 Lectures)**

Introduction to trade mark – Trade mark registration process-Post registration procedures-Trade mark maintenance – transfer of rights- inter party’s proceeding – Infringement-Dilution ownership of trade mark-likelihood of confusion – trademark claims- trademark litigations

UNIT-III **(6 Lectures)**

Introduction to copy rights- principles of copyright – subjects matter of copy right- rights afforded by copyright law- copyright ownership- transfer and duration – right to prepare derivative works- right of distribution- right to perform the work publicity- copyright formalities and registrations

UNIT-IV **(7 Lectures)**

Introduction to patent law- Rights and limitations- Rights under patent law- patent requirements- ownership – transfer- patent application process- patent infringement- patent litigation

UNIT-V **(6 Lectures)**

Introduction to transactional law- creating wealth and managing risk – employment relationship in the Internet and technologic cal sector- contact for internet and technological sector

TEXT BOOKS:

1 Kompal Bansal and Praishit Bansal, "Fundamentals of IPR for Engineers", 1st Edition, BS Publications, 2012.

2 Prabhuddha Ganguli, *"Intellectual Property Rights"*, 1st Edition, TMH, 2012.

REFERENCES:

1 R Radha Krishnan & S Balasubramanian, *"Intellectual Property Rights"*, 1st Edition, Excel Books, 2012.

2 M Ashok Kumar & mohd Iqbal Ali, *"Intellectual Property Rights"*, 2nd Edition, Serial publications, 2011.

NOTES

SYLLABI FOR VI SEMESTER

MANAGEMENT SCIENCE

(Common to Chemical, CSE, IT, ECE, EEE)

Course Code: 13HM1102	L	T	P	C
	4	0	0	3

Course Educational Objectives:

To familiarize with the process of management and to provide basic insights into to select contemporary management practices.

Course Outcomes:

To understand the management processes and evolve management levels for effective decision making

UNIT-I (16 Lectures)

INTRODUCTION TO MANAGEMENT:

Concept-nature and importance of management- functions of management- evolution of management thought- decision making process- designing organization structure- principles of organization – types of organization structure

UNIT-II (12 Lectures)

OPERATIONS MANAGEMENT:

Principles and types of plant layout- work study- statistical quality control- control charts(R Chart, P Chart & C Chart- Simple numerical problems) – materials management- Need for Inventory Control- EOQ, ABC Analysis(Simple numerical Analysis)- Types of Inventory Analysis(HML. SDE, VED, FSN Analysis)

UNIT-III (10 Lectures)

HUMAN RESOURCE MANAGEMENT:

Concept of HRM, HRD and PMIR- Functions of HR Manager- theories of motivation and leadership styles- Job Evaluation and Merit Rating,

Welfare measures-statutory and non statutory compliance – grievance handling

UNIT-IV (12 Lectures)

MARKETING MANAGEMENT:

Marketing Management- Functions of Marketing Management- Marketing mix-Market segmentation - Marketing strategies based on product life cycle- Channels of Distribution- Consumer Behavior and marketing research

UNIT-V (14 Lectures)

PROJECT MANAGEMENT:

Project planning and control- Project life cycle- Development of network- Difference between PERT and CPM- Identifying critical path- probability of completing the project within the given time, cost analysis, - project crashing(simple numerical problems)

TEXT BOOKS:

1 Ramanujam Naidu & Sastry, *"Management Science"*, 1st Himalaya Publisher, 2012.

2 Vijaya Kumar & Appa Rao, *"Management Science"*, 1st Cengage Publishers, 2012.

3 AR Aryasri, *"Management Science"*, 4th Edition, Tata McGraw-Hill, 2009.

REFERENCES:

1 O P Khanna, *"Industrial Engineering & Management"*, 2nd Edition, Dhanpat Rai, 2004.

2 Martand Telsang, *"Industrial Engineering & Production Management"*, 2nd Edition, S. Chand & Company, 2008.

DATA WAREHOUSING AND DATA MINING
(Common to CSE & IT)

Course Code :13CT1122

L	T	P	C
4	1	0	3

Course Educational Objectives:

To introduce the student to various data warehousing and data mining techniques. The course will cover all the issues of KDD process and will illustrate the whole process by examples of practical applications.

- ✤ To make the student capable of applying data mining techniques in real time applications.
- ✤ To make the student capable to compare and contrast different conceptions of data mining as evidenced in both research and application.
- ✤ Explain the role of finding associations in commercial market basket data.
- ✤ Identify and characterize sources of noise, redundancy, and outliers in presented data.
- ✤ To get an idea about the data that how it is going to be classified into clusters

Course Outcomes:

At the end of the course the student will be able to

- ✤ Understand the application of data mining techniques in real time applications
- ✤ Understand the Comparing and contrast different conceptions of data mining
- ✤ Understand the finding associations in commercial market basket data

- Understand the identifying and characterizing the noise, redundancy and outliers in presented data
- Understand about the clusters.

UNIT-I (12 Lectures)

INTRODUCTION:

Data mining-On what kinds of Data, what kinds of patterns can be mined, which technologies are used, which kinds of applications are targeted, major issues in Data Mining.

DATA PREPROCESSING: An Overview, Data Cleaning, Data Integration, Data Reduction, Data .Transformation and Data discretization.

UNIT-II (12 Lectures)

DATA WAREHOUSE AND OLAP TECHNOLOGY:

Data Warehouse: Basic concepts, Data Warehouse Modeling: Data Cube and OLAP, Data Warehouse Implementation, Data cube computation method- Multi way array aggregation for full cube computation.

DATA GENERALISATION: Data generalization by Attribute-Oriented Induction.

UNIT-III (12 Lectures)

MINING FREQUENT PATTERNS, ASSOCIATION AND CORRELATIONS:

Basic Concepts, Efficient and Scalable Frequent Item set Mining Methods, Which patterns Are interesting?-Pattern Evaluation methods.

UNIT-IV (12 Lectures)

CLASSIFICATION: BASIC CONCEPTS:

Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation.

UNIT-V (12 Lectures)

CLUSTER ANALYSIS: BASIC CONCEPTS:

Cluster analysis, Partitioning Methods (k- Means, k- Medoids) Hierarchical Methods: Agglomerative Vs Divisive, (BIRCH), Density-Based Methods: DBSCAN, Grid-Based Methods (STING).

TEXT BOOKS:

1 Jlawei Han & Micheline Kamber, *"Data Mining – Concepts and Techniques"*, 3rd Edition, Morgan Kaufmann Publishers, 2011.

2 Margaret H Dunham, *"Data Mining Introductory and advanced topics"*, 6th Edition, Pearson Education, 2009.

REFERENCES:

1. Arun K Pujari, *"Data Mining Techniques"*, 1st Edition, University Press, 2005.
2. Pang- Ning Tan, Michael Steinbach, Vipin Kumar, *"Introduction to Data Mining"*, 1st Edition, Pearson Education,2012.
3. Sam Aanhory & Dennis Murray, *"Data Warehousing in the Real World"*, 1st Edition, Pearson Edn Asia, 2008.
4. Paulraj Ponnaiah, *"Data Warehousing Fundamentals"*, 1st Edition, Wiley student Edition,2007.
5. Ralph Kimball, *"The Data Warehouse Life Cycle Tool Kit"*, 2nd Edition, Wiley student Edition, 2005.

COMPILER DESIGN
(Common to CSE& IT)

Course Code :13CT1123

L	T	P	C
4	1	0	3

Course Educational Objectives:

The main objective of the course is to give an overall idea about the compiler development process. Upon completion of this course the student should be able to:

- ✤ Analyze the source code and differentiate between lexical, syntax and semantic errors.
- ✤ Understand the run time storage requirements to run a program.
- ✤ Optimize the source code by applying optimization techniques.
- ✤ Develop a Compiler by having an idea of the six different phases.
- ✤ Giving idea about the Data-Flow Analysis of Structured Flow graphs

Course Outcomes:

At the end of the course the student will be able to

- ✤ Understand the internal process of Compilation
- ✤ Understand Lexical Analyzer
- ✤ Understands both top-down and bottom-up parsers
- ✤ Understand Semantic Analyzer
- ✤ Understands intermediate code generation and optimization techniques

UNIT-I (12 Lectures)

INTRODUCTION TO COMPILING:

Overview of Compilers, Analysis of the Source Program, the Phases of a Complier, Pre-Processors, Assemblers, Two Pass Assembly, Loaders and Link-Editors, Bootstrapping, The Grouping of Phases, Compiler Construction Tools.

UNIT-II (12 Lectures)

LEXICAL ANALYSIS:

The Role of the Lexical Analyzer, Strings and Languages, Operations on Languages, Regular Expressions, Regular Definitions, Notational Shorthands, Recognition of Tokens, A Language for specifying Lexical Analyzers(LEX).

SYNTAX ANALYSIS:

The Role of the Parser, Context-free Grammars, Writing a Grammar.

UNIT-III (12 Lectures)

TOP-DOWN PARSING:

Recursive Descent Parsing, Predictive Parsers, Non-Recursive Predictive Parsing, First and Follow, Construction of Predictive Parsing Tables, LL(1) Grammars, Error Recovery in Predictive Parsing.

BOTTOM-UP PARSING:

Handles, Handle Pruning, Stack Implementation, Operator-Precedence Parsing, LR Parsers-SLR, Canonical LR, LALR. Using Ambiguous Grammars, Parser Generator (YACC).

SYNTAX-DIRECTED TRANSLATION:

Syntax-Directed Definition, Construction of Syntax Trees, S-Attributed Definitions, L-Attributed Definitions.

UNIT-IV (12 Lectures)

SEMANTIC ANALYSIS:

Type Systems, Specification of a Type Checker, Equivalence of type-expressions, Type Conversions, Overloading of functions and operators, Polymorphic functions, Algorithm for Unification.

RUN-TIME ENVIRONMENT:

Source Language Issues, Storage Organization, Storage Allocation Strategies, Blocks, Access Links, Procedure Parameters, Displays, Parameter Passing, Symbol Tables.

UNIT-V (12 Lectures)

INTERMEDIATE CODE GENERATION:

Intermediate Languages-Graphical Representations, Three Address Code, Implementations, Boolean Expressions.

CODE OPTIMIZATION:

Introduction, Principle sources of Optimization, Optimization of Basic Blocks.

CODE GENERATION:

Issues, the Target Machine, Run-Time Storage Management, Basic Blocks and Flow graphs, Loops in Flow graphs, Data-Flow Analysis of Structured Flow graphs, Peephole Optimization, DAG, Simple Code Generator.

TEXT BOOKS:

1. Alfred V Aho, Ravi Sethi, Jeffrey D.Ullman, Compilers-Principles Techniques and Tools, 2nd Edition, Pearson Education, 2008.

REFERENCES:

1. Raghavan, *"Principles of Compiler Design"*, 2nd Edition, TMH, 2011.
2. Kenneth C.Louden, *"Compiler Construction-Principles and Practice"*, 2nd Edition, Cengage, 2010.
3. Cooper and Linda, *"Engineering a Compiler"*, 4th Edition, Elsevier, 2008.

WEB REFERENCES:

http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-%20Guwahati/afl/index.htm

COMPUTER NETWORKS
(Common to CSE, IT & ECE)

Course Code :13CT1124

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student learn the design of computer networks.

- ✤ Basics of Computer Networks and different Transmission Media.
- ✤ Giving idea about Design issues in framing.
- ✤ Giving idea about Design issues in Routing Algorithms.
- ✤ Giving idea about Design issues in transport protocols.
- ✤ Giving idea about Design issues in Domain Name Systems and SNMP.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Understand the Network Models and Physical Layer.
- ✤ Understand the data link layer and medium access sub layer.
- ✤ Understand the Network Layer and Congestion Control.
- ✤ Understand the Transport Layer.
- ✤ Understand the concepts and their implementation in Application Layer.

UNIT-I (12 Lectures)

NETWORK MODELS:

Layered Tasks, WAN, LAN, MAN, OSI model, TCP/ IP protocol stack, addressing (Text book 2), Novell Networks Arpanet, Internet. (Text book 1).

PHYSICAL LAYER:

Transmission media: copper, twisted pair, wireless; switching and encoding asynchronous communications; Narrow band ISDN, broad band ISDN and ATM. (Text book 1)

UNIT-II (12 Lectures)

DATA LINK LAYER:

Design issues, framing, error detection and correction, CRC, Elementary data link protocols, Sliding Window Protocol, Slip, HDLC, Internet, and ATM.

MEDIUM ACCESS SUB LAYER:

Random access, Controlled access, Channelization, IEEE 802.X Standards, Ethernet, wireless LANS, Bridges. (Text book 2)

UNIT-III (12 Lectures)

NETWORK LAYER:

Network Layer Design Issues, Routing Algorithms, Internetworking, Network Layer in Internet.(Text book-1)

CONGESTION CONTROL:

General Principles, policies, traffic shaping, flow specifications,

Congestion control in virtual subnets, choke packets, loads shedding, jitter control.(Text book-2)

UNIT-IV (13 Lectures)

TRANSPORT LAYER: Transport Services, Elements of Transport Protocols, Internet Transport Protocols (TCP & UDP); ATM AAL Layer Protocol.(Text book-1)

UNIT-V (11 Lectures)

APPLICATION LAYER:

Network Security, Domain name system, SNMP, Electronic Mail: the World WEB, Multi Media.

TEXT BOOKS:

1. Andrew S Tanenbaum , *"Computer Networks"*, 6th Edition. Pearson Education/PI, 2012.
2. Behrouz A. Forouzan , *"Data Communications and Networking"*, 4th Edition TMH, 2012.

REFERENCES:

1. S.Keshav, *"An Engineering Approach to Computer Networks"*, 2nd Edition, Pearson Education, 2001.
2. William, A. Shay , *"Understanding communications and Networks"*, 3rd Edition, Thomson Publication, 2006

WEB REFERENCES:

1. http://nptel.iitm.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Computer%20networks/New_index1.html
2. http://nptel.iitm.ac.in/courses/IIT-MADRAS/Computer_Networks/index.php

SOFTWARE TESTING

(ELECTIVE- 1)

(Common to CSE & IT)

Course Code : 13CT1125

L	T	P	C
4	0	0	3

Pre-Requisite: Software Engineering

Course Educational Objectives:

The main objective of the course is to expose the students how to test the large scale projects module wise, program wise. Also to give awareness to the student how to validate a particular program with proper and improper inputs. Upon completion of this course, the student should be able to:

- Determine software testing objectives and criteria.
- Develop and validate a test plan.
- Select and prepare test cases.
- Studying various testing methodologies.
- Prepare testing policies and standards.

Course Outcomes:

At the end of the course the student will be able to

- Understand Creating An Environment Supportive Of Software Testing.
- Understand the Flow Graphs, Data flow & Path Testing.
- Understand the Domain Testing.
- Understand the Logic Based Testing.
- Understand the way of testing with different tools.

UNIT-I (12 Lectures)

INTRODUCTION:

Purpose of testing, Dichotomies, model for testing, consequences of bugs.

CREATING AN ENVIRONMENT SUPPORTIVE OF SOFTWARE TESTING:

Writing policy for software testing, economics of testing, building a structured approach for software testing process, work bench Concept.

OVERVIEW OF SOFTWARE TESTING PROCESS:

Advantages of following process cost of computer testing, the seven step software testing process.

UNIT-II (12 Lectures)

FLOW GRAPHS AND PATH TESTING:

Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

DATAFLOW TESTING: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT-III (12 Lectures)

DOMAIN TESTING:

Domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domains and testability.

PATHS, PATH PRODUCTS AND REGULAR EXPRESSIONS:

Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection

UNIT-IV (12 Lectures)

LOGIC BASED TESTING:

Overview, decision tables, path expressions, KV charts, specifications.

STATE GRAPHS:

State graphs, good & bad state graphs, state testing.

UNIT-V (12 Lectures)

BUILDING TOOLS.

Win Runner: Introduction to win runner, Features, Add Ins, Identifying GUI objects, Creating GUI map file, Recording test, Choosing Record mode, Running the test, Win Runner Testing process, GUI Check point, Data driven test, Synchronization, Batch Test, Dialogue Boxes, Functions, Regular Expressions, Exception handling, Break points.

TEXT BOOKS:

1. Baris Beizer, *"Software Testing Techniques"*, 2nd Edition, Dreamtech Press ,2002 .
2. Dr.K.V.K.K.Prasad, *"Software Testing Tools"*, 1st Edition, Dreamtech, 2011.
3. William E Perry, *"Effective methods of Software Testing"*, 3rd Edition , John Wiley,2006 .

REFERENCES:

1. Brian Marick, *"The craft of Software Testing"*, 1st Edition, Pearson Education, 1994.
2. Edward Kit, *"Software Testing in the Real World"* , 1st Edition, Pearson Education, 2002.

WEB REFERENCES:

1. http://books.google.co.in/books/about/Software_Testing_Techniques.html?id=Ixf97h356zcC&redir_esc=y
2. http://my.safaribooksonline.com/book/software-engineering-and-development/software-testing/9780764598371
3. http://www.tmhshop.com/9780070583528
4. http://en.wikipedia.org/wiki/Software_testing
5. http://www.testingstuff.com/references.html

INFORMATION STORAGE SYSTEMS
(ELECTIVE-1)
(Common to CSE & IT)

Course Code :13CT1126

L	T	P	C
4	0	0	3

Course Educational Objectives:

The main objective of the course is to introduce the students to different storage requirements, Data Center Environment, Data Protection Policies, Intelligent Storage Systems, and Storage Technologies. Upon completion of this course, the student should be able to:

- Giving idea about storage technology solutions.
- Giving idea about describing common storage management and roles.
- Giving idea about the concept of information availability and its measurement.
- Giving idea about the Components of an Intelligent Storage System.
- Giving idea about the File Systems and Network File Sharing.

Course Outcomes:

At the end of the course the student will be able to

- Understand the Basics Of Information Storage.
- Understand the Data Center Environment.
- Understand the Data Protection Raid.
- Understand the Fiber Channel Storage Area Networks.
- Understand the Network-Attached, Object Based & Unified Storage.

UNIT-I (11 Lectures)

INTRODUCTION TO INFORMATION STORAGE:

Information Storage, Evolution of Storage Architecture, Data Center Infrastructure, Virtualization and Cloud Computing

UNIT-II (11 Lectures)

DATA CENTER ENVIRONMENT:

Application, Database Management System (DBMS), Host (Compute), Connectivity, Storage, Disk Drive Components, Disk Drive Performance, Host Access to Data, Direct-Attached Storage , Storage Design Based on Application Requirements and Disk Performance, Disk Native Command Queuing , Introduction to Flash Drives, Concept in Practice: VMware ESXi.

UNIT-III (12 Lectures)

DATA PROTECTION: RAID:

RAID Implementation Methods , RAID Array Components, RAID Techniques , RAID Levels , RAID Impact on Disk Performance, RAID Comparison, Hot Spares.

INTELLIGENT STORAGE SYSTEMS:

I Components of an Intelligent Storage System, Storage Provisioning, Types of Intelligent Storage Systems, Concepts in Practice: EMC Symmetric and VNX.

STORAGE NETWORKING TECHNOLOGIES

UNIT-IV (12 Lectures)

FIBRE CHANNEL STORAGE AREA NETWORKS:

Fibre Channel: Overview, The SAN and Its Evolution, Components of FC SAN , FC Connectivity, Switched Fabric Ports, Fibre Channel Architecture, Fabric Services , Switched Fabric Login Types, Zoning, FC SAN Topologies, Virtualization in SAN, Concepts in Practice: EMC Connectrix and EMC VPLEX .

IP SAN and FCoE : FCIP, FCoE.

UNIT-V (13 Lectures)

NETWORK-ATTACHED STORAGE :

General-Purpose Servers versus NAS Devices, Benefits of NAS, File Systems and Network File Sharing, Components of NAS, NAS I/O Operation, NAS Implementations, NAS File-Sharing Protocols, Factors

Affecting NAS Performance, File-Level Virtualization, Concepts in Practice: EMC Isilon and EMC VNX Gateway.

OBJECT-BASED AND UNIFIED STORAGE:

Object-Based Storage Devices, Content-Addressed Storage, CAS Use Cases, Unified Storage, Concepts in Practice: EMC Atoms, EMC VNX, and EMC Centera.

TEXT BOOKS:

1. G.Somasundaram, A.Shrivastava, *"EMC Corporation, Information Storage and Management: Storing, Managing and Protecting Digital Information in Classic, Virtualized and Cloud Environment"*, 2nd Edition, Wiley publication, 2012.
2. Robert Spalding, *"Storage Networks: The Complete Reference"*, 1st Edition, Tata McGraw Hill/Osborne, 2003.

REFERENCES:

1. Marc Farley, *"Building Storage Networks"*, 2nd Edition, Tata McGraw Hill/Osborne, 2001.
2. Meeta Gupta, *"Storage Area Network Fundamentals"*, 1st Edition, Pearson Education, 2002.

ARTIFICIAL INTELLIGENCE
(ELECTIVE-1)
(Common to CSE & IT)

Course Code :13CT1127

L	T	P	C
4	0	0	3

Course Educational Objectives:

The main objective of the course is to introduce Artificial Intelligence, Knowledge Representation and Game Playing. Upon completion of this course, the student should be able to:

- Learn what AI is?
- Define problems, problem space and search spaces.
- Learn heuristic search techniques.
- Know the knowledge representation.
- About game playing.

Course Outcomes:

At the end of the course the student will be able to

- Understand the Basics of Artificial Intelligence.
- Understand the Searching for solutions, uninformed search strategies.
- Understand the Knowledge Representation & First Order Logic.
- Understand the Planning, Uncertainty and Practice.
- Understand the Basics of neural networks.

UNIT-I (14 Lectures)

INTRODUCTION:

AI problems, foundation of AI and history of intelligent agents, Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

SEARCHING:

Searching for solutions, uninformed search strategies- Breadth first search, depth first search, Search with partial information (Heuristic search) Greedy best first search , A*search. Game Playing: Adversarial search, Games, minimax algorithm, optimal decisions in multiplayer games, Alpha Beta pruning, Evaluation functions, cutting of search.

UNIT-II (12 Lectures)

KNOWLEDGE REPRESENTATION:

Knowledge Based agents, the Wumpus world, logic, propositional logic, Resolution patterns in propositional logic, Resolution, Forward and Backward chaining.

FIRST ORDER LOGIC:

Inference in first order logic, propositional vs first order inference, unification and lifts, forward chaining, backward chaining, resolution

UNIT-III (12 Lectures)

PLANNING :

Classical planning problem, Language of planning problems, Expressiveness and extension, planning with state-space search, Forward state space search, Backward state space search, Heuristics for state space search. Planning search, planning with state space search, partial order planning graphs.

UNIT-IV (14 Lectures)

UNCERTAINTY:

Acting under uncertainty, Basic probability notation, axioms of probability, Inference using Full joint distributions, Baye's Rule and its use. Probabilistic Reasoning: Representing knowledge in an uncertain domain, the semantics of Bayesian Networks, Efficient representation of conditional distributions. Exact inference in Bayesian networks.

PROBABILISTIC REASONING OVER TIME:

Time and Uncertainty, Inference in Temporal models, Hidden Markov models, Kalman Filters, Dynamic Bayesian Networks, Speech Recognition.

UNIT-V (10 Lectures)

LEARNING :

Forms of learning, Induction learning, Learning Decision trees, statistical learning methods, learning with complex data, learning with hidden variables-the EM algorithm, instance based learning, neural networks.

TEXT BOOKS:

1. Stuart Russel, Peter Norvig , *"Artificial Intelligence-A Modern Approach"*, 2nd Edition PHI/Pearson Education , 2003.

REFERENCES:

1. Patrick Henry Winston , *"Artificial Intelligence"*, 3rd Edition, Pearson Edition, 2001.
2. E.Rich and K.Knight , *"Artificial Intelligence"*, 3rd Edition, TMH, 2008.
3. Patterson, *"Artificial Intelligence and Expert Systems"*, 2nd Edition, PHI, 2008.

WEB REFERENCES:

http://nptel.iitm.ac.in/video.php?subjectId=106105079

MOBILE COMMUNICATIONS
(ELECTIVE- II)
(Common to CSE & IT)

Course Code :13CT1128

L	T	P	C
4	0	0	3

Pre requisites: Computer Networks.

Course Educational Objectives:

To teach students about the fundamentals of mobile communications.

- ✤ The challenges imposed by wireless transmission, at the physical, Mac, IP, and TCP layers, and possible solutions.
- ✤ Wireless communications in a LAN environment (IEEE 802.11), and in a (cellular phone) Telecommunications Environment (GSM).
- ✤ MANETs, Routing in MANETs and technologies like Bluetooth, J2ME, and WAP.
- ✤ Giving idea about Location-aware and Context-aware computing
- ✤ Giving idea about Command Listener and Item State Listener interfaces

Course Outcomes:

At the end of the course the student must be able to to

- ✤ Understand the Basics of Mobile Communications And Computing.
- ✤ Understand the Global System for Mobile Communications.
- ✤ Understand the Mobile Network Layer.
- ✤ Understand the Wireless Application Protocol.
- ✤ Understand the Database issues.

UNIT-I **(12 Lectures)**

INTRODUCTION TO MOBILE COMMUNICATIONS AND COMPUTING:

Introduction to MC, Novel applications, Limitations, and Architecture.

(Wireless) Medium Access Control :

Motivation for a specialized MAC (Hidden and exposed term

inals, Near and far terminals), SDMA, FDMA, TDMA, CDMA. Wireless LAN(IEEE802.11):

System architecture, Protocol architecture, Basic DFW MAC-DCF using CSMA/CA, DFWMAC with RTS/CTS extensions, DFWMAC-PCF with polling.

GSM :

Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover security

UNIT-II (12 Lectures)

MOBILE NETWORK LAYER :

Mobile IP (Goals, assumptions, Entities and Terminology, IP packet delivery, Agent advertisement and Discovery, Registration, Tunneling and Encapsulation, Optimizations), Dynamic Host Configuration Protocol (DHCP).

MOBILE TRANSPORT LAYER :

Traditional TCP, Indirect TCP Snooping TCP, Mobile TCP, Fast retransmit/ fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT-III (12 Lectures)

MOBILE AD HOC NETWORKS (MANETS):

Overview, Properties of a MANET, Spectrum of MANET applications, Routing and various routing algorithms (DSR, DV/DSDV, AODV, LSR/ OLSR, FSR, CGSR, ZRP), Security issues in MANETs.

UNIT-IV (12 Lectures)

WIRELESS APPLICATION PROTOCOL-WAP:

Introduction, Protocol Architecture, Treatment of protocols of all layers.

Bluetooth:

User scenarios, Physical layer, MAC layer, Networking, Security,Link Management. J2ME:Configurations, Profiles, Packages, Midlet life cycle, Display and Displayable Classes, Command Listener and ItemState Listener interfaces.

UNIT-V (12 Lectures)

DATABASE ISSUES :

Hoarding techniques, Caching invalidation mechanisms. Client server computing with adaptation, Location-aware and Context-aware computing. Transactional models in Mobile Communication Systems.

DATA DISSEMINATION:

Communications Asymmetry, Classification of new data delivery mechanisms, Push-based mechanisms, Pull-based mechanisms, Hybrid mechanisms, Selective tuning (indexing) techniques.

TEXT BOOKS :

1. Jochen Schiller, *"Mobile Communications"*, 2nd Edition, Addison-Wesley, 2004. (Chapters 1-4,7-11)
2. Stojmenovic and Cacute, *"Handbook of Wireless Networks and Mobile Computing"*,1st Edition Wiley, 2002. (Chapters 11, 15,17, 26 and 27)

REFERENCES:

1. Reza Behravanfar, *"Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML"*, 1st Edition , Cambridge University Press, October 2004,
2. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden , Schwiebert, Loren, *"Fundamentals of Mobile and Pervasive Computing"*, 1st Edition, McGraw-Hill Professional, 2005.
3. Hansmann, Merk, Nicklous, Stober, *"Principles of Mobile Computing"*, 2nd Edition Springer, 2003.
4. Martyn Mallick, *"Mobile and Wireless Design Essentials"*,1st Edition, Wiley DreamTech, 2003.

WEB REFERENCES:

1. IETF RFC's. www.ietf.org/
2. NPTEL Course Material. http://textofvideo.nptel.iitm.ac.in/1036/

ENTERPRISE RESOURCE PLANNING AND SUPPLY CHAIN MANAGEMENT
(ELECTIVE- II)

Course Code :13IT1101

L	T	P	C
4	0	0	3

Course Educational Objectives:

To explore the different strategies that are adopted in managing the different resources in business environment.

- The supply chain networks, strategies and management.
- The different metrics that are used for supply chain performance.
- ERP Marketplace and Marketplace Dynamics.
- Objective of a Supply Chain.
- The Importance Of Supply Chain Decisions.

Course Outcomes:

At the end of the course the student will be able to

- Understand the Basics of Enterprise Resource Planning.
- Understand the Business modules of an ERP package.
- Understand the ERP Marketplace and Marketplace Dynamics
- Understand the Basics of The Supply Chain.
- Understand the drivers of supply chain performance.

UNIT-I (14 Lectures)

Enterprise - An Overview(1), Benefits of ERP(6), ERP and related technologies(7), Business Process reengineering(10), Data Warehousing(11), Data Mining(12), On-line Analytical Processing(OLAP)(13), Supply Chain Management(SCM)(15).

Implementation life cycle(21), Implementation methodologies(24), Vendors and consultants(28), Contracts with vendors, consultants and employees(30), project management and monitoring(33).

UNIT-II (12 Lectures)

Business modules of an ERP package(40), Finance(41), Manufacturing(production)(42), Human Resources(43), Plant maintenance(44), Materials management(45), Quality managment(46), marketing(47).

UNIT-III (12 Lectures)

ERP Marketplace and Marketplace Dynamics(49), SAP AG(50), Oracle Corporation(51), PeopleSoft(52), JD Edwards(53), QAD Inc.(54), SSA Global(55), Lawson Software(56), Epicor(57), Intutive(58).

UNDERSTANDING THE SUPPLY CHAIN :

What is supply chain?, Historical Perspective, the objective of a supply chain, the importance of supply chain decisions, decision phases in supply chain , process view of a supply chain, examples of supply chains.

Note: Numeric's after topic are chapter number in Text Book 1.

UNIT-IV (12 Lectures)

Supply chain performance: Achieving strategic fit and scope(2): Competitive and supply chain strategies, achieving strategic fit, expanding strategic scope, obstacles to achieve strategic fit.

Supply chain drivers and metrics(3): Impellers of supply chain, drivers of supply chain performance, framework for structuring drivers, facilities, inventory, transportation, information, sourcing, pricing, obstacles to achieving the strategic fit.

UNIT-V (10 Lectures)

Information Technology in a supply chain(16): The role of IT in a supply chain, the supply chain IT framework, Customer relationship management, internal supply chain management, supply relationship management, the transaction management foundation, the future of IT in a supply chain, Risk management in IT, supply chain IT in practice, IT System selection processes - Indian Approach and Experiences.

Note: Numeric's after topic are chapter number in Text Book 2.

TEXT BOOKS:

1. Alexis Leon, *"ERP Demystified"*, 2nd Edition, Tata McGraw-Hill, 2008.
2. Sunil Chopra, Peter meindl, D. V. Karla, *"Supply Chain Management, Strategy, Planning and operation"*, 4th Edition, Pearson, 2011.

REFERENCES:

1. Vinod Kumar, Vekata Krishna, *"Enterprise Resource Planning-Concepts and Planning"*, 2nd Edition, PHI, 2011.
2. David Simchi-Levi, Philip Kaminsky, and Edith Simchi-Levi, *"Designing and Managing the Supply Chain: Concepts, Strategiesand Case Studies"*, 2nd Edition, TMH, 2003.

INFORMATION RETRIEVAL SYSTEMS

(Elective- II)

Course Code :13IT1102	L	T	P	C
	4	0	0	3

Course Educational Objectives:

This course is to introduce fundamental concepts of information retrieval and the procedures for evaluating information retrieval tool

- Giving idea about the existing problems and potentials of current IR systems.
- learn and use different retrieval algorithms and systems.
- Giving idea about k-gram indexes for spelling correction.
- Giving idea about Dictionary compression.
- Giving idea about Parametric and zone indexes.

Course Outcomes:

At the end of the course the student will be able to

- Understand the retrieval of relevant information from a text database.
- Understand the Term Vocabulary And Postings Lists.
- Understand the Index Construction.
- Understand the Index Compression.
- Understand the Vector Space Model.

UNIT-I (14 Lectures)

BOOLEAN RETRIEVAL:

An example information retrieval problem, A first take at building an inverted index, Processing Boolean queries, The extended Boolean model versus ranked retrieval.

THE TERM VOCABULARY AND POSTINGS LISTS :

Document delineation and character sequence decoding, Obtaining the character sequence in a document, Choosing a document unit, Determining the vocabulary of terms ,Tokenization, Dropping common terms: stop words,

Normalization (equivalence classing of terms) stemming and lemmatization, Faster postings list intersection via skip pointers, Positional postings and phrase queries , Biword indexes , Positional indexes , Combination schemes

UNIT-II (12 Lectures)

DICTIONARIES AND TOLERANT RETRIEVAL :

Search structures for dictionaries ,Wildcard queries, General wildcard queries, k-gram indexes for wildcard queries, Spelling correction , Implementing spelling correction, Forms of spelling correction , Edit distance , k-gram indexes for spelling correction, Context sensitive spelling correction , Phonetic correction.

INDEX CONSTRUCTION :

Hardware basics , Blocked sort-based indexing , Single-pass in-memory indexing , Distributed indexing , Dynamic indexing , Other types of indexes

UNIT-III (12 Lectures)

INDEX COMPRESSION:

Statistical properties of terms in information retrieval, Heaps' law: Estimating the number of terms , Zipf's law: Modeling the distribution of terms , Dictionary compression , Dictionary as a string , Blocked storage , Postings file compression, Variable byte codes , ã codes.

SCORING, TERM WEIGHTING :

Parametric and zone indexes, Weighted zone scoring, Learning weights, The optimal weight g, Term frequency and weighting , Inverse document frequency, Tf-idf weighting.

UNIT-IV **(12 Lectures)**

THE VECTOR SPACE MODEL:

The vector space model for scoring, Dot products , Queries as vectors , Computing vector scores, Variant tf-idf functions , Sublinear tf scaling, Maximum tf normalization, Document and query weighting schemes , Pivoted normalized document length

UNIT-V **(12 Lectures)**

EVALUATION IN INFORMATION RETRIEVAL :

Information retrieval system evaluation, Standard test collections , Evaluation of unranked retrieval sets , Evaluation of ranked retrieval results, Assessing relevance , Critiques and justifications of the concept of Relevance, A broader perspective: System quality and user utility ,System issues , User utility , Refining a deployed system, Results snippets.

TEXT BOOKS:

1. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, *"An Introduction to Information Retrieval"*, 1st Edition, Cambridge University Press, 2008.

REFERENCES:

1. G.G. Chowdhury, *"Introduction to Modern Information Retrieval"*, 3rd Edition, neal-schuman publishers, 2010.
2. Gerald J.Kowalski, Mark T.Maybury, *"Information storage and Retrieval systems: theory and implementation"*, 2nd Edition, kluwer academic publishers, 2009.

WEB REFERENCES:

1. http://nlp.stanford.edu/IR-book/pdf/irbookonlinereading.pdf

TECHNICAL COMMUNICATION AND SOFT SKILLS LAB

Course Code : 13HE1103

L	T	P	C
0	0	3	2

Introduction:

The introduction of the Advanced English Communication skills Lab is considered essential at B.Tech. level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context. The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

- Gathering ideas and information: organizing ideas relevantly and coherently
- Engaging in debates
- Participating in group discussions
- Facing interviews
- Writing project proposals / technical reports
- Making oral presentations
- Writing formal letters and essays
- Transferring information from non-verbal to verbal texts and vice versa
- Taking part in social and professional communication

Course Educational Objectives:

The Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the students' accuracy and fluency in English through a well-developed vocabulary, and enable them to listen to English

spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.

- To enable students face competitive exams such as, GRE, TOEFL, IELTS, UPSC and other Bank examinations.
- To enable them communicate their ideas relevantly and coherently in writing.

Course Outcomes:

- Students will be able to use language accurately, fluently and appropriately.
- They will be able to show their skills of listening, understanding and interpreting.
- They will be able to write project reports, reviews and resumes.
- They will be able to express their ideas relevant to given topics.
- Students will also exhibit advanced skills of interview, debating and discussion.

LIST OF TASKS :

1. Listening comprehension – Achieving ability to comprehend material delivered at relatively fast speed; comprehending spoken material in Standard Indian English, British English, and American English; intelligent listening in situations such as interview in which one is a candidate.
2. Vocabulary building, Creativity, using Advertisements, Case Studies etc.
3. Personality Development: Decision-Making, Problem Solving, Goal Setting, Time Management & Positive Thinking
4. Cross-Cultural Communication : Role-Play/ Non-Verbal Communication.
5. Meetings- making meeting effective, chairing a meeting, decision-making, seeking opinions , interrupting and handling interruptions, clarifications, closure- Agenda, Minute writing

6. Group Discussion – dynamics of group discussion, Lateral thinking, Brainstorming and Negotiation skills

7. Resume writing – CV – structural differences, structure and presentation, planning, defining the career objective

8. Interview Skills – formal & informal interviews,concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing

9. Writing Skills - Business Communication, Essays for competitive examinations.

10. Technical Report Writing/ Project Proposals – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.- Feasibility, Progress and Project Reports.

REFERENCES:

1. Simon Sweeny, *"English for Business Communication"*, CUP, First South Asian Edition, 2010.

2. M. Ashraf Rizvi, *"Effective Technical Communication"*, Tata McGraw-Hill Publishing Company Ltd. 2005.

3. Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, *"English Language Communication: A Reader cum Lab Manual"*, Anuradha Publications, Chennai, 2006.

4. Dr. Shalini Verma, *"Body Language- Your Success Mantra"*, S. Chand, 2006.

5. Andrea J. Rutherford, *"Basic Communication Skills for Technology"*, 2nd Edition, Pearson Education, 2007.

6. Sunita Mishra & C. Muralikrishna, *"Communication Skills for Engineers"*, Pearson Education, 2007.

7. Jolene Gear & Robert Gear, *"Cambridge Preparation for the TOEFL Test"*, 2010.

8. Meenakshi Raman & Sangeeta Sharma, *"Technical Communication"*, Oxford University Press, 2011.

9. Nick Ceremilla & Elizabeth Lee- Cambridge *"English for the Media"* CUP, 2010.

10. R.C. Sharma, Krishna Mohan, *"Business Correspondence and Report writing"*, 4th Edition, Tata Mcgraw-Hill Publishing Co. Ltd., 2010.

11. DELTA's key to the Next Generation TOEFL Test: *"Advanced Skill Practice,"* New Age International (P) Ltd., Publishers, New Delhi. 2010.

12. Books on TOEFL/GRE/GMAT/CAT by Barron's/ CUP, 2011.

13. IELTS series with CDs by Cambridge University Press, 2010.

BASIC COMPUTATIONS LAB

Course Code : 13ES11BC

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to enable the student to learn the basics of MATLAB Toolbox and to solve general mathematical problems.

Course Outcomes:

- ✤ Student will able to solve mathematical problems numerically.
- ✤ The student able to solve ODE-IVP, ODE-BVP, Regression using MAT LAB.

LIST OF EXERCISES:

1. Basic commands like representing arrays, matrices, reading elements of a matrix, row and columns of matrices, random numbers.
2. Round, floor ceil, fix commands.
3. Eigen values and Eigen vectors of a matrix.
4. Plotting tools for 2-D and 3-D plots, putting legends, texts, using subplot tool for multiple plots, log-log and semilog plots.
5. Linear Regression and polynomial regression, Interpolation.
6. Non linear regression.
7. Solving non linear algebraic equations.
8. ODE IVP problems using Runge - Kutta method.
9. Using quadrature to evaluate integrals (1-D, 2-D and 3-D cases).
10. Control statements like switch, if else statement etc.
11. Write a Matlab code for reading an image and to display its negative effect .
12. Write a Matlab code for embedding Salt & Pepper Noise using “imnoise” inbuilt function and perform median filtering on the noisy image by varying mask size and observe the filtering performance.

COMPUTER NETWORKS AND CASE TOOLS LAB

Course Code :13IT1103

L	T	P	C
0	0	3	2

Course Educational Objectives:

To make the student learn the design of computer networks and design various software models using object oriented modeling. Upon completion of this course, the student should be able to:

- Giving idea of Data Link Layer.
- Giving idea of CRC (Cyclic Redundancy Checking).
- Giving idea of Dijkstra 's algorithm.
- Giving idea of subnet graphs with weights indicating delay between nodes.
- Implement routing algorithms and encryption, decryption algorithms.

Course Outcomes:

At the end of the course the student will be able to

- Understand the error detection and correction.
- Understand the Internet layer.
- Understand the Network Layer
- Understand the Transport Layer.
- Understand the Model different views of case studies and create documentation of the project.

LIST OF PROGRAMMES :

PART-A:

1. Implement the data link layer framing methods such as character stuffing and bit stuffing.

2. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC 32 .
3. Implement Dijkstra 's algorithm to compute the Shortest path through a graph.
4. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node using distance vector routing algorithm.
5. Take a 64 bit playing text and encrypt the same using DES algorithm.
6. Write a program to break the above DES coding.
7. Using RSA algorithm Encrypt a text data and Decrypt the same.

PART-B:

1. The student should take up the case study of Unified Library application which is mentioned in the theory, and Model it in different views i.e Use case view, logical view, component view, Deployment view, Database design, forward and Reverse Engineering, and Generation of documentation of the project.
2. Student has to take up another case study of his/her own interest and do the same what ever mentioned in first problem. Some of the ideas regarding case studies are given in REFERENCES which were mentioned in theory syllabus can be referred for some idea.

   Note : The analysis, design, coding, documentation, database design of mini project which will be carried out in 4th year should be done in object-oriented approach using UML and by using appropriate software which supports UML, otherwise the mini project will not be evaluated.
3. Take an example subnet of hosts. Obtain broadcast tree for it

SYLLABI FOR VII SEMESTER

EMBEDDED SYSTEMS - 2

(Common to CSE & IT)

Course Code :13CT1129

L	T	P	C
4	1	0	3

Pre requisites: Embedded Systems - 1

Course Educational Objectives:

To present to the student the computational devices, peripherals and networks along with software and hardware description languages.

- To provide students fundamental concept and insight for advance ARM7 and PIC32 Processor based architecture and programming Embedded System based on ARM
- PIC32 powered MCU for application in control, multimedia, Mobiles, wireless communication.
- It exposes students to the field of Embedded Systems and gives them a chance to hear and read about embedded system topics, and then put those concepts to work by developing and debugging embedded system hardware and firmware.
- The students will have the opportunity to develop various Embedded Systems from the ground up, starting with electronic components and data sheets.
- Progressing through construction of hardware and implementation of firmware.

Course Outcomes:

At the end of the course the student will be able to

- Understand the essentials of the ARM7 instruction set and its registers and able to write programs in assembly language for real time problems.

- ✤ Understand the essentials of the PIC32 instruction set and its registers and able to write programs in assembly language for real time problems.
- ✤ Design their application by interfacing System Peripherals and external sensors.
- ✤ Understand modern communication protocols starting with addressable USART, SPI bus, 12C bus and USB; their characteristics protocols and usage in high speed communication.
- ✤ Know the basics of In Circuit Emulation techniques using JTAG.

UNIT-I **(12 Lectures)**

The ARM Architecture: ARM / THUMB register organization, Modes of operations, The bus structure and the peripherals, memory organization, load store instruction set, addressing modes. Basic assembly language programming (64 bit addition, string operations, block transfer).

UNIT-II **(12 Lectures)**

ARM interfacing programs: GPIO, Timers, Counters, PWM, ADC. Application coding examples: Measurement and control of time, frequency velocity acceleration, power control and touch monitoring.

UNIT-III **(12 Lectures)**

Introduction to MIPS processor architecture in PIC 32 bit family, CPU architecture and a detailed introduction to peripherals, present. GPIO, timers, capture control and PWM features. Instruction set usage with application examples.

(http://ww1.microchip.com/downloadsEditionn/DeviceDoc/61146B.pdf)

UNIT-IV **(12 Lectures)**

PIC 32 Interrupts, modes and vectored interrupt priority processing using the many shadow registers. Interfacing programs using interrupts. Measurement of time, frequency, velocity & acceleration.

UNIT-V **(12 Lectures)**

Modern communication protocols starting with addressable USART, SPI bus, 12C bus and USB; their characteristics protocols and usage in high speed communication. Introduction to In

TEXT BOOKS:

1. B.Kanta Rao, *"Embedded Systems"*, 1st Edition, PHI Learning Private Limited, 2011. (Units 1, 2, 5)
2. Trevor Martin, *"Introduction to the LPC2000"*, 1st Edition, Hitex (UK) Ltd, 2005. (Units 1, 2, 5)
3. Lucio Di Jasio, *"Programming 32-bit Microcontrollers in C Exploring the PIC 32"*, 1st Edition, Newnes, 2008. (Units3, 4)

REFERENCES:

1. A.N.Sloss, D.Symes and C. Wright, *"RM system's Developer Guide, Designing an Optimizing system software"*, 1st Edition, Morgann Kaufmann Publishers, 2004.
2. Steve Furber, *"ARM system on Chip Architecture"*, 2nd Edition, Adison Wesley Publishers, 2000.
3. David Seal, *"ARM Architecture reference Manual"*, 2nd Edition, Adison Wesley Publishers, 2001.
4. http://ww1.microchip.com/downloadsEdition/DeviceDoc/61146B.pdf (Unit 5)

WEB REFERENCES:

1. http://www.nptel.iitm.ac.in/video.php?subjectId=108102045

MULTIMEDIA AND APPLICATION DEVELOPMENT

Course Code :13IT1104

L	T	P	C
4	0	0	3

Course Educational Objectives:

The course aims at developing theoretical and practical knowledge of multimedia among the students. After the completion of the course the student will be able to

- Use Action Script 3.0 to develop interactive multimedia applications.
- To use different compression techniques during multimedia application development.
- Create, manipulate and incorporate multimedia building blocks.
- Understand and apply theoretical considetations and practical knowledge of the multimedia development process.
- Choose a suitable multimedia communication mechanism for a particular multimedia applications.

Course Outcomes :

At the end of the course the student will be able to

- Understand fundamental concepts of multimedia.
- Understand different issues in multimedia data communication and storage.
- Learn action script programming skills required for development of multimedia applications using Flash.
- To effective use and produce multimedia elements and products.
- To understand the intricacies of multimedia communications.

UNIT-I (13 Lectures)

INTRODUCTION TO MULTIMEDIA:

What is Multimedia? Multimedia and Hypermedia, World Wide Web, Overview of Multimedia Software Tools. Graphics and Image Data Representations: Graphics/Image Data Types.

ACTION SCRIPT 3.0 CORE CONCEPTS:

Tools for writing action script code, Flash client runtime environments, compilation, just in time compilation, classes and objects, creating a program, packages, defining a class, variable and values, constructor parameters and arguments.

COLOR IN IMAGE AND VIDEO:

color science, color models in images, color models in video.

ACTION SCRIPT 3.0 CONDITIONALS, LOOPS AND FUNCTIONS:

conditionals, loops, Boolean logic. Functions: package-level functions, nested functions, source-file-level functions, accessing definitions from within a function, functions as values.

UNIT-II (12 Lectures)

FUNDAMENTAL CONCEPTS IN VIDEO AND DIGITAL AUDIO:

Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

ACTION SCRIPT 3.0 DATA TYPES AND TYPE CHECKING:

Data types and type annotations, un typed variables, parameters, return values, strict modes three special cases, warnings for missing type annotations, detecting reference errors at compile time, casting ,conversion to primitive types, default variable values, null and undefined.

UNIT-III (12 Lectures)

MULTIMEDIA DATA COMPRESSION :

Lossless compression algorithms: Run-Length Coding, Variable Length Coding, and Dictionary Based Coding. Lossy compression algorithms: Quantization, Transform Coding, Wavelet-Based Coding.

ACTION SCRIPT 3.0 INHERITANCE :

A primer on inheritance, overriding instance methods, constructor methods in sub classes, preventing classes from being extended and methods from being overridden.

UNIT-IV (12 Lectures)

BASICS OF VIDEO COMPRESSION :

Introduction to Video Compression, Video Compression with Motion Compensation, Search for Motion Vectors

ACTION SCRIPT 3.0 INTERFACES :

The case for interfaces, interfaces and multiple data type classes, interface syntax and use, another multiple type example.

VIDEO CODING :

Overview of MPEG-1, MPEG-2 and MPEG-4. Motion compensation in MPEG-1, MPEG-2 Profiles, Object-based Visual Coding in MPEG-4, Synthetic Object Coding in MPEG-4, MPEG- 4 Object types, Profile and Levels.

ACTION SCRIPT 3.0 ARRAYS :

What is an array?, the anatomy of an array, creating an array, using single dimensional and ,multi dimensional arrays.

UNIT-V (12 Lectures)

MULTIMEDIA NETWORKS :

Basics of Multimedia Networks, Quality of Multimedia Data Transmission.

ACTION SCRIPT 3.0 EVENTS AND EVENT HANDLING:

Action script event basics, accessing the target Object, Accessing the object that registered the listener, preventing default event behavior, Event Listener priority, Event listeners and memory management.

MULTIMEDIA COMMUNICATION :

Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-on Demand (MOD). ACTION SCRIPT 3.0 :The exception handling cycle, handling multiple types of exceptions, exception bubbling, The finally block, nested exceptions.

TEXT BOOKS:

1. Ze-Nian Li and Mark S.Drew, *"Fundamentals of Multimedia"*, 1st Edition, PHI/Pearson Education,2009.

2. Colin Moock, *"Essential ActionScript 3.0"*, 1st Edition, SPD O'Reilly, 2007.

REFERENCES:

1. Nigel Chapman and Jenny Chapman, *"Digital Multimedia"*, 3rd Edition, Wiley Dreamtech, 2009.
2. Steve Heath, *"Multimedia and Communications Technology"*, 2nd Edition, Elsevier (Focal Press), 1999.
3. Steinmetz, Ralf, Nahrstedt, *"Multimedia Applications"*, 1st Edition, Springer, 2004.
4. Weixel, *"Multimedia Basics"*, 2nd Edition, Thomson Press, 2006.

UNIX NETWORK PROGRAMMING
(Common to CSE & IT)

Course Code :13CT1130

L	T	P	C
4	0	0	3

Course Educational Objectives:

To teach the students how to write programs that communicates with other programs across a computer network.

- ✤ The student shall be able to write their own network programs in UNIX.
- ✤ To provide an opportunity to do network programming using TCP sockets.
- ✤ To provide an opportunity to do network programming using UDP sockets.
- ✤ To provide to do IPC programs.
- ✤ To know The importance of platform independent networks

Course Outcomes:

At the end of the course the student should be able to:

- ✤ Get familiar with the variety of interfaces and frameworks for writing network applications.
- ✤ Get the knowledge of Interfaces, STREAMS, sockets, and remote procedure call libraries.
- ✤ Know the basic steps and underlying mechanisms of writing programs using the client-server model.
- ✤ To get knowledge on I/O Multiplexing, UDP Sockets, Name and Address Conversions.
- ✤ Using UNIX socket system calls (socket, bind, listen, connect etc.). Writing a client. Using select to manage multiple I/O streams

UNIT-I (10 Lectures)

INTRODUCTION TO NETWORK PROGRAMMING:

OSI model, Unix standards, TCP and UDP, TCP connection establishment and termination, Buffer sizes and limitations, Standard Internet services, Protocol usage by common internet applications.

UNIT-II (14 Lectures)

SOCKETS:

Address structures, Value – result arguments, Byte ordering and manipulation functions and related functions. Elementary TCP sockets – socket, connect, bind, listen, accept, fork and exec functions, concurrent servers, close function and related functions.

UNIT-III (10 Lectures)

TCP CLIENT SERVER EXAMPLE:

Introduction, TCP Echo server and client functions, Normal startup and Termination, Signal handling, Server process termination, Crashing and Rebooting of server host, Shutdown of server host.

I/O MULTIPLEXING: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server.

UNIT-IV (13 Lectures)

ELEMENTARY UDP SOCKETS:

Introduction, recvfrom and sendto functions, UDP Echo server and client functions, Lost datagrams, , Lack of flow control with UDP, determining outgoing interface with UDP, TCP and UDP echo server using select.

ELEMENTARY NAME AND ADDRESS CONVERSIONS:

DNS, gethostbyname function, Resolver option, gethostbyname2 function and IPV6 support, uname function, getserverbyname and getservbyport functions, other networking information.

UNIT-V (14 Lectures)

IPC:

Introduction, File and record locking, Pipes, FIFOs, streams and messages, Message queues, Semaphores, Shared memory.

REMOTE LOGIN:

Terminal line disciplines, Pseudo-Terminals, Terminal modes, Control Terminals, RPC Transparency Issues.

TEXT BOOKS:

1. W.Richard Stevens, UNIX Network Programming, Sockets API, Volume I, 3rd Edition, PHI , 2010.
2. W.Richard Stevens, UNIX Network Programming, Volume II, 1st Edition, PHI, 2009.

REFERENCES:

1. T Chan, *"UNIX Systems Programming using C++"*, 1st Edition, PHI, 2010.
2. Graham Glass, King abls, *"UNIX for Programmers and Users"*, 3rd Edition, Pearson Education, 2010.
3. M.J. Rochkind, *"Advanced UNIX Programming"*, 2nd Edition, Pearson Education, 2008

INFORMATION SECURITY

Course Code :13IT1105

L	T	P	C
4	1	0	3

Course Educational Objectives:

To gives an idea about the security issues and how to secure the information from unauthorized users and they implement the respective algorithms.

- ✤ Analyze basic Encryption and Decryption algorithms.
- ✤ Understand cryptographic data integrity algorithms.
- ✤ Understand Key management and distribution of keys.
- ✤ Understand security in the web, e-mail security.
- ✤ Understand intrusion detection, malicious software and firewalls.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Get a high level understanding of how information security functions in an organization.
- ✤ Understand information security and its importance.
- ✤ Understand how threats to an organization are discovered, and analyzed.
- ✤ Master the key concepts of information security and how they "work".
- ✤ Work and interact collaboratively in groups to examine, understand and explain key aspects of information security.

UNIT-I (12 Lectures)

OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A model for Internetwork security

Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques , Block Cipher Principles, Data

Encryption Standard ,DES Example , Strength of DES , Multiple Encryption and Triple DES , Advanced Encryption Standard, Stream Ciphers, RC4 (Text book 1)

UNIT-II **(12 Lectures)**

Public-Key Cryptography: Public-Key Cryptography and RSA, Other Public-Key Cryptosystems(Diffie-Hellman Key Exchange, Elliptic Curve Cryptography

Cryptographic Hash Functions , Message Authentication Codes: Message Authentication Requirements, Message Authentication Functions, Requirements for Message Authentication Codes, Security of MACs, MACs Based on Hash Functions: HMAC , Digital Signature Standard (Text book 1)

UNIT-III **(12 Lectures)**

Key Management and Distribution: Symmetric Key Distribution using Symmetric Encryption, Symmetric Key Distribution using Asymmetric Encryption, Distribution of Public Keys, X.509 Certificates, Kerberos (Text book 1)

UNIT-IV **(12 Lectures)**

Transport-Level Security: Web Security Issues, Secure Sockets Layer (SSL), Transport Layer Security (TLS), HTTPS

Electronic Mail Security: Pretty Good Privacy, S/MIME (Text book 2)

UNIT-V **(12 Lectures)**

IP Security :IP Security Overview, IP Security Policy, Encapsulating Security Payload, Combining Security Associations, Internet Key Exchange, Intruders, Malicious Software, Firewalls (Text book 2)

TEXT BOOKS:

1. William Stallings, *"Cryptography and Network Security Principles and Practices"*, 5th Edition, PHI/Pearson, 2011.
2. William Stallings, *"Network Security Essentials : Applications and Standards"*, 4th Edition, Pearson Education,2011.

REFERENCES:

1. Eric Maiwald, *"Fundamentals of Network Security"*, 1st Edition, Dreamtech press,2008.
2. Charlie Kaufman,Radia Perlman and Mike Speciner, *"Network Security Private Communication in a Public World"*, 2nd Edition, Pearson/PHI, 2009.
3. Whitman, *"Principles of Information Security"*, 3rd Edition, Thomson, 2008.
4. Robert Bragg, Mark Rhodes, *"Network Security The complete Reference"*, 4th Edition, TMH, 2009.
5. Buchmann, *"Introduction to Cryptography"*, 2nd Edition, Springer, 2009.

WEB REFERENCES:

http://nptel.iitm.ac.in/courses/106105031

MIDDLEWARE TECHNOLOGIES

(Common to CSE & IT)

Course Code :13CT1131

L	T	P	C
4	0	0	3

Course Educational Objectives:

The main objective of the course is to create a practical, wide-ranging discussion on Middleware Technologies to help students understand what is going on so they can pick out the real issues from the imaginary issues and start building complex distributed systems with confidence. Upon completion of this course the students will be able to

- ✤ Understand Distributed systems design and implementation
- ✤ Understand existing Distributed Technologies
- ✤ Use Middleware to Build Distributed Applications
- ✤ Understand Middleware Interoperability
- ✤ Understand Web services architectures

Course Outcomes:

At the end of the course the student will be able to

- ✤ Learn how to use Middleware to Build Distributed Applications
- ✤ Implement Business Processes
- ✤ Learn about MiddleWare Technologies
- ✤ Implement Business Processes
- ✤ Learn application design and IT architecture

UNIT-I (12 Lectures)

INTRODUCTION:

Moving to e-business, what is IT architecture? Why is this different from what we did before? Rewrite or evolve? , Who develops the architecture? Early days, Preliminaries, Remote procedure calls, Remote database access, Distributed transaction processing, Message queuing, Message queuing versus distributed transaction processing, what happened to all this technology?

OBJECTS, COMPONENTS, AND THE WEB:

Using object middleware, Transactional component middleware, COM, EJB, Final comments on TCM, Internet Applications.

WEB SERVICES: Service concepts, Web services, and Using Web services: A pragmatic approach.

UNIT-II (12 Lectures)

A TECHNICAL SUMMARY OF MIDDLEWARE:

Middleware elements, The communications link, The middleware protocol, The programmatic interface, Data presentation, Server control, Naming and directory services, Security, System management, Comments on Web services, Vendor architectures, Vendor platform architectures, Vendor-distributed architectures, Using vendor architectures, Positioning, Strawman for user target architecture, Marketing, Implicit architectures, Middleware interoperability.

UNIT-III (12 Lectures)

USING MIDDLEWARE TO BUILD DISTRIBUTED APPLICATIONS:

What is middleware for? Support for business processes, Information retrieval, Collaboration, Tiers, The presentation tier, The processing tier, The data tier, Services versus tiers, Architectural choices, Middleware bus architectures, Hub architectures, Web services architectures, Loosely coupled versus tightly coupled.

UNIT-IV (12 Lectures)

SECURITY:

What security is needed, Traditional distributed system security, Web services security, Architecture and security.

APPLICATION DESIGN AND IT ARCHITECTURE

:Problems with today's design approaches, Design up front or as needed?, The role of business rules, Existing systems, Reuse, Silo and monolithic development, The role of architecture, Levels of design, Reconciling design approaches.

UNIT-V (12 Lectures)

IMPLEMENTING BUSINESS PROCESSES:

What is a process? Business processes, Information and processes, Architecture process patterns, Clarification and analysis, Error Handling, Timing, Migration, Flexibility.

TEXT BOOKS:

1. Chris Britton and Peter Eye, *"IT Architectures and Middleware: Strategies for Building Large, Integrated Systems"*, 2nd Edition, Pearson Education, 2004.

REFERENCES:

1. Qusay H. Mahmoud, *"Middleware for Communications"*, 1st Edition, John Wiley and Sons,2004.
2. Michah Lerner, *"Middleware Networks: Concept, Design and Deployment of Internet Infrastructure"*, 1st Edition, Kluwer Academic Publishers, 2000.

SOFTWARE PROJECT MANAGEMENT

(Elective – III)

(Common to CSE & IT)

Course Code :13CT1132

L	T	P	C
4	0	0	3

Pre requisites: Software Engineering.

Course Educational Objectives:

The main objective of the course is to make students understand how to manage software projects.

- ✤ To understand the draw backs of traditional project management methods.
- ✤ To understand the principles of modern software project management.
- ✤ To understand the improving software economics.
- ✤ To understand the model based software architectures.
- ✤ To show how to reduce rework, labor-intensiveness, expenditure and produce a project within schedule.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Understand ethical issues related to software project management.
- ✤ Apply this ethical knowledge in practical situations.
- ✤ Understand how different management and development practices process quality.
- ✤ Understand how different management and development practices affect software.
- ✤ get idea about workflows of the process.

UNIT-I (12 Lectures)

CONVENTIONAL SOFTWARE MANAGEMENT:

The Waterfall Model, Conventional Software Management Performance.

EVOLUTION OF SOFTWARE ECONOMICS:

Software Economics, Pragmatic Software Cost Estimation.

IMPROVING SOFTWARE ECONOMICS:

Reducing Software Product Size, Improving Software Processes, Improving Team Effectiveness, Improving Automation through Software Economics, Achieving Required Quality, Peer Inspections.

UNIT-II (12 Lectures)

THE OLD WAY AND THE NEW:

The Principles of Conventional Software Engineering, The Principles of Modern Software Management, Transitioning to an Iterative Process.

LIFE CYCLE PHASES: Engineering and Production Stages, Inception Phase, Elaboration Phase, Construction Phase, Transition Phase.

ARTIFACTS OF THE PROCESS:

The Artifact Sets, Management Artifacts, Engineering Artifacts, Pragmatic Artifacts.

UNIT-III (12 Lectures)

MODEL BASED SOFTWARE ARCHITECTURES:

A Management Perspective, A Technical Perspective.

WORKFLOWS OF THE PROCESS:

Software Process Workflows, Iteration Workflows.

CHECKPOINTS OF THE PROCESS:

Major Milestones, Minor Milestones, Periodic Status Assessments.

ITERATIVE PROCESS PLANNING:

Work Breakdown Structures, Planning Guidelines, The Cost and Schedule Estimating Process, The Iteration Planning Process.

UNIT-IV (12 Lectures)

PROJECT ORGANIZATION AND RESPONSIBILITIES:

Line-Of-Business Organizations, Project Organizations, Evolution of Organizations.

PROJECT CONTROL AND PROCESS INSTRUMENTATION:

The Seven Core Metrics, Management Indicators, Quality Indicators Modern Project Profiles, Next-Generation Software Economics. The COCOMO Cost Estimation Model: COCOMO

UNIT-V (12 Lectures)

EFFORT ESTIMATION AND SCHEDULING:

Effort Estimation, Scheduling

QUALITY PLANNING:

Quality Concepts, Quantitative Quality Management Planning.

RISK MANAGEMENT: Risk Assessment, Risk Control.

(VIII Unit from Pankaj Jalote)

TEXT BOOKS:

1. Walker Royce, *"Software Project Management – A Unified Framework"*, 1st Edition, Pearson Education, 2002.
2. Pankaj Jalote, *"Software Project Management in Practice"*, 1st Edition, Pearson Education, 2002.

REFERENCES:

1. Bob Hughes, *"Mike Cotterell, Rajib Mall, Software Project Management"*, 5th Edition, The McGraw-Hill Higher Education, 2011.
2. Joel Henry, *"Software Project Management"*, 1st Edition, Pearson Education, 2004.

BIO-INFORMATICS
(ELECTIVE-III)
(Common to CSE & IT)

Course Code :13CT1133

L	T	P	C
4	0	0	3

Course Educational Objectives:

The main objective of the course is to make students understand the concepts of Bio-informatics in the leading applications in engineering field.

- ✤ Understand protein information resources.
- ✤ Understand the genome information resources.
- ✤ Understand the DNA sequence analysis,
- ✤ To understand pair wise alignment techniques.
- ✤ Understand multiple sequence alignment.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Learn about DNA and its Sequences,
- ✤ To get idea about DNA Databases.
- ✤ Understand pair wise alignment techniques.
- ✤ Learn about Biological databases.
- ✤ To get idea about multiple sequence alignment

UNIT-I (12 Lectures)

INTRODUCTION:

Definitions, Sequencing, Biological sequence/structure, Genome Projects, Pattern recognition an prediction, Folding problem, Sequence Analysis, Homology and Analogy.

PROTEIN INFORMATION RESOURCES:

Biological databases, Primary sequence databases, Protein Sequence databases, Secondary databases, Protein pattern databases, and Structure classification databases.

UNIT-II (12 Lectures)

GENOME INFORMATION RESOURCES:

DNA sequence databases, specialized genomic resources

DNA SEQUENCE ANALYSIS:

Importance of DNA analysis, Gene structure and DNA sequences, Features of DNA sequence analysis, EST (Expressed Sequence Tag) searches, Gene hunting, Profile of a cell, EST analysis, Effects of EST data on DNA databases.

UNIT-III (12 Lectures)

PAIR WISE ALIGNMENT TECHNIQUES:

Database searching, Alphabets and complexity, Algorithm and programs, Comparing two sequences, sub-sequences, Identity and similarity, The Dotplot, Local and global similarity, different alignment techniques, Dynamic Programming, Pair wise database searching.

UNIT-IV (12 Lectures)

MULTIPLE SEQUENCE ALIGNMENT:

Definition and Goal, The consensus, computational complexity, Manual methods, Simultaneous methods, Progressive methods, Databases of Multiple alignments and searching.

SECONDARY DATABASE SEARCHING:

Importance and need of secondary database searches, secondary database structure and building a sequence search protocol.

UNIT-V (12 Lectures)

ANALYSIS PACKAGES:

Analysis package structure, commercial databases, commercial software, comprehensive packages, packages specializing in DNA analysis, Intranet Packages, Internet Packages.

TEXT BOOKS:

1. T K Attwood & D J Parry Smith Addison, *"Introduction to Bioinformatics"*, 1st Edition, Wesley Longman, 2008.
2. Jean-Michel Claveriw, Cerdric Notredame, *"Bioinformatics- A Beginner's Guide"*, 1st Edition, WILEY dreamtech India Pvt. Ltd, 2003.

REFERENCES:

1. Arthur M.Lesk, *"Introduction to Bioinformatics"*, 1st Edition, OXFORD publishers (Indian Edition), 2002.

IMAGE PROCESSING AND PATTERN RECOGNITION
(ELECTIVE III)

Course Code :13IT1106

L	T	P	C
4	0	0	3

Course Educational Objectives:

This subject aims to teach the students how a computer can emulate functions typical of human vision and enable them to design and implement image processing and pattern recognition applications

- To be familiar with Image model, sensing and acquisition, digital image representation, properties of human visual system, various applications.
- Different image processing operations for improving image quality through enhancement, restoration and filtering etc..
- Affine transformation and registration compressing data to save storage and channel capacity during transmission.
- Image segmentation for partitioning into objects and background.
- Extraction of image features, quantifying shapes, pattern recognition, image analysis

Course Outcomes:

At the end of the course the student will be able to

- Get adequate background knowledge about image processing.
- Get adequate background knowledge about pattern recognition.
- Get practical knowledge and skills about image processing tools.
- Get practical knowledge and skills about pattern recognition tools.
- Get necessary knowledge to design and implement a prototype of an image processing and pattern recognition application.

UNIT-I (12 Lectures)

THE DIGITIZED IMAGE AND ITS PROPERTIES:

Applications of image processing, image function, image representation, sampling, quantization, color images, metrics and topological properties of digital images, histograms, image quality, noise image.

UNIT-II (12 Lectures)

IMAGE PREPROCESSING:

Pixel brightness transformation, position dependent brightness correction, gray scale transformation; geometric transformation, local preprocessing-image smoothening,

edge detectors, zero-crossing, scale in image processing, canny edge detection, parametric edge models, edges in multi spectral images, local preprocessing and adaptive neighborhood pre processing; image restoration;

UNIT-III (12 Lectures)

IMAGE SEGMENTATION:

Threshold detection methods, optimal thresholding, multispectral thresholding, thresholding in hierarchical data structures; edge based image segmentation- edge image thresholding, edge relaxation, border tracing, border detection,

UNIT-IV (12 Lectures)

MATHEMATICAL MORPHOLOGY :

Basic morphological concepts, four morphological principles, binary dilation, erosion, Hit or miss transformation, opening and closing; thinning and skeleton algorithms; Morphological segmentation -particles segmentation and watersheds, particle segmentation.

IMAGE TEXTURES :

statistical texture description, methods based on spatial frequencies, co-occurrence matrices, edge frequency, and texture recognition method applications Image representation and description-representation, boundary descriptors, regional descriptors

UNIT-V (12 Lectures)

PATTERN RECOGNITION FUNDAMENTALS:

Basic concepts of pattern recognition, fundamental problems in pattern recognition system, design concepts and methodologies, example of automatic pattern recognition systems, a simple automatic pattern recognition model

TEXT BOOKS:

1. Millan sonka, Vaclav Hiavac, Roger Boyle, *"Image Processing Analysis and Machine Vision"*, 3rd Edition, CL Engineering , 2013.
2. Rafel C. Gonzalez, Richard E. Woods, *"Digital Image Processing"*, 3rd Edition, Pearson Education, 2008.

REFERENCES:

1. Julus T. Tou , Rafel C. Gonzalez, Addision, *"Pattern Recognition Principles"*, 1st Edition, Wesley publishing company.
2. Earl Gose, Richard Johnsonbaugh, *"Pattern Recognition and Image Analysis"*, 1st Edition, Prentice Hall of India Private limited, 2009.

WEB REFERENCES:

http://nptel.iitm.ac.in/courses/106108057

INFORMATION STORAGE SECURITY AND MANAGEMENT (ELECTIVE-III)

(Common to CSE & IT)

Course Code :13CT1134

L	T	P	C
4	0	0	3

Pre requisites: Information Storage Systems.

Course Educational Objectives:

The main objective of the course is to expose the students to different Backup, Archive and Replication, Business Continuity, Local Replication, Cloud Computing, Securing Storage Infrastructure. Upon completion of this course, the student should be able to:

- Describe about Information availability and Business continuity.
- Describe the backup/recovery topologies.
- Describe local replication technologies and their operation.
- Describe remote replication technologies and their operation.
- Describe processes and technologies for identifying, analyzing, and mitigating security risks in storage infrastructure.

Course Outcomes:

At the end of the course the student will be able to

- Understands the Information availability and Business continuity.
- Understand storage infrastructure, backup/recovery topologies.
- Understands local replication technologies and their operation.
- Understands remote replication technologies and their operation
- Learn about processes and technologies for identifying, analyzing, and mitigating security risks.

UNIT-I (12 Lectures)

INTRODUCTION TO BUSINESS CONTINUITY:

Information Availability, BC Terminology, BC Planning Life Cycle, Failure Analysis, Business Impact Analysis, BC Technology Solutions, Concept in Practice: EMC PowerPath.

BACKUP AND ARCHIVE:

Backup Purpose, Backup Considerations, Backup Granularity, Recovery Considerations, Backup Methods, Backup Architecture, Backup and Restore Operations Backup Topologies, Backup in NAS Environments, Backup Targets, Data De duplication for Backup, Backup in Virtualized Environments, Data Archive, Archiving Solution Architecture, Concepts in Practice: EMC NetWorker, EMC Avamar, and EMC Data Domain.

UNIT-II (12 Lectures)

LOCAL REPLICATION:

Replication Terminology, Uses of Local Replicas, Replica Consistency, Local Replication Technologies , Tracking Changes to Source and Replica, Restore and Restart Considerations, Creating Multiple Replicas, Local Replication in a Virtualized Environment, Concepts in Practice: EMC TimeFinder, EMC SnapView, and EMC RecoverPoint.

UNIT-III (12 Lectures)

REMOTE REPLICATION:

Modes of Remote Replication, Remote Replication Technologies, Three-Site Replication, Data Migration Solutions, Remote Replication and Migration in a Virtualized Environment, Concepts in Practice: EMC SRDF, EMC MirrorView, and EMC Recover Point.

CLOUD COMPUTING:

Cloud Enabling Technologies , Characteristics of Cloud Computing, Benefits of Cloud Computing, Cloud Service Models, Cloud Deployment Models, Cloud Computing Infrastructure, Cloud Challenges, Cloud Adoption Considerations, Concepts in Practice: Vblock.

UNIT-IV (12 Lectures)

SECURING THE STORAGE INFRASTRUCTURE:

Information Security Framework, Risk Triad, Storage Security Domains, And Security Implementations in Storage Networking, Securing Storage Infrastructure in Virtualized and Cloud Environments, Concepts in Practice: RSA and VMware Security Products.

UNIT-V (12 Lectures)

MANAGING THE STORAGE INFRASTRUCTURE:

Monitoring the Storage Infrastructure, Storage Infrastructure Management Activities, Storage Infrastructure Management Challenges, Developing an Ideal Solution, Information Lifecycle Management, Storage Tiering, Concepts in Practice: EMC Infrastructure Management Tools.

APPLICATIONS & EXERCISES:

Application I/O Characteristics , Parallel SCSI , SAN Design Exercises , Information Availability Exercises , Network Technologies for Remote Replication.

TEXT BOOKS:

1. G.Somasundaram, A.Shrivastava: EMC Corporation, *"Information Storage and Management: Storing, Managing and Protecting Digital Information in Classic, Virtualized and Cloud Environment"*, 2nd Edition, Wiley publication, 2012.
2. Robert Spalding, Storage Networks, *"The Complete Reference"*, 1st Edition, Tata McGraw Hill/Osborne, 2003.

REFERENCES:

1. Marc Farley, *"Building Storage Networks"*, 2nd Edition, Tata McGraw Hill/Osborne, 2001.
2. Meeta Gupta, *"Storage Area Network Fundamentals"*, 1st Edition, Pearson Education, 2002.

CLOUD COMPUTING
(ELECTIVE-III)
(Common to CSE & IT)

Course Code :13CT1135

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course introduces the fundamental concepts of cloud.

- ✤ Cloud Computing principles.
- ✤ Cloud Computing components.
- ✤ Cloud Computing architectures and implementations.
- ✤ Cloud Computing services.
- ✤ Cloud Computing Sharing

Course Oucomes:

At the end of the course the student will be able to

- ✤ Understand the fundamentals of big cloud and.
- ✤ Learn about cloud computing for the community.
- ✤ Learn about cloud services.
- ✤ Learn about cloud for the corporation.
- ✤ To know about cloud architectures.

UNIT-I (12 Lectures)

A MODEL OF VIRTUALIZATION:

What Is Virtualization, Access Virtualization: Providing Universal Access, Application Virtualization: Application Isolation, Delivery and Performance, Processing Virtualization: Doing System Tricks, Network Virtualization: Controlling the View of the Network, Storage Virtualization: Where Are Your Files and Applications, Security for Virtual Environments: Guarding the Treasure?

UNIT-II (14 Lectures)

INTRODUCTION:

Cloud Computing Introduction, From, Collaboration to cloud, Working of cloud computing, pros and cons, benefits, developing cloud computing services, Cloud service development, discovering cloud services.

CLOUD COMPUTING FOR EVERYONE:

Cloud Computing for the Family: Centralizing Email Communications, Collaborating on Schedules, Collaborating on Grocery Lists, Collaborating on To-Do Lists, Collaborating on Household Budgets, Collaborating on Contact Lists, Collaborating on School Projects, Sharing Family Photos. Cloud Computing for the Community: Communicating Across the Community, Collaborating on Schedules, Collaborating on Group Projects and Events.

UNIT-III (10 Lectures)

CLOUD COMPUTING FOR THE CORPORATION:

Managing Schedules, Managing Contact Lists, Managing Projects, Collaborating on Reports, Collaborating on Marketing Materials, Collaborating on Expense Reports, Collaborating on Budgets, Collaborating on Financial Statements, Collaborating on Presentations, Presenting on the Road Accessing Documents on the Road

UNIT-IV (12 Lectures)

CLOUD SERVICES-COLLABORATING EVENTS:

Collaborating on Calendars, Schedules, and Task Management , Collaborating on Event Management,

CLOUD SERVICES-collaborating database applications.

Collaborating on Word Processing, Collaborating on Spreadsheets, Collaborating on Databases, Collaborating on Presentations laborating on Contact Management, Collaborating on Project Management.

UNIT-V (12 Lectures)

OUTSIDE THE CLOUD:

Evaluating web mail services, Evaluating instant messaging, Evaluating web conference tools, creating groups on social networks, Evaluating on line groupware, collaborating via blogs and wikis.

STORING AND SHARING:

Understanding Cloud Storage, Evaluating Online File-Storage and -Sharing Services, Exploring Online Bookmarking Services

SHARING DIGITAL PHOTOGRAPHS AND CONTROLLING IT ALL WITH WEB-BASED DESKTOPS:

Exploring Online Photo-Editing Applications, Exploring Photo-Sharing Communities Understanding Web-Based Desktops, Evaluating Web-Based Desktops.

TEXT BOOKS:

1. Dan Kusnetzky , *"Virtualization: A Manager's Guide"*, 1st Edition ,O'Reilly,2011
2. Michael Miller, *"Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online"*, 1st Edition, Pearson Education, New Delhi, 2009.

REFERENCES:

1. Barrie Sosinsky, *"Cloud Computing Bible"*, 1st Edition ,Wiley India Pvt Ltd,2011.
2. Robert Elsenpeter, Toby J. Velte, Anthony T. Velte, *"Cloud Computing : A Practical Approach"*, 1st Edition, Tata Mcgraw Hill Education, 2011.

MULTIMEDIA AND APPLICATION DEVELOPMENT LAB

Course Code :13IT1107

L	T	P	C
0	0	3	2

Course Educational Objectives:

The course is designed to ensure that students possess a broad range of computing knowledge and skills, and it includes core modules in general software design and development, as well as in scripting technologies specific for web development.

- ✤ Learn Action Script 3.0 programming concepts.
- ✤ Apply different types of tweening to user created objects.
- ✤ Know multimedia effects in FlashCS5.
- ✤ Develop web pages based on flash animations.
- ✤ To develop an application using flash along with action script.

Course Outcomes:

At the end of the lab course the students will be able to

- ✤ Learn Real-world skills related to technology, effective collaboration techniques.
- ✤ Analyze the impact and importance of different media and techniques for synthesizing complex content.
- ✤ Learn about different tweens.
- ✤ Learn about different tools.
- ✤ Design Banner.

LIST OF EXPERIMENTS:

1. Draw a circle, fill it with color and divide it into four equal half's. (Use rulers and transformation tools).

2. Create any object on the stage; apply motion tween on it and vary the speeds of motion.
3. Create any two objects on the stage. Transform object1 into object2 using shape tween.
4. Simulate a solar system based on the concept of guided motion.
5. Import an image on to the stage. Add fading effect to the image.
6. Design a slideshow using a set of images.
7. Design play, stop and pause buttons to control an audio object.
8. Display a set of names one after the other with zooming effect Add any audio in the background.
9. Design an animated banner. Banner can display scenery or advertise a product/organization.
10. Convert any video into a flash video. Embed this flash video in a web page.
11. Create a Movie clip to hold a simple animation. Duplicate the animation in to several copies.
12. Create a simple greeting card with audio effect. The greeting card should have play and stop buttons.
13. Using action script 3.0 write a program to create a rain fall effect. (Hint. Create a Movie clip to capture the motion of a single rain drop and then duplicate it to have rain fall effect)
14. Using action script 3.0, design a login form.
15. Design an animated car and show that it is gradually progressing in some direction.

REFERENCES:

1. Flash CS5 Development Team, *"Using ADOBE® FLASH® PROFESSIONAL CS5 & CS5.5"*, 1st Edition 2011, Adobe.
2. Chris Grover, *"Flash CS5: The Missing Manual"*, 1st Edition, O'reilly,2010.
3. Joey, Lott, *"Action Script Cookbook"*, 1st Edition, SPD-Oreilly, 2003.

NETWORK PROGRAMMING LAB

Course Code :13IT1108

L	T	P	C
0	0	3	2

Course Educational Objectives:

To teach the students how to write programs that communicates with other programs across a computer network.

- ✤ The student shall be able to write their own network programs in UNIX.
- ✤ To provide an opportunity to do network programming using TCP sockets.
- ✤ To provide an opportunity to do network programming using UDP sockets.
- ✤ To provide to do IPC programs.
- ✤ To learn about socket programming

Course Outcomes:

At the end of the lab course the students will be able to

- ✤ Achieve a deep understanding of the protocol stack in widely available computer networks.
- ✤ Enable the students to consider programming client/server systems over transport layer protocols.
- ✤ Understand the functionality of network layers in detail, with the potential to eventually develop or implement simple versions of tasks like packetization, control flow, error correction, network flow control and security.
- ✤ To design client server application using protocols
- ✤ To know about shared memory concept

LIST OF EXPERIMENTS:

1. Design TCP iterative Client and Echo server application to given input sentence.

2. Design TCP iterative Client and server application to reverse the given input sentence
3. Design TCP client and server application to transfer file.
4. Design a TCP concurrent server to convert a given text into upper case using multiplexing system call “select”.
5. Design a TCP concurrent server to echo given set of sentences using poll functions
6. Design UDP Client and server application to reverse the given input sentence
7. Design UDP Client server to transfer a file
8. Implement the following forms of IPC.

   a. Pipes

   b. FIFO
9. Implement file transfer using Message Queue form of IPC
10. Write a program to create an integer variable using shared memory concept and increment the variable simultaneously by two processes. Use semaphores to avoid race conditions
11. Design using poll client server application to multiplex TCP and UDP requests for converting a given text into upper case.
12. Design a RPC application to add and subtract a given pair of integers

TEXT BOOKS:

1. W.Richard Stevens, *“UNIX Network Programming, Sockets API, Volume I”*, 3rd Edition, Pearson Education, 2004.
2. W.Richard Stevens, *“UNIX Network Programming, Volume II”*, 1st Edition, PHI, 2010.

REFERENCES:

1. T Chan, *“UNIX Systems Programming using C++”*, 1st Edition, PHI, 2010.
2. Graham Glass, King abls, *“UNIX for Programmers and Users”*, 3rd Edition, Pearson Education, 2010.
3. M. J. Rochkind, *“Advanced UNIX Programming”*, 2nd Edition, Pearson Education, 2008

NOTES

SYLLABI FOR VIII SEMESTER

DISTRIBUTED DATABASES

Course Code :13IT1109

L	T	P	C
4	0	0	3

Course Educational Objectives:

The main objective of the course is to expose the students to database creation and maintenance in distributed environment.

- ✤ Understand how data is collected and distributed in a database across multiple physical locations.
- ✤ To Gain advanced knowledge on creating and maintaining databases in distributed environment, how to handling all types of queries, query optimization techniques.
- ✤ To improve database performance at end-users worksites.
- ✤ Understand and to get knowledge of advanced features of object orientation and interoperability object management in distributed environment.
- ✤ Management of distributed data with different levels of transparency.
- ✤ Understand how to use database management tools in resolving deadlock situations.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Gain advanced knowledge on creating and maintaining databases in distributed environment.
- ✤ Understand how to handle all types of queries, query optimization techniques.
- ✤ Understand how to use Foundations of Distributed Concurrency Control.
- ✤ Understand how to Query Processing Layers in Distributed Multi-DBMSs
- ✤ Understand how to implement push based technologies

UNIT-I (12 Lectures)

DISTRIBUTED DATABASES:

Features of Distributed versus Centralized Databases, Distributed Database Management Systems (DDBMSs)

PRINCIPLES OF DISTRIBUTED DATABASES -

Levels of Distribution Transparency: Reference Architecture for Distributed Databases, Types of Data Fragmentation, Integrity Constraints in Distributed Databases.

UNIT-II (12 Lectures)

DISTRIBUTED DATABASE DESIGN:

A Framework for Distributed Database Design, the Design of Database Fragmentation, the Allocation of Fragments.

TRANSLATION OF GLOBAL QUERIES TO FRAGMENT QUERIES:

Equivalence Transformations For Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parametric Queries.

THE MANAGEMENT OF DISTRIBUTED TRANSACTIONS:

A Framework for Transaction Management, Supporting Atomicity of Distributed Transactions, Concurrency Control for Distributed Transactions, Architectural Aspects of Distributed Transactions.

UNIT-III (12 Lectures)

CONCURRENCY CONTROL:

Foundations of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control Based on Timestamps, Optimistic Methods for Distributed Concurrency Control.

RELIABILITY:

Basic Concepts, Nonblocking Commitment Protocols, Reliability and Concurrency Control, Determining a Consistent View of the Network, Detection and Resolution of Inconsistency, Checkpoints And Cold Restart.

DISTRIBUTED DATABASE ADMINISTRATION:

Catalog Management in Distributed Databases, Authorization and Protection

UNIT-IV (12 Lectures)

DISTRIBUTED OBJECT DATABASE MANAGEMENT SYSTEMS

Architectural Issues: Alternative Client/Server Architectures, Cache Consistency.

OBJECT MANAGEMENT :

Object Identifier Management, Pointer Swizzling, Object Migration

Distributed Object Storage

OBJECT QUERY PROCESSOR :

Object Query Processing Architectures, Query Processing Issues, Query Execution.

TRANSACTION MANAGEMENT :

Transaction Management in Object DBMSs, Transactions as Objects.

UNIT-V (12 Lectures)

DATABASE INTEROPERABILITY :

Database Integration: Scheme Translation, Scheme Integration.

QUERY PROCESSING:

Query Processing Layers in Distributed Multi-DBMSs, Query Optimization Issues.

TRANSACTION MANAGEMENT :

Transaction and Computational Model, Multi database

Concurrency Control, Multi database Recovery.

OBJECT ORIENTATION AND INTEROPERABILITY :

Object Management Architecture, CORBA and Database Interoperability, Distributed Component Object Model, COM/OLE and Database Interoperability.

PUSH BASED TECHNOLOGIES:

Delivery Schedule Generation, Client Cache Management, Propagating Updates.

TEXT BOOKS:

1. Stefano Ceri and Giuseppe Pelagatti, *"Distributed Databases – Principles and Systems"*, 1st Edition, Tata McGraw-Hill Edition, 2008.
2. M Tamer Ozsu, Patrick Valduriez, *"Principles of Distributed Database Systems"*, 2nd Edition, Pearson Education. (Last 2 Units).

REFERENCE:

M. Tamer ozsu, Patrick Valduriez, *"Principles of Distributed Data Base Systems"*, 3rd Edition, Springer, 2011.

BIG DATA AND HADOOP

(ELECTIVE- IV)

(Common to CSE & IT)

Course Code :13CT1136

L	T	P	C
4	0	0	3

Pre requisites: Database Management Systems, Object Oriented Programming Through Java.

Course Educational Objectives:

This course introduces the fundamental concepts of cloud and lays a strong foundation of Apache Hadoop (Big data framework).

- The HDFS file system, MapReduce frameworks are studied in detail.
- Hadoop tools like Hive, and Hbase, which provide interface to relational databases, are also covered as part of this course work.
- Analyzing data with unix tools
- Sorting. Map side and Reduce side joins.
- Implementation. Java and Mapreduce clients

Course Oucomes:

At the end of the course the student will be able to

- Understand the fundamentals of Big cloud and data architectures.
- Understand HDFS file structure and Mapreduce frameworks, and use them to solve complex problems, which require massive computation power.
- Use relational data in a Hadoop environment, using Hive and Hbase tools of the Hadoop Ecosystem..
- Understand The Hive Shell.
- Understand the Comparison with traditional databases.

UNIT-I **(12 Lectures)**

Introduction to Big Data. What is Big Data. Why Big Data is Important. Meet Hadoop. Data. Data Storage and Analysis. Comparison with other systems. Grid Computing. A brief history of Hadoop. Apache hadoop and the Hadoop EcoSystem. Linux refresher; VMWare Installation of Hadoop.

UNIT-II **(12 Lectures)**

The design of HDFS. HDFS concepts. Command line interface to HDFS. Hadoop File systems. Interfaces. Java Interface to Hadoop. Anatomy of a file read. Anatomy of a file write. Replica placement and Coherency Model. Parallel copying with distcp, Keeping an HDFS cluster balanced.

UNIT-III **(12 Lectures)**

Introduction. Analyzing data with unix tools. Analyzing data with hadoop. Java MapReduce classes (new API). Data flow, combiner functions, Running a distributed MapReduce Job.

Configuration API. Setting up the development environment. Managing configuration. Writing a unit test with MRUnit. Running a job in local job runner. Running on a cluster.Launching a job. The MapReduce WebUI.

UNIT-IV **(12 Lectures)**

Classic Mapreduce. Job submission. Job Initialization. Task Assignment. Task execution .Progress and status updates. Job Completion. Shuffle and sort on Map and reducer side. Configuration tuning. MapReduce Types. Input formats. Output formats ,Sorting. Map side and Reduce side joins.

UNIT-V **(12 Lectures)**

The Hive Shell. Hive services. Hive clients. The meta store. Comparison with traditional databases. HiveQl. Hbasics. Concepts. Implementation. Java and Mapreduce clients. Loading data, web queries.

TEXT BOOKS:

1. Tom White, Hadoop, *"The Definitive Guide"*, 3rd Edition, O'Reilly Publications, 2012.

2. Dirk deRoos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutsch , *"Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data"*, McGraw-Hill Osborne Media; 1 edition, 2011

WEB REFERENCES:

1. http://www.cloudera.com/content/cloudera-content/cloudera-docs/HadoopTutorial/CDH4/Hadoop-Tutorial.html
2. https: //www.ibm.com / developerworks / community / blogs / Susan Visser Editionntry/flash book understanding big data analytics for enterprise class hadoop and streaming data? lang en

AD-HOC NETWORKS
(ELECTIVE- IV)

Course Code :13IT1110

L	T	P	C
4	0	0	3

Pre requisites: Computer Networks.

Course Educational Objectives:

The main objective of the course is to expose the students to different networking environments like Mobile Ad Hoc Networks and Wireless Sensor Networks. Upon completion of this course, the student should be able to know:

- MANETs Environment.
- Routing in Ad Hoc Networks.
- Different Networking Environments like Broadcasting, Multicasting and Geocasting.
- Wireless LANs, Wireless PANs.
- Wireless Sensor Networks.

Course Outcomes:

At the end of the course the student will be able to

- Identify the major issues associated with ad-hoc/sensor networks.
- Explore current ad-hoc/sensor technologies by researching key areas such as algorithms, protocols, hardware, and applications.
- Gain hands-on experience through real-world programming projects on ad-hoc/sensor hardware.
- Implement or develop algorithms involved in ad-hoc/sensor systems.
- Understand data retrieval in sensor networks.

UNIT-I (12 Lectures)

INTRODUCTION TO AD HOC NETWORKS:

Introduction, Applications of MANETs, Challenges.

ROUTING IN AD HOC NETWORKS:

Introduction, Topology-Based versus Position-Based Approaches, Topology-Based Routing Protocols, Position-Based Routing, Other Routing Protocols.

BROADCASTING, MULTICASTING AND GEOCASTING: Introduction, The Broadcast Storm, Multicasting, Geocasting.

UNIT-II (12 Lectures)

WIRELESS LANS:

Introduction, Why Wireless LANs, Transmission Techniques, Medium Access Control Protocol Issues, The IEEE 802.11 Standard for Wireless LANs, Enhancement to IEEE 802.11 MAC, The HIPPERLAN/2 Standard for Wireless LANs.

WIRELESS PANS:

Introduction, Why Wireless PANs, The Bluetooth Technology, Enhancements to Bluetooth, The IEEE 802.15 Working Group for WPANs, Comparison between WPAN Systems, WLANs versus WPANs.

UNIT-III (12 Lectures)

TCP OVER AD HOC NETWORKS:

Introduction, TCP Protocol Overview, TCP and MANETs, Solutions for TCP Over AdHoc.

UNIT-IV (12 Lectures)

WIRELESS SENSOR NETWORKS:

Introduction, The Mica Mote, Sensing and Communication Range, Design Issues, Energy Consumption, Clustering of Sensors, Applications.

UNIT-V (12 Lectures)

DATA RETRIEVAL IN SENSOR NETWORKS:

Introduction, Classifications of WSNs, MAC Layer, Routing Layer, High

Level Application Layer Support, Adapting to the Inherent Dynamic Nature of WSNs.

SECURITY:

Introduction, Distributed Systems Security, Security in Ad Hoc Networks, Key Management, Secure Routing, Cooperation in MANETs, Wireless Sensor Networks, Intrusion Detection Systems.

TEXT BOOKS:

1. Carlos D Corderio and Dharma P. Aggarwal, *"Ad Hoc and Sensor Networks: Theory and Applications"*, 2nd Edition, World Scientific Publications, 2011.

REFERENCES:

1. C. Siva Rama Murthy and B.S. Manoj , *"Ad Hoc Wireless Networks: Architecture and Protocols"*, 2nd Edition , Pearson Education, 2009.
2. Sudip Misra, Isaac Woungang and Subhas Chandra Misra, *"Guide to Wireless Ad Hoc Networks"* , 1st Edition, Springer-Verlag London Limited, 2009.

MULTI-CORE PROGRAMMING

(ELECTIVE-IV)

(Common to CSE & IT)

Course Code :13CT1137	L	T	P	C
	4	0	0	3

Pre requisites: Linux

Course Educational Objectives:

The main objective of the course is to expose the students to the basic concepts of Multi Core programming and various practical models of Multi Core programming.

- ✤ Understand the Multi Core Architecture.
- ✤ Understand Parallel Programming Concepts and Threading API's.
- ✤ Understand OpenMP programming and MPI programming.
- ✤ Learn about Multi Core Debugging Techniques.
- ✤ Use Multi Core Processors efficiently with the help Multi Core programming tools.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Learn about different OpenMP programming, MPI programming,
- ✤ Learn multi-core processors software development products,
- ✤ Understand multi-threaded debugging techniques
- ✤ Understand OpenMP programming and mpi programming
- ✤ Learn various Multi-core processors

UNIT-I **(12 Lectures)**

INTRODUCTION TO MULTI-CORE ARCHITECTURE:

Motivation for Concurrency in Software, Parallel Computing Platforms(SIMD & MIMD systems, an overview of Single-Core, Multi-Processor, Multi-Core Architectures) , Parallel Computing in Microprocessors, Differentiating Multi-Core Architectures from Hyper-Threading Technology, Multi-threading on Single-Core versus Multi-Core Platforms, Understanding Performance, Amdahl's Law, Gustafson's Law

UNIT-II (12 Lectures)

MULTI-CORE PROCESSORS:

An Overview of Software Threading Defining Threads, System View of Threads: Threading above the Operating System, Threads inside the OS , Threads inside the Hardware , Application Programming Models and Threading ,Virtual Environment: Virtual Machines and Platforms, Runtime Virtualization, System Virtualization.

PARALLEL PROGRAMMING FUNDAMENTAL CONCEPTS:

Designing for threads, parallel programming patterns, Threading and parallel programming constructs: Synchronization, Critical sections, Deadlock, Synchronization Primitives, and Messages

UNIT-III (12 Lectures)

THREADING API'S:

Threading APIs for Microsoft Windows, Threading APIs for Microsoft .NET Framework: Creating Threads, Managing Threads, Thread Pools, Thread Synchronization, POSIX Threads: Creating Threads, Managing Threads, Thread Synchronization , Signaling ,Compilation and Linking

UNIT-IV (12 Lectures)

OPENMP PROGRAMMING:

OpenMP Challenges in Threading a loop, Minimizing Threading overhead, Performance oriented Programming ,Library Functions. Solutions to parallel programming problems: Data races, deadlocks and Livelocks Non-blocking algorithms, Memory and cache related issues.

MPI PROGRAMMING:

Message-Passing Model, Message-Passing Interface, MPI functions, Compiling and running MPI Programs, collective communication, data decomposition, Point-to-point communication – MPI Library.

UNIT-V (12 Lectures)

MULTI-THREADED DEBUGGING TECHNIQUES:

General Debug Techniques, Debugging Multi-threaded Applications in Windows: Threads Window, Trace points, Breakpoint Filters, Naming Threads, Multi-threaded Debugging Using GDB.

MULTI-CORE PROCESSORS SOFTWARE DEVELOPMENT PRODUCTS:

An Overview of Software tools on Multi-Core Processors, Intel Software Development Products: overview, Thread Checker, Compilers: OpenMP, Software-based Speculative Pre computation, Compiler Optimization and Cache Optimization, Debugger , Intel Libraries, Intel Threading Building Blocks , VTune Performance Analyzer , Thread Profiler , MPI Programming :Intel Support for MPI

TEXT BOOKS:

1. Shameem Akhter and Jason Roberts, *"Multi-core Programming- Increasing Performance through Software Multi-Threading"*, 1st Edition, Intel Press, 2006.
2. Michael J Quinn, *"Parallel programming in C with MPI and OpenMP"*, 2nd Edition, Tata McGraw Hill, 2007.

REFERENCES:

1. John L.Hennessey and David A.Patterson, *"Computer architecture – A quantitative approach"*, 4th Edition, Morgan Kaufmann Elsevier Publishers, 2007.
2. David E. Culler, Jaswinder Pal Singh, *"Parallel computing architecture: A hardware software approach"*, 1st Edition, Morgan Kaufmann Elsevier Publishers, 1999.

DIGITAL FORENSICS
(ELECTIVE IV)

Course Code :13IT1111

L	T	P	C
4	0	0	3

Pre requisites: Information Security.

Course Educational Objectives:

The main objective of the course is to introduce the students to bring awareness in crimes and tracing the attackers.

- ✤ Gain the knowledge on various attackers and how they attack systems.
- ✤ Gain the knowledge on tracing attackers.
- ✤ Get exposure on various Forensic tools.
- ✤ Know the computer forensics fundamentals.
- ✤ Know the types of computer forensics technology

Course Outcomes:

At the end of the course student will be able to

- ✤ Get exposure on crimes and real time problems.
- ✤ Resolve the crimes and real time problems using various forensic tools.
- ✤ Encryption Methods and Vulnerabilities.
- ✤ Understand Biometric Security Systems.
- ✤ Satellite Encryption Security Systems.

UNIT-I **(12 Lectures)**

INTRODUCTION & EVIDENTIAL POTENTIAL OF DIGITAL DEVICES:

Key developments , Digital devices in society,Technology and culture, Comment, Closed vs. open systems, evaluating digital evidence potential.

DEVICE HANDLING & EXAMINATION PRINCIPLES:

Seizure issues, Device identification, Networked devices, Contamination, Previewing,

Imaging, Continuity and hashing, Evidence locations.

UNIT-II (12 Lectures)

EVIDENCE CREATION & EVIDENCE INTERPRETATION:

A Seven element securtiy Model, A development model of digital systems, Knowing, Unknowing, Audit and logs, Data content, Data Context

INTERNET & MOBILE DEVICES

A little bit of history, The ISO OSI model, The internet protocol suite, DNS, Internet

applications, Mobile phones and PDAs, GPS, Other personal technology.

UNIT-III (12 Lectures)

COMPUTER FORENSICS FUNDAMENTALS

Introduction to Computer Forensics, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps

Taken by Computer Forensics Specialists, Who Can Use Computer Forensic Evidence?,

Case Histories, Case Studies.

UNIT-IV (12 Lectures)

TYPES OF COMPUTER FORENSICS TECHNOLOGY:

Types of Military Computer Forensic Technology, Types of Law Enforcement : Computer Forensic Technology, Types of Business Computer Forensic Technology, Specialized Forensics Techniques, Hidden Data and How to Find It, Spyware and Adware, Encryption Methods and Vulnerabilities, Protecting Data from Being Compromised, Internet Tracing Methods 65 , Security and Wireless Technologies , Avoiding Pitfalls with Firewalls, Biometric Security Systems

UNIT-V (14 Lectures)

TYPES OF COMPUTER FORENSICS SYSTEMS:

Internet Security Systems, Intrusion Detection Systems, Firewall Security Systems, Storage Area Network Security Systems, Network Disaster Recovery Systems, Public Key Infrastructure Systems, Wireless Network Security Systems, Satellite Encryption

Security Systems, Instant Messaging (IM) Security Systems, Net Privacy Systems, Identity Management Security Systems, Identity Theft, Biometric Security Systems, Homeland Security Systems.

VENDOR AND COMPUTER FORENSICS SERVICES :

Occurrence of Cyber Crime, Cyber Detectives, Fighting Cyber Crime with Risk-Management Techniques, Computer Forensics Investigative Services, Forensic Process

Improvement, Course Content, Case Histories.

TEXT BOOKS:

1. Angus M.Mashall, *"Digital Forensics"*, 1st Edition , Wiley-Blackwell, A John Wiley & Sons Ltd Publication, 2008.
2. John R. Vacca, *"Computer forensics: Computer Crime Scene Investigation"*, 2nd Edition, Charles River Media, Inc. Boston, Massachusetts, 2008.

PRINCIPLES OF DIGITAL SIGNAL PROCESSING
(ELECTIVE IV)

Course Code :13IT1112

L	T	P	C
4	0	0	3

Pre requisites: Mathematics-I, Mathematics-II

Course Educational Objectives:

To give an understanding on the study that deals with the representation of signals as ordered sequences of numbers and how to process those ordered sequences.

- ✤ To understand the basics of signals and system by analyzing the various transformations available and determine their use to DSP.
- ✤ To study on the various digital filtering techniques and how to apply to DSP.
- ✤ To study on the ways to estimate signal parameters, and transform a signal into a form that is more informative.
- ✤ To give students a flavor on the applications of DSP in the areas of speech and image
- ✤ To understand Speech compression.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Learn about filtering methods based on DFT.
- ✤ Learn about structures of IIR filter design.
- ✤ Learn about Bilinear transformation.
- ✤ Learn about fir filter design.
- ✤ Learn about different applications in signal processing.

UNIT-I **(12 Lectures)**

SIGNALS AND SYSTEMS :

Basic elements of DSP – concepts of frequency in Analog and Digital Signals -sampling theorem – Discrete – time signals, systems – Analysis of discrete time LTI systems – Z transform – Convolution (linear and circular) – Correlation.

UNIT-II **(12 Lectures)**

FREQUENCY TRANSFORMATIONS:

Introduction to DFT – Properties of DFT – Filtering methods based on DFT – FFT Algorithms - Decimation – in – time Algorithms, Decimation – in – frequency Algorithms – Use of FFT in Linear Filtering – DCT.

UNIT-III **(12 Lectures)**

IIR FILTER DESIGN:

Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (HPF, BPF, BRF) filter design using frequency translation

UNIT-IV **(12 Lectures)**

FIR FILTER DESIGN:

Structures of FIR – Linear phase FIR filter – Filter design using windowing techniques, Frequency sampling techniques – Finite word length effects in digital Filters

UNIT-V **(12 Lectures)**

APPLICATIONS:

Multi rate signal processing – Speech compression – Adaptive filter – Musical sound processing – Image enhancement.

TEXT BOOKS:

1. John G. Proakis & Dimitris G.Manolakis, *"Digital Signal Processing – Principles, Algorithms & Applications"*, 4th Edition, Pearson education / Prentice Hall, 2007.

2. Emmanuel C..Ifeachor, & Barrie.W.Jervis, *"Digital Signal Processing"*,2nd Edition, Pearson Education / Prentice Hall, 2002.

REFERENCES:

1. Sanjit K. Mitra, *"Digital Signal Processing – A Computer Based Approach"*, Tata McGraw Hill, 4th Edition, 2007.
2. Alan V.Oppenheim, Ronald W. Jchafer & Hohn. R.Back, *"Discrete Time Signal Processing"*, 2nd Edition, Pearson Education, 2001.
3. Andreas Antoniou, *"Digital Signal Processing"*, 2nd Edition, Tata McGraw Hill, 2009.

NOTES

SEMESTER - I

Code	COURSE TITLE	L	T	P	C
13BM1101	Mathematics-I	4	1	0	3
13BP1101	Physics	4	0	0	3
13CT1102	Computer Programming through C	4	0	0	3
13ME1101	Elements of Mechanical Engineering	4	0	0	3
13ME1102	Engineering Mechanics	4	1	0	3
13BP1102	Physics Lab	0	0	3	2
13CT1103	Computer Programming Lab	0	0	3	2
13ME1103	Engineering Drawing	1	0	3	3
13NM1101	Professional Ethics	2	0	0	0
	TOTAL	**23**	**2**	**12**	**22**

SEMESTER - II

Code	COURSE TITLE	L	T	P	C
13HE1101	English	4	0	0	3
13BM1102	Mathematics-II	4	1	0	3
13BC1101	Chemistry	4	1	0	3
13EE1142	Basic Electrical Engineering	4	0	0	3
13EC1141	Electronics Engineering	4	0	0	3
13BC1103	Chemistry Lab	0	0	3	2
13HE1102	English Language Lab	0	0	3	2
13ME1104	Computer Aided Engineering Drawing practice	0	0	3	2
13MT1101	Engineering Workshop	0	0	3	2
	TOTAL	**20**	**2**	**12**	**23**

SEMESTER - III

Code	COURSE TITLE	L	T	P	C
13BM1105	Probability and Statistics	4	1	0	3
13HM1101	Managerial Economics and Financial Accounting	4	0	0	3
13ME1105	Mechanics of Solids	4	0	0	3
13ME1106	Materials Science	4	0	0	3
13ME1107	Thermodynamics	4	1	0	3
13ME1108	Fluid Mechanics	4	0	0	3
13ME1109	Materials Testing Lab	0	0	3	2
13ME1110	Electrical and Electronics Lab	0	0	3	2
	TOTAL	**24**	**2**	**6**	**22**

SEMESTER - IV

Code	COURSE TITLE	L	T	P	C
13BM1108	Numerical Methods	4	1	0	3
13ME1111	Computer Aided Machine Drawing	1	0	3	3
13ME1112	Fluid Machinery	4	0	0	3
13ME1113	Thermal Engineering-I	4	0	0	3
13ME1114	Kinematics of Mechanisms	4	1	0	3
13ME1115	Manufacturing Technology - I	4	0	0	3
13ME1116	Fluid Mechanics and Machinery Lab	0	0	3	2
13ME1117	Production Technology Lab	0	0	3	2
13NM1102	Environmental Studies	2	0	0	0
	TOTAL	**21**	**2**	**9**	**22**

SEMESTER - V

Code	COURSE TITLE	L	T	P	C
13ME1118	Manufacturing Technology - II	4	0	0	3
13ME1119	Dynamics of Machinery	4	0	0	3
13ME1120	Design of Machine Elements-I	4	1	0	3
13ME1121	Thermal Engineering-II	4	1	0	3
13ME1122	Operations Research	4	0	0	3
13ME1123	Engineering Metrology	4	0	0	3
13ME1124	Thermal Engineering Lab	0	0	3	2
13HE1103	Technical Communication and Soft Skills Lab	0	0	3	2
13ES11BC	Basic Computations Lab	0	0	3	2
	TOTAL	**24**	**2**	**9**	**24**

SEMESTER - VI

Code	COURSE TITLE	L	T	P	C
13HM1103	Industrial Management	4	0	0	3
13ME1125	Mechanical Measurements	4	0	0	3
13ME1126	Design of Machine Elements - II	4	1	0	3
13ME1127	Heat Transfer	4	1	0	3
	ELECTIVE - I	4	0	0	3
13ME1128	Production Planning Control				
13ME1129	Power Plant Engineering				
13ME1130	Advanced Mechanics of Solids				
13ME1131	Foundry Technology				
	ELECTIVE - II	4	0	0	3
13ME1132	Composites				
13ME1133	Materials Handling				
13ME1134	Mechanical Vibrations and Condition Monitoring				
13ME1135	Value Engineering				
13ME1136	Machine Shop Practice	0	0	3	2
13ME1137	Heat Transfer Lab	0	0	3	2
13NM1103	Intellectual Property rights and Patents	2	0	0	0
	TOTAL	**26**	**2**	**6**	**22**

SEMESTER - VII

Code	COURSE TITLE	L	T	P	C
13ME1138	CAD/CAM	4	0	0	3
13ME1139	Robotics	4	1	0	3
13ME1140	Mechatronics	4	0	0	3
13ME1141	Finite Element Method	4	1	0	3
13ME1142	Automobile Engineering	4	0	0	3
	ELECTIVE - III	4	0	0	3
13ME1143	Renewable Sources of Energy				
13ME1144	Automation in Manufacturing				
13ME1145	Computational Fluid Dynamics				
13ME1146	Introduction to Aircraft Systems				
13ME1147	CAD/CAM Lab	0	0	3	2
13ME1148	Instrumentation Lab and Mechatronics Lab	0	0	3	2
13ME11MP	Industry Oriented Mini-Project	0	0	0	2
	TOTAL	**24**	**2**	**6**	**24**

SEMESTER - VIII

Code	COURSE TITLE	L	T	P	C
13ME1149	Advanced Manufacturing processes	4	0	0	3
	ELECTIVE - IV	4	0	0	3
13ME1150	Design Optimization				
13ME1151	Refrigeration and Air conditioning				
13ME1152	Introduction to Aircraft Structures				
13ME1153	Project Management				
	OPEN ELECTIVE	4	0	0	3
13ME11SM	Seminar	0	0	3	2
13ME11CV	Comprehensive Viva	0	0	0	2
13ME11PW	Project Work	0	0	12	8
	TOTAL	**12**	**0**	**15**	**21**

LIST OF OPEN ELECTIVES

CODE	COURSE TITLE	OFFERING DEPARTMENT
13CH1128	Design and Analysis of Experiments*	Chemical Engineering
13CE1155	Green Buildings and Infrastructure	Civil Engineering
13CE1156	Disaster Management	Civil Engineering
13CS1113	E-Commerce	Computer Science and Engineering
13CT1132	Software Project Management*	Computer Science and Engineering
13EC1140	Bio-Medical Instrumentation	Electronics and Communications Engineering
13EE1138	Electrical Safety Management	Electrical and Electronics Engineering
13EE1139	Reliability Evaluation of Engineering Systems	Electrical and Electronics Engineering
13EE1140	Design Concepts for Engineers	Electrical and Electronics Engineering
13EE1141	Special Electrical Machines for Industrial Applications	Electrical and Electronics Engineering
13IT1113	Neural Networks	InformationTechnology
13IT1114	Biometrics	InformationTechnology
13ME1143	Renewable Sources Of Energy*	Mechanical Engineering
13ME1153	Project Management*	Mechanical Engineering
13BP1103	Nano Technology	Physics
13HM 1104	Entrepreneurship and Small Business Management	Management Studies
13HM 1105	Financial Management	Management Studies
13HM 1106	Indian and International Business Environment	Management Studies

*These courses can be taken by the students of respective departments if they are not offered /opted earlier in the structure.

SYLLABI FOR I SEMESTER

MATHEMATICS-I

(Common to all Branches)

Subject Code: 13BM1101

L	T	P	C
4	1	0	3

Pre requisites:

- ✤ Basic formulae of differentiation, product rule, and quotient rule.
- ✤ Basic Integration formulae, integration by parts, definite integrals and properties.
- ✤ Basic concept of partial differentiation.

Course Educational Objectives:

- ✤ The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- ✤ The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- ✤ Solve ordinary differential equations of first, second and higher order.
- ✤ Learn the technique of Laplace transform and apply it to solve differential equations.
- ✤ Understand the concept of Double and Triple integrals and their applications to calculation of areas, volumes .
- ✤. Extend the concept of integration to vector functions, understand the significance of the operators, gradient, divergence and curl.
- ✤ Find surface areas and volumes of certain solids using Green, Stokes and Gauss divergence theorems.

UNIT-I (12 Lectures)

ORDINARY DIFFERENTIAL EQUATIONS:

Linear equations of first order, Bernoulli differential equation, Linear differential equations of higher order with constant coefficients, Method of Variation of parameters, Linear differential equations with variable coefficients (Cauchy's homogeneous linear equation, Legendre's linear equation).

APPLICATIONS OF LINEAR DIFFERENTIAL EQUATIONS:

Orthogonal trajectories, Models on R-L-C circuits, Newton's law of cooling.
(11.9, 11.10, 13.1—13.7, 13.8(1), 13.9, 12.3, 12.5, 12.6)

UNIT-II (12 Lectures)

LAPLACE TRANSFORMS:

Laplace transform of elementary functions, properties, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, division by t, evolution of integrals by Laplace transforms.

INVERSE TRANSFORM:

Introduction, Finding inverse transforms by the method of partial fractions, other methods of finding Inverse Transform, Convolution theorem, Unit step function, and Unit impulse function.

APPLICATION OF LAPLACE TRANSFORMS: Initial and Boundary Value Problems.
(21.1-21.5, 21.7-21.15, 21.17, 21.18)

UNIT-III (12 Lectures)

PARTIAL DIFFERENTIATION:

Total derivative, change of variables, Jacobians, Tangent Plane and Normal to the Surface, Taylor's theorem for functions of two variables.

APPLICATIONS OF PARTIAL DIFFERENTIATION:

Maxima and Minima of functions of two variables, Lagrange method of undetermined multipliers.
(5.5 – 5.9, 5.11, 5.12)

UNIT-IV (12 Lectures)

MULTIPLE INTEGRALS:

Introduction to Non-Cartesian Coordinates, Double integrals, Change of order of integration, Double integral in polar co-ordinates, Triple integrals, Change of variables in double integrals, Change of variables in triple integrals. Simple Applications of Multiple Integrals**:** Area enclosed by plane curves, Volumes of solids.
(8.19, 8.21, 7.1, 7.7,)

UNIT-V (12 Lectures)

VECTOR DIFFERENTIATION:

Differentiation of vectors, curves in space, velocity, acceleration, Scalar and Vector point functions. Gradient of a scalar field and directional derivatives- Divergence and curl of a Vector field and it's physical interpretation.

VECTOR INTEGRATION:

Line integral, Circulation, work done, surface and volume integrals.

Vector integral theorems: Green's, Stoke's and Gauss Divergence theorems (without proofs) and related problems.
(8.1- 8.16)

TEXT BOOK:

Dr.B.S.Grewal *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. Kreyszig E, "*Advanced Engineering Mathematics*", 8th Edition, John Wiley, Singapore, 2001.
2. Greenberg M D, "*Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, "*Advanced Engineering Mathematics*", 7th Edition, Cengage Learning, 2011.

PHYSICS

(Common to all Branches)

Subject Code: 13BP1101

L	T	P	C
4	0	0	3

Course Educational Objectives:

The aim and objective of the course curriculum is to impart learners the basic knowledge that enables effective understanding of various core subjects of engineering branches through principles of physics such as architectural acoustics, wave mechanics, dielectrics, fiber optics, Electromagnetism and so on.

Course Outcomes:

- ✤ Students will acquire knowledge of basic physical principles and they can correlate the same to natural environment and social concern.
- ✤ Students will be able to apply the knowledge in the selection of materials for various engineering applications.
- ✤ Enables students to learn the characteristics and applications of laser devices and enhances information levels on fiber optic communications.
- ✤ Enables the students gain a research orientation and innovative spirit.

UNIT-I (10 Lectures)

ELASTIC PROPERTIES OF MATERIALS & ARCHITECTURAL ACOUSTICS:

Introduction – classification of stress, strain and Hooke's law – Elastic behavior of materials – Poisson's ratio and relationship between modulus of elasticity – Twisting couple on a solid shaft – bending of beams – bending moment - Y by cantilever – Uniform bending - Reverberation and reverberation time – absorption coefficient – Sabine's law (quantitative treatment) – Factors affecting the acoustics of buildings and their remedies – Acoustical design of a hall.

UNIT-II (15 Lectures)

ELECTROSTATICS AND DIELECTRICS:

Vectors - unit vectors - Gradient of a scalar field – divergence & curl of a vector field – Coulombs law - Electric flux - Gauss law in electrostatics – differential form of Gauss law – derivation of Coulombs law from Gauss Law – Applications of Gauss Law (Electric Field due to a solid charged sphere and thin sheet of charge) - Gauss law in dielectric medium - Dipole - Electric displacement vector - Dielectric permittivity and susceptibility- Dielectric constant and dielectric polarization in materials - Types of polarizabilities - Electronic polarizability derivation - Internal fields in solids and Claussius - Mosotti equation - frequency dependence of dielectric constant - Dielectric loss - Dielectric Strength and dielectric breakdown - important dielectric materials in electrical engineering.

UNIT-III (10 Lectures)

ELECTROMAGNETICS:

Biot-Savart Law - Magnetic flux – Magnetic scalar potential - Magnetic Vector Potential - Ampere’s law – Force and torque on a magnetic dipole due to external magnetic field, Magnetization - Bound volume and surface current densities - auxiliary field H (Ampere’s law in magnetized materials) - Magnetic susceptibility and permeability - Force on charged particle under electric and magnetic fields - Faraday’s law of electromagnetic induction - Self and mutual Inductances - Displacement current density - Maxwell’s equations – Physical Significance of Maxwell’s equations.

UNIT-IV (10 Lectures)

WAVE MECHANICS & BAND THEORY OF SOLIDS:

Introduction to wave mechanics – wave particle duality – de-Broglie matter waves – Wave function characteristics and significance – Schrodinger’s time independent wave equation – particle in one dimensional rigid box - Fermi-Dirac distribution function – Fermi level - Effect of temperature on Fermi function - Bloch theorem (Qualitative), Kronig - Penny model (Qualitative treatment) – Concept of effective mass, Origin of energy band formation in solids – Classification of materials in to

conductors, semi-conductors and insulators based on number of effective electrons.

UNIT-V (15 Lectures)

OPTICS & LASERS:

Introduction to optics – Interference phenomenon - interference through thin films in reflected light – Newton's rings – determination of wave length of a source – Diffraction due to single slit – intensity pattern discussion – Diffraction grating – Resolving Power of grating (qualitative) - Polarization – Law of Malus - Brewster's law – double refraction – Nicol prism - Basic principle of a LASER – Induced absorption, spontaneous and stimulated emissions – Einstein's coefficients – Population inversion – Ruby laser, CO_2 laser and Semiconductor laser – Laser Applications – Introduction to optical fibers – Classification of fibers on the basis of refractive index profile – Acceptance angle and numerical aperture definitions and expression for Numerical aperture – Applications relating to communication and sensors (force and temperature).

TEXT BOOKS:

1. D.J. Griffiths, *"Introduction to Electrodynamics"*, 3rd Edition, PHI (EEE series), 2009.
2. M.N. Avadhanulu, P.G. Kshirasagar, *"A Text book of Engineering Physics"*, 10th Edition, S. Chand & Company Limited, 2013.
3. V. Rajendran, *"Engineering Physics"*. 2011 Edition, TMH publishing company, 2011.

REFERENCES:

1. A.J. Dekker, *"Electrical Engineering Materials"*, 1st Edition, Macmillan Publishers, 2007.
2. C. Kittel, *"Introduction to Solid State Physics"*, John Wiley Publishers, 2007.
3. M.N.Sadiku, *"Elements of Electromagnetics"*, 4th Edition, Oxford University Press, 2007.

4. V. Raghavan, *"Materials Science"*, 5th Edition, PHI Publishers, 2007.

5. R.K. Gaur, S.L. Gupta, *"Engineering Physics"*, 8th Edition, Dhanapat Rai Publishers, 2003.

6. P.K. Palanisamy, *"Applied Physics"*, 2nd Edition, Scitech Publishers, 2010.

7. M. R. Srinivasan, *"Engineering Physics"*, New Age Publishers, 2012.

COMPUTER PROGRAMMING THROUGH C

(Common to all Branches)

Course Code : 13CT1102

L	T	P	C
4	0	0	3

Course Educational Objectives:

This course helps the student in understanding Computer Programming concepts. An individual will have ability to:

- ✤ Design Algorithmic solution for various problems and convert algorithms to C programs
- ✤ Design programs with Interactive Input and Output
- ✤ Design programs utilizing arithmetic expressions
- ✤ Design programs utilizing repetition and decision making
- ✤ Design programs utilizing arrays and structures
- ✤ Design programs using file Input and Output
- ✤ Test and verifying programs

Course Outcomes:

At the end of the course the student will be able to

- ✤ Know how to write algorithms and draw flowcharts and develop programs
- ✤ Write programs using sequential, condition, iterative control statements
- ✤ Write programs using derived data types like arrays, functions, pointers, strings, structures, unions
- ✤ Define user defined data types like type- def, enum
- ✤ Learn about files, their creation, and various operations that can be performed on files

UNIT-I (12 Lectures)

Introduction to Computers , Algorithm/ Pseudo code, Flow chart, Program Development steps, Basic structure of C Program, Input and Output statements (printf() & scanf()), A Simple C Program, Identifiers, Basic data types and sizes, Constants, Variables, Operators, Type Conversion, Expression Evaluation, Precedence & Associativity of operators.

CONTROL STATEMENTS:

If, switch, for, while and do- while statements, break, continue and goto statements.Sample programs covering all the above topics.

UNIT-II (12 Lectures)

FUNCTIONS:

Definition, Advantages, types of functions- user defined and standard library functions, categories of functions , scope rules, recursion, storage classes. Sample programs covering all the above topics.

UNIT-III (12 Lectures)

ARRAYS:

Introduction to arrays, 1 D Arrays: Definition, Declaration, Initialization, Accessing & storing the elements, 2 D Arrays: Definition, Declaration, Initialization, Accessing & storing the elements C Pre processors.

STRINGS:

String- Declaration, Initialization, pointers and strings, standard library string functions, array of pointers to strings. Sample programs covering all the above topics.

UNIT-IV (12 Lectures)

POINTERS:

Definition, Declaration of Pointer variables, the & and * operators, Pointer Expressions, Char, int, and float pointers, Pointer arithmetic, Passing addresses to functions, Functions returning pointers, Pointers & Arrays: Passing array elements to functions, pointer to pointer, array of pointers, Dynamic memory allocation functions, Sample programs covering all the above topics

UNIT-V (12 Lectures)

STRUCTURES & UNIONS:

Structures: Definition, Initialization, Accessing structures, nested structures, array of structures, additional features of structures, self referential structures, unions, type-def, bit fields, enum data type.

FILES:

Concept of a file, Text and Binary files, file I/O operations, Command line arguments. (Let Us C, Yashavant Kanetkar)

Sample programs covering all the above topics.

TEXT BOOKS:

1. B.A Forouzan and R.F. Gilberg, *"Computer science, A structured programming approach using C"*, 3rd Edition, Cengage Learning.
2. Yashavant Kanetkar, *"Let Us C"*, 12th Edition, BPB Publications, 2012.
3. Yashavant Kanetkar, *"Understanding pointers in C"*, 4th Edition, BPB Publications, 2009.

REFERENCES:

1. N. B. Venkateswarlu, E.V. Prasad, *"C & Data Structures"*, 1st Edition, S. Chand Publications, 2010.
2. K.R.Venugopal, S.R.Prasad, *"Mastering C"*, 1st Edition, TMH, 2007.

ELEMENTS OF MECHANICAL ENGINEERING

Course Code: 13ME1101

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student understand

- ✤ Fundamental knowledge on workshop processes
- ✤ Working of I.C. engines
- ✤ Principles of refrigeration and air conditioning
- ✤ Concepts of mechanical power transmission drives

Course Outcomes:

Students will be able to

- ✤ Explain the theory of workshop practice
- ✤ Identify the basic components of different power plants
- ✤ Explain working of I.C.Engines
- ✤ Explain the basic concepts of refrigeration and air conditioning
- ✤ Differentiate various power transmissions drives

UNIT-I (12 Lectures)

WOOD AND WOOD WORKING:

Structure of wood – grain in wood – seasoning of wood – carpentry tools – marking and measuring tools – cutting tools and planes – striking and holding tools – carpentry procedures: marking, sawing, planing, chiseling, boring, grooving – wood working machines.

FOUNDRY:

Introduction - pattern materials, types, pattern making tools. core prints, core boxes, moulding tools and equipments, moulding sands, sand additives, properties of moulding sand. functions of runner ,riser and gates, preparation of sand moulds. outline of sand casting.

UNIT-II (12 Lectures)

BENCH WORK AND FITTING:

Introduction - vices, hammers, chisels, files, hacksaw, marking tools and accessories, drilling operations, tapping.

SMITHY AND FORGING:

Introduction to black-smithy - operations - types of forging - hand tools and appliances - smith forging operations.

sheet metal working: Introduction - metals used in sheet metal work. sheet metal hand tools - sheet metal operations.

Lathe**:** Major components and basic operations.

UNIT-III (12 Lectures)

POWER PLANTS:

Layout of steam, hydel, nuclear, diesel and gas turbine power plants – major components and their functions.

Power transmission: Types of drives – belt drives – flat and v belts–spur and helical gears– gear trains – simple and compound.

UNIT-IV (12 Lectures)

I.C.ENGINES:

Introduction, classification of I.C. engines, I.C. engine-parts and terminology, four stroke cycle engines –petrol and diesel, two stroke cycle engines – petrol and diesel, comparison between four stroke and two stroke cycle engines, comparison between petrol engine and diesel engine.

UNIT-V (12 Lectures)

REFRIGERATION AND AIR CONDITIONING:

Refrigeration – unit of refrigeration and C.O.P. – principle of vapour compression systems – types of refrigerants.

Air conditioning – terminology – classification – summer air conditioning for hot and dry weather – winter room air conditioner.

TEXT BOOKS:

1. K.VenuGopal and V.PrabhuRaja, "*Basic Mechanical Engineering*," 10th Edition, Anuradha Agencies, 2011.
2. S.K.Hajra Choudary and A.K. Hajra Choudary, "*Elements of Workshop Technology*", Vol1: Manufacturing Processes,2007.

REFERENCES:

1. Basant Agarwal and C.M. Agarwal, "*Basic Mechanical Engineering*," 3rd Edition, Wiley India, 2011.
2. R.K. Rajput, "*Basic Mechanical Engineering*," 3rd Edition, University Science Press, 2012

ENGINEERING MECHANICS

(Common to all Branches)

Course Code: 13ME1102

L	T	P	C
4	1	0	3

Course Educational Objectives:

To develop

- The skill of converting a physical problem into a suitable mathematical model
- Analytical skills of solving the mathematical model
- The skill of interpreting the results in terms of the given physical situation
- The skills of optimization

Course Outcomes:

The student will be able to

- Identify and list , for a given physical problem, all known's, intermediate unknowns, and final results
- Formulate suitable mathematical equations and the constraints.
- Resolve a given force into rectangular components, find the moment of a force about a given point and find the resultant of a set of forces
- Solve problems involving static and dynamic friction
- Locate the centroid and calculate the moments of inertia of a given plane area
- Find the resulting acceleration of a body subjected to a set of forces and moments
- Calculate the work done, energy, power and efficiency

UNIT-I (13 Lectures)

RESULTANTS OF FORCE SYSTEM:

Parallelogram law, forces and components, resultant of coplanar concurrent forces, components of forces in space, moment of force, principle of moments, coplanar applications, couples, resultant of any force system (coplanar concurrent cases only).

Equilibrium of force systems: Free body diagram, equations of equilibrium, equilibrium of planar systems, further discussion of planar equilibrium.

UNIT-II (09 Lectures)

FRICTION:

Theory of friction, angle of friction, laws of friction, static friction, kinetic friction, friction in bodies moving up or down on an inclined plane, wedge friction, screw friction and screw jack.

UNIT-III (14 Lectures)

CENTROIDS AND CENTERS OF GRAVITY:

Center of gravity of flat plate, centroids of areas and lines, importance of centroids of areas and lines, importance of centroids and moments of area, centroids determined by integration, centroids of composite figures, theorem of Pappus, center of gravity of bodies.

MOMENT OF INERTIA:

Definition of moment of inertia, polar moment of inertia, radius of gyration, parallel axis theorem, moments of inertia by integration, moments of inertia for composite areas.

UNIT-IV (12 Lectures)

MASS MOMENT OF INERTIA:

Introduction, radius of gyration, parallel axis theorem, mass moments of inertia by integration, moments of inertia of composite bodies.

KINEMATICS AND KINETICS OF A PARTICLE:

Motion of a particle, rectilinear motion, rectangular components of curvilinear motion, normal and tangential components of acceleration, radial and transverse components, cylindrical coordinates translation-analysis as a particle, further discussion of particle kinematics.

UNIT-V (10 Lectures)

KINEMATICS AND KINETICS OF A BODY UNDERGOING FIXED AXIS ROTATION:

Types of rigid-body motion, angular motion-fixed axis rotation, application of kinematic equations, kinetics of fixed axis rotation.

WORK-ENERGY METHOD:

Work-energy equation for translation, interpretation and computation of work, work-energy applied to particle motion, power, efficiency, applied to fixed-axis rotation, work-energy applied to connected systems, work-energy method.

TEXT BOOK:

Vijaya Kumar Reddy K and Suresh Kumar J(Adapters), "*Singer`s Engineering Mechanics : Statics and Dynamics*", Third edition (SI Units), BS Publications, Hyderabad, 2011

REFERENCES :

1. Timoshenko SP and Young DH, Rao and Pytel, "*Engineering Mechanics*", fourth edition, McGraw Hill international editions, 2013.
2. Hibbeler RC, " *Engineering Mechanics : Statics* ", low price edition, Pearson Education,2000.
3. Hibbeler RC, " *Engineering Mechanics : Dynamics* ", low price edition, Pearson Education,2000.
4. Tayal AK "*Engineering Mechanics: Statics and Dynamics*", Thirteenth edition, Umesh Publications, Delhi, 2005

PHYSICS LAB

(Common to all Branches)

Subject Code: 13BP1102

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to involve the students to learn the subject and gain knowledge in handling the apparatus which will help them in designing devices and to trouble shoot the problems in their future professional work. The experiments are designed to cater to the needs of the students of all branches.

Course Outcomes:

The course will help the student in handling different apparatus for conducting various experiments in different fields which enables the student to trouble shoot the problems in their future professional work.

ANY TEN OF THE FOLLOWING 15 EXPERIMENTS

ERROR ANALYSIS AND GRAPH DRAWING (LECTURE - DEMO).

1. Bending of beams – Elliptical and Hyperbolic fringes - Determination of 'Y'.
2. Torsional pendulum - comparison of rigidity modulii of various wires.
3. Melde's experiment – determination of frequency of electrically maintained tuning fork.
4. Determination of wavelength of laser light using diffraction through a graded scale.
5. Particle size determination using He-Ne laser (Lycopodium powder).
6. Diffraction grating – determination of wavelengths of spectral lines of Mercury spectrum by minimum deviation method.
7. Spectrometer – determination of dispersive power of the material of a prism.

8. Polarization of light – verification of Malu's law and to determine the Brewster's Angle for glass.
9. Determination of Planck's constant.
10. Solar cell characteristics – I-V characteristics, measurement of efficiency and Fill factor.
11. Stewart – Gee apparatus – study of variation of magnetic field along the axis of circular current carrying loop.
12. LCR series and parallel resonance circuit study the frequency response.
13. Familiarity of CRO – Lissajjou's figures - determination of time period, voltage, frequency and phase of a wave.
14. Newton's Rings- determination of wavelength of the source/radius of curvature of given convex lens.
15. Optical fibres- determination of Numerical aperture, acceptance angle and bending losses.

COMPUTER PROGRAMMING LAB
(Common to all Branches)

Course Code : 13CT1103

L	T	P	C
0	0	3	2

Course Educational Objectives:

The main objectives of the course are to give the basic knowledge of C Language with practical orientation of various features present in this language.

- To give exposure about RAPTOR tool to design flow charts.
- To give hands on exposure to the students in developing the programs.
- Develop programs by using simple and optimized logic.
- Maximizing the usage of various C programming features.
- To give hands on exposure to the students to work with files.

Course Outcomes:

Upon completion of the course the student will be able to

- Gets exposure on RAPTOR tool.
- Learn how to program basic mathematical operation using various loops like for, while, do while, and switch statement.
- Program various string handling functions.
- Program various file operations.
- Gets an idea on maximizing the usage of various C programming features.

LIST OF PROGRAMS:

1. Demonstration of RAPTOR Tool to generate flowcharts by considering simple algorithms. Generation of flow charts to solve problems such as Temperature Conversion, Swapping of Two numbers etc. using RAPTOR Tool.

2. Write C Programs to solve problems such as Student Grading, Income Tax Calculation, and Largest of three Numbers etc., which expose students to various categories of IF Statements. Generate flowcharts using RAPTOR Tool.

3. a) Write a C program to find the roots of a quadratic equation.

   b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

4. a) The total distance travelled by vehicle in 't' seconds is given by distance = $ut+1/2at^2$

   where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write a C

   program to find the distance travelled at regular intervals of time given the values of

   'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

   b) Write a C program to determine whether a given number is an Armstrong or not.

   (If the sum of the cubes of the number is equal to the original number, then the number

   Is called Armstrong number. Eg: 371 is Armstrong number ($3^3+7^3+1^3= 371$))

5. a) Write a C program to find the sum of individual digits of a positive integer.

   b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

6. a) Write a C program to calculate the following sum:

   $Sum=1-x^2/2! +x^4/4!-x^6/6! +x^8/8! -x^{10}/10!$

b) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

7. a) Write a C program to generate Pascal's Triangle.

   b) Write a C program to construct a Pyramid of Numbers.

8. Write C programs that use both recursive and non-recursive functions for the following

   a) To find the factorial of a given integer.

   b) To find the GCD (greatest common divisor) of two given integers.

9. a) Write a C function to read in two numbers, x and n, and then compute the sum of this geometric progression:

   $1+x+x^2+x^3+\ldots\ldots\ldots\ldots + x^n$. Also perform error checking by considering negative values for n and also check for illegal values of x.

   b) Write a C function to read in two numbers, x and n (no. of terms), and then compute sin(x) and cos(x).

10. a) Write a C program to find the largest and smallest number in a list of integers.

    b) Write a C program to perform Matrix Addition & Matrix Multiplication.

    c) Write a C program to compute Transpose of a Matrix.

11. a) Write a C program to exchange value of two integers using call by value and call by reference.

    b) Write C programs to demonstrate the use of Pointers.

12. Write user defined string handling functions to implement the following standard library functions: strlen(), strcpy(), strcat(), strrev(), strcmp().

13. a) Write a C program that displays the position/ index in the string S where the string T begins, or –1 if S doesn't contain T.

    c) Write a C program to determine whether a given string is Palindrome or not.

14. Write a C program that uses functions to perform the following operations:

    a) To insert a sub-string in to given main string from a given position.

    b) To delete n Characters from a given position in a given string.

    c) To replace a character of string either from beginning or ending or at a specified location.

15. a) Write a C program to find the two's complement of a binary number.

    b) Write a C program to convert a Roman numeral to its Decimal Equivalent.

16. Write a C program that uses functions to perform the following operations using Structures:

    a) Reading a complex number.

    b) Writing a complex number.

    c) Addition of two complex numbers.

    d) Multiplication of two complex numbers.

17. a) Write a C program which copies one file to another.

    b) Write a C program to count the number of characters, lines, words, tabs and spaces in a given file.

ENGINEERING DRAWING

(Common to all Branches)

Course Code:13ME1103

L	T	P	C
1	0	3	3

Course Educational Objectives:

To make the student

- ✤ Familiar with the drawing practices and conventions.
- ✤ Familiar with projections of points, lines, planes and solids
- ✤ Familiar with isometric views

Course Outcomes:

Student will be able to

- ✤ Draw various types of engineering curves
- ✤ Draw orthographic projections of points, lines, planes and solids inclined to one plane or both the planes
- ✤ Draw isometric views of simple solids

LIST OF EXERCISES

1. Introduction to engineering drawing & basics of geometrical construction
2. Construction of parabola, ellipse, hyperbola- general method
3. Cycloid, epicycloids, hypocycloid, involutes of circle and square
4. Projections of points
5. Projections of lines inclined to one plane
6. Projections of lines inclined to both the planes
7. Projections of planes inclined to one plane
8. Projections of planes inclined to both the planes
9. Projections of solids in simple positions

10. Projections of solids inclined to both the planes

11. Isometric views

TEXT BOOK:

N.D. Bhatt and V.M. Panchal, *"Engineering Drawing"*, Charotar Publication House, 49th Edition, 2008.

PROFESSIONAL ETHICS

(Common to all Branches)

Course Code: 13NM1101	L	T	P	C
	2	0	0	0

Course Educational Objectives:

- To educate and make the young generation students aware of their Social responsibilities make an Endeavour to tell them first we are humans and then we are scientists, engineers, technocrats and professionals.
- To make students accountable to whatever job they do whether it is less paid or heavily paid.
- To inculcate a spirit of togetherness, unity and team work in an organization.
- To make him reasonably a 'good' professional conscious of his duties to the society that graced this wonderful life.
- To induce the spiritual aspect of life in one's own practical and real life.
- To give an overview of a decent, dignified, humane, dedicated professional with a sense of social responsibility and security.

Course Outcomes:

By the end of this course, it is expected that the student will be able to

- Deal with complex situations while dealing with the people in the society (parents, friends, and co-professionals) in making the work environment congenial, encouraging and loving.
- Discriminate when he is forced through certain undesirable and ambiguous situations either in his day today life as a student and as a professional in his career further.
- Understand the basics regarding the leadership and to become a conscious professional.

- ✤ Be aware of codes of professional bodies.
- ✤ Implement these concepts in one's career for achieving excellent job satisfaction.

UNIT-I (6 Lectures)

BASIC HUMAN VALUES:

'Be a Human First and then one can become a good Professional'; so the basic Human Values-Truth, Right Conduct (Righteousness), Love, Non-violence and Peace, Humility and character. What is ethics? Core areas of ethics: Social ethics, personal ethics Integrity and Trustworthiness, Honesty, Loyalty, Courage, Prudence, Confidence, Confidentiality.

Character: definition, 'A bundle of Virtues and weaknesses of Head and Heart- the resulting individuality of a person from the balance sheet of 'good' and 'bad qualities' is his/her character.

TRAITS OF GOOD CHARACTER:

Honesty and integrity, sense of duties and obligations to one's own profession, Adherence to truth and principles, excellent team work with a good rapport with the subordinates and colleagues, self-discipline, Responsibilities and accountability, self-lessness. Unity in thought, word and deed (Case studies relating to these aspects can be drawn from history & epics or from one's own experience)

Human values as practiced in the Indian societal context-past and present. (Examples drawn from any standard scriptures and many other sources available may be illustrated, debated and discussed).

Spirit of Nationalism and Patriotism with examples from 'struggle for Freedom' (Case studies in the lives of Mahatma Gandhi & His team who strived for Freedom from the British, Scientists and Engineers like Bhaha, Sarabhai, Dhavan, Abdul J Kalam, and Benjamin Franklin, Martin Luther King, or any renowned personalities)

UNIT-II (6 Lectures)

What is a profession? Who is a Professional? Special criteria to meet the definition of professional, criteria to be a 'professional engineer (Pages 24-36) of Mike W Martin and Roland Schinzinger)

The 5 Ds (Discipline, Devotion, Dedication, Discrimination and

Determination) against 3 Ps (Pay-Prospects and Promotion)

Personal ethics-Social ethics and professional ethics – are they different- How would you distinguish? –A debate

General and Applied ethics, Relationship between these two in day-to-day functioning of an Engineering Professional- (Pages 10-12 of Mike W Martin and Roland Schinzinger)

PROFESSIONAL AND ENGINEERING ETHICS:

Why Engineering ethics? Moral issues encountered by professional engineers during their day-to-day operations both at home and office/workplace- Moral problems that frequently arise in ones Profession, (case studies from Chapter 1 pages 2-9, analysis of the case studies on pages 13 &14)

MORAL AUTONOMY:

Moral integrity and social and professional behavior. Different theories proposed under moral autonomy-Kohlberg's and Gilligan's Theory. Heinz's Dilemma- Motive behind aggression (16-23 Pages)

LEADERSHIP IN PROFESSIONALISM:

Characteristics of a Leader? Case studies and examples (Leadership by Dr M L Chibber)

UNIT-III (6 Lectures)

Religion and Ethics and Morals-Debate and discussion- Spirituality, social consciousness and ethics

THEORY ABOUT MORALITY:

Virtue ethics, Utilitarianism, Duty ethics, Right ethics based on the concepts of Virtues and vices, most good for most people, Duties to respect for persons, Human rights respectively (pages 53-61, Study Questions for analysis and discussion on pages 60 &61)

Engineering Profession as a social responsibility, His responsibility and accountability while dealing with public issues such as safety, risk, hazards, Risk Analysis and assessment-a brief discussion (risk assessment problem on Page (Chapter 4, specified topics and Case studies)

(Present the case studies on Challenger space shuttle(97), Chernobyl (173), Bhopal tragedy (299), Titanic disaster (p 83), SLV-3, the Indian

Space Shuttle (Wings of Fire) recent nuclear holocaust in Japan recent floods and other man-made and natural calamities or accidents we come across frequently in our society)

Environmental ethics (304-308) & Computer ethics 319-323328-330) (All Pages from Mike W Martin and Roland Schinzinger)

UNIT-IV (6 Lectures)

RESPONSIBILITIES AND RIGHTS OF ENGINEERS:

Collegiality (Ones attitude) towards other engineers working in the same Organization or outside) and Loyalty (to the Employer), obligation of Loyalty and misguided loyalty, Respect for authority and its limitations, Bootlegging, Collective bargaining, Commitments and Convictions (APJ Abdul Kalam's "Wings of Fire") Confidentiality while changing jobs, Conflicts of interests, Gifts, bribes, kickbacks -case studies related, Occupational Crime and industrial espionage

Whistle blowing and moral guide line (case studies), Discrimination, preferential treatment and harassment Rights of Engineers (page 284-286)

Selected topics from Ch 5 and 6 and case studies on pages 200-201,

UNIT-V (6 Lectures)

Engineers as Managers and leaders promoting ethical climate (350-358)

–Ethics in Engineering by Mike W Martin and Roland Schinzinger)

Why a code of Ethics for professional Engineers? ('A code of ethics is not something you post on the Bulletin board; it is something you live every day in your life and career)

Code of ethics for Engineers, Organizational Culture, and Guidelines for use with the Fundamental canons of ethics; (pages 142-162 Indian Culture and Professional Ethics by P S R Murty and 399-414 0f Mike W Martin and Roland Schinzinger)

PROFESSIONAL BODIES:

IEEE, IETE, IE, ASME, ASCE, ABET, NSPE, ISTE Etc…

{** Any topic can be discussed and debated with known live examples and illustrations we find in our day-to-day -living circumstances.}

TEXT BOOKS :

1. Mike W Martin and Ronald Schinzinger : *"Ethics Engineering"*, 3rd Edition, Tata McGraw Hill Education Pvt. Ltd., 2003.
2. P S R Murthy : *"Indian Culture Values and Professional Ethics"*, 2nd Edition, B S Publications, Hyderabad. 2013.

REFERENCES:

1. M. Govindarajan, S Natarajan and V.S. Senthil Kumar : *"Engineering Ethics and Human Values"*, 1st Edition, PHI Publications , 2013.
2. A. Alavudden, R. Kalil Rahaman & M . Jayakumaran : *"Professional Ethics & Human Values"*, 1st Edition, University Science Press (An Imprint of Laxmi Publications Pvt Ltd., Chennai, Bangalore. 2008.
3. Lieunt Gen Dr. M. L. Chibber : *"Leadership-Education in Human Values"*, Sri Sathya Sai Books and Publications Trust, Prasantinilayam, 1st Edition, 2009.
4. Kalam A P J : *"Wings of Fire"*, Universities Press Publications, 2013.
5. Charles B. Fleddermann : *"Engineering Ethics"*, 4th Edition, PHI, 2012.

NOTES

SYLLABI FOR II SEMESTER

ENGLISH

(Common to all Branches)

Course Code: 13HE1101

L	T	P	C
4	0	0	3

Course Educational Objectives:

Enabling the students to

- ✤ Understand class room lectures in different subjects
- ✤ Read technical and general materials including literary, scientific, political, economic and cultural topics of interest
- ✤ Develop effective written communication in academic, technical and professional contexts
- ✤ Develop creative and critical thinking skills necessary to become employable

Course Outcomes:

The learners will be able to show:

- ✤ Skills in reading including skimming, scanning, intensive and extensive and comprehension
- ✤ Enriched vocabulary and become better communicators
- ✤ Skills of communicating in descriptive, analytical and narrative modes with felicity
- ✤ Creative and critical thinking skills for employability

Course work:

To achieve the above objectives, instruction will be imparted through relevant ESP materials, articles and editorials from newspapers, technical journals, magazines in classes and laboratory. Students will be given individual and integrated practice in LSRW skills.

Contents:

Reading Comprehension - Reading in various degrees of speed (slow, fast, very fast); reading different kinds of texts for different purposes (for example, for relaxation, for information, for understanding, for discussion at a later stage etc.); reading between the lines, skimming and scanning and so on.

Vocabulary –synonyms, antonyms, prefixes, suffixes, confusables, one-word substitutes, Idioms and phrases

WRITING:

- ✤ Grammar: Common errors, articles, prepositions, tenses, concord, phrasal verbs, modal verbs, conditionals, transformation of sentences, punctuation and spelling
- ✤ Selecting materials for expository, descriptive, and argumentative pieces summarizing and abstracting
- ✤ Paragraph writing with coherence, cohesiveness and clarity,
- ✤ Essay writing- variety in sentences and paragraphs, précis writing
- ✤ Business letter writing
- ✤ Reference skills; use of dictionary, library and internet sources

SYLLABUS

UNIT-I (13 Lectures)

1. Story of Insects (English Today)
2. Bringing up Boys & Girls (Academic Encounters)
3. The Lunatic, the Lover and the Poet (The Siren's Song)
4. Vocabulary Building: Prefixes, Suffixes, One-Word Substitutes etc.

UNIT-II (14 Lectures)

1. Unity of Minds by Dr. A.P.J. Kalam (English Today)
2. On His Blindness (The Siren's Song)
3. Cultural Variation & Change (Academic Encounters)
4. Grammar: Tenses & Concord

UNIT-III **(11 Lectures)**

1. Three Years She Grew in Sun and Shower (The Siren's Song)
2. Advertising in the Media (Academic Encounters)
3. Grammar: Articles & Prepositions
4. Paragraph Writing; Technical Description-Process, Object

UNIT-IV **(12 Lectures)**

1. A Special Kind of Blessing (English Today)
2. Techniques of Solving Crimes (Academic Encounters)
3. La Belle Dame Sans Merci (The Siren's Song)
4. Précis writing &Letter Writing

UNIT-V **(10 Lectures)**

1. I Have A Dream (English Today)
2. Because I Could not Stop for Death (The Siren's Song)
3. Writing: Note Taking & Note Making ,Essay writing
4. Grammar: Simple, Compound & Complex Sentences

TEXTBOOKS:

1. Kristine Brown & Susan Hood, *"Academic Encounters: Life in Society Reading, Study Skills, Writing, London"*, Cambridge University Press/ Foundation Books, 2006.
2. K Durga Bhavani, G. K. Subbarayuydu, C. Vijayasree, D. Prema Kumari & Y. L. Srinivas, *"English Today: A Course in Reading and Writing"*, Foundation Books, 2005.
3. David Murdoch, The Siren's Song, "*An Anthology of British and American Verse*", Madras, Orient Longman, 1993.

REFERENCS:

1. Alec Fisher, *"Critical Thinking An Introduction"*, New Delhi: CUP, First South Asian Edition, 2011.
2. Bikram K. Das, Kalyani Samantray, Rath Nayak, Susmita Pani & Saveeta Mohanty, "*An Introduction to Professional English and Soft Skills*", New Delhi, Foundation Books, 2009.

3. *"Regional Institute of English, English for Engineers"*, New Delhi, Foundation Books, 2006.
4. Sharon J.Gerson, Steven M.Gerson, *"Technical Writing"*, New Delhi, Pearson education, 2007.

SUGGESTED READING:

Stories of humour, adventure, mystery and autobiographies of eminent scientists.

MATHEMATICS-II

(Common to all Branches)

Subject Code:13BM1102

L	T	P	C
4	1	0	3

Pre requisites:

- ✤ Basic formulae of differentiation and integrations.
- ✤ Basic terminology and elementary operations on Matrices.
- ✤ Basic concept of partial differentiation.

Course Educational Objectives:

- ✤ The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
- ✤ The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.
- ✤ Understand the most basic numerical methods to solve simultaneous linear equations.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- ✤ Solve simultaneous linear equations using matrix methods.
- ✤ Calculate eigenvalues and eigen vectors of matrices that are essential for vibration/design analysis.
- ✤ Understand Fourier series, integral ,transforms and they are provided with practice in their application and interpretation in a range of situations.
- ✤ Identify/classify and solve the different types of partial differential equations.

UNIT-I (12 Lectures)

MATRICES:

Rank, Normal form, Echelon form, Consistency and Solution of system of simultaneous linear homogeneous and non-homogeneous equations. Finding eigenvalues and eigen vectors, properties, Cayley-Hamilton theorem, computing inverse and powers of a matrix by applying Cayley-Hamilton theorem, Diagonalisation of matrix.

(2.7, 2.10, 2.13 -2.16)

UNIT-II (12 Lectures)

NUMERICAL METHODS IN LINEAR ALGEBRA:

Solution of linear simultaneous equations: LU decomposition, Jacobi iteration and Gauss-Seidel methods. Determination of eigenvalues and eigen vectors by iteration (Rayleigh's Power Method) .

(28.5, 28.6(3), 28.7(1)(2), 28.9)

UNIT-III (12 Lectures)

DIFFERENCE EQUATIONS AND APPLICATIONS:

Difference operators (forward, backward and shift operators), Introduction to difference equation, formation of difference equation, Linear difference equations and it's complete solution. Rules for finding the complementary function and complete integral, Deflection of a loaded string.

(29.1, 29.4, 31.1 - 31.6, 31.8)

UNIT-IV (12 Lectures)

FOURIER SERIES:

Euler's formulae, Dirichlet's Conditions for a Fourier expansion, functions having points of discontinuities, Change of interval, even and odd functions, half range series, wave forms.

FOURIER TRANSFORMS :

Fourier integral theorem, Fourier transform and inverse Fourier transform, Fourier sine and cosine integrals. – Fourier sine and cosine transforms – properties of Fourier Transforms – Finite Fourier transforms.

(10.1 – 10.9, 22.1 – 22.5)

UNIT-V (12 Lectures)

PARTIAL DIFFERENTIAL EQUATIONS:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – solutions of first order linear (Lagrange) equation and nonlinear first order (standard type) equations.

APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS:

Method of separation of variables, Classification of second order linear Partial Differential Equations. Solutions of one dimensional heat equation, wave equation and two-dimensional Laplace's equation under initial and boundary conditions. (17.1 – 17.3, 17.5, 17.6, 18.1-18.7)

TEXT BOOK:

Dr.B.S.Grewal *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. Kreyszig E, "*Advanced Engineering Mathematics*", 8th Edition, John Wiley, Singapore, 2001.
2. Greenberg M.D, "*Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, "*Advanced Engineering Mathematics*", 7th Edition, Cengage Learning, 2011.

CHEMISTRY

(Common to all Branches)

Course Code: 13BC1101

L	T	P	C
4	0`	0	3

Course Eductational Objectives:

The course attempts impart a sound knowledge on the principles of chemistry involving different application oriented topics to requied for all engineering branches.

Course Outcomes :

The student should able to apply

- ✤ The principles involved in corrosion and its control
- ✤ Treatment of water for industrial purpose and concepts of energy storage devices.
- ✤ Utillisation of polymer engineering materials towards different applications.

UNIT-I (10 Lectures)

ELECTROCHEMICAL CELLS:

Electrode potential, Nernst equation, EMF of electrochemical cell, Reference electrodes-Standard hydrogen electrode, calomel electrode. Electrochemical series, Concentration cell, Construction of glass electrode, determination of P^H of given solution using glass electrode

Batteries-Primary cell-Dry or Lachanche cell, alkaline battery; secondary cells (storage batteries or accumulators) – Lead-acid Accumulator, Nickel-cadmium battery, Lithium ion battery (LIB) and redox flow battery.

Fuel cells - hydrogen - oxygen fuel cell, phosphoric acid fuel cell, solid oxide fuel cells

UNIT-II (12 Lectures)

CORROSION AND ITS CONTROL:

Introduction - Direct chemical corrosion and electrochemical corrosion and its mechanisms, Types of electrochemical corrosion-Differential aeration corrosion, galvanic corrosion, concentration cell corrosion, corrosion and pitting, stress corrosion, Galvanic series, passivity, factors influencing corrosion.

Corrosion control-proper designing, cathodic protection-sacrificial anodic protection and impressed current cathodic protection, modifying the environment and use of inhibitors.

Protective coatings- Anodic and cathodic coatings, Hot dipping-Galvanizing and Tinning, Metal cladding, Electroplating, Electroless plating, cementation or diffusion coatings.

UNIT-III (10 Lectures)

POLYMER TECHNOLOGY:

Polymerization, classification, degree of polymerization, functionality and tacticity of polymer, Types of polymerization-addition and condensation polymerization, Mechanism of addition polymerization, Condensation polymerization, Preparation, properties and uses of polythene, PVC, Teflon, nylons-6,6, Polyester, Bakelite and Silicones.

Plastics- Thermo plastics and thermosetting plastics, compounding of plastic.

Elastomers-Natural and synthetic rubbers, Manufacture, properties and applications of natural rubber-vulcanization, compounding of rubber, Synthetic rubbers-Preparation, properties and applications of Buna-S and Buna-N.

UNIT-IV (12 Lectures)

WATER TECHNOLOGY:

Introduction-characteristics imparted by impurities, hardness of water – Temporary and permanent hardness- units, Determination of hardness by EDTA method, Disadvantages of hard water, Chemical aspects of scale and sludge formation in boilers, caustic embrittlement,boiler corrosion, priming and foaming, Municipal water treatment-sedimentation, coagulation,

and filtration, Desalination of brackish water, Water softening methods-lime -soda method, zeolite method and ion exchange process.

UNIT-V (16 Lectures)

ENGINEERING MATERIALS:

Fuels- classification, characteristics of fuel, calorific value –determination of calorific value by bomb calorimeter and Junkers gas calorimeter, theoretical calculation of calorific value, Types and Analysis of coal - Proximate and ultimate analysis of coal, Manufacture of coke- Petroleum-classification based on sources of petroleum, Refining of petroleum, Knocking, octane value, cetane value, Cracking -thermal cracking and catalytic cracking-fixed bed & moving bed catalytic cracking, reforming.

Cement: Classification of cement, chemical composition, functions of ingredients in Portland cement, Manufacture of Portland cement- raw materials, setting and hardening of Portland cement.

Refractories- Classification and properties of refractories, Failures of refractory materials.

Lubricants-friction, lubrication, functions of lubricants, mechanism of lubrication-thick film, thin film and extreme pressure lubrication, types of lubricants- solid, semisolid and liquid lubricants and their properties .

TEXT BOOKS:

1. Jain& Jain, *"A text book of Engineering Chemistry"*, 15th Edition, Dhanapat Roy publishing company, 2010.
2. Sasichawla, *"Engineering Chemistry"*, 3rd Edition, Dhanapat Roy publishing company, 2004.

REFERENCES:

1, S.S. Dara, *"A Text book of Engineering Chemistry"*, 11th Edition, S.Chand & Co, 2006.
2. C. Parameswara Murthy, C.V. Agarwal and Andhra Naidu, *"A Text Book of Engineering Chemistry"*, 1st Edition, B.S. Publications, 2006.

BASIC ELECTRICAL ENGINEERING

Course Code: 13EE1142

L	T	P	C
4	0	0	3

Pre requisites: Basic Electrical Laws.

Course Educational Objectives:

- ✤ Basic Electrical Engineering is a basic fundamental course for the disciplines of CSE,IT and MECHANICAL.
- ✤ Hence it is introduced in I-Year so that the students will have to understand the topics related to Electrical Applications in the later studies.

Course Outcomes:

- ✤ Students acquire knowledge on the basics of electrical engineering and get ability to solve simple electrical network problems.
- ✤ And also will be knowledgeable enough to conduct experiments in electrical machines and miserable instruments.

UNIT-I (12 Lectures)

INTRODUCTION TO ELECTRICAL DC CIRCUITS AND THEOREMS:

Introduction, SI units, charge & current, voltage, power & energy, circuit elements. Ohm's law, Nodes, Branches & Loops, Kirchoff's laws, series resistors and voltage division, parallel resistors and current division(simple problems).

Wye–Delta transformation, source transformation, super position, Thevenin's, Norton's, Maximum power transfer theorems (simple problems).

UNIT-II (12 Lectures)

MAGNETIC CIRCUITS AND AC CIRCUITS

Magnetic field due to Electric current, force on current carrying conductor, Electro Magnetic Induction, Direction of Induced EMF's, EMF induced in a coil, comparison of electric, magnetic circuits, self and mutual inductance.

Introduction, Capacitors, series and parallel capacitors, Inductors, series, parallel inductors, sinusoids, Phasors, phasor relationships for circuit elements, impedance, admittance, instantaneous and average power, RMS values, apparent power, power factor, complex power.

UNIT-III **(12 Lectures)**

TRANSFORMERS AND DC MACHINES

TRANSFORMERS: Working Principle, construction, types, rating, induced EMF, ideal transformer, magnetizing and core loss current, voltage regulation, efficiency (simple problems), Auto transformer (elementary treatment only).

DC MACHINES: Constructional features, emf and torque, DC machine excitation, characteristics of DC motors and speed control, losses, efficiency (simple problems), (elementary treatment only).

UNIT-IV **(12 Lectures)**

AC MACHINES

SYNCHRONOUS MACHINE : Constructional details, EMF equation, determination of synchronous reactance, voltage regulation (simple problems), Principle of operation of a synchronous motor.

INDUCTION MOTOR: Constructional details, principle of operation, slip, rotor frequency, torque equation (simple problems) (Elementary treatment only).

UNIT-V **(12 Lectures)**

BASIC INSTRUMENTS:

Introduction, classification of Instruments, operating Principles, Basic requirements for measurement, Moving Coil Permanent Magnet (PMMC) instruments, Moving Iron of Ammeters and Voltmeters (elementary treatment only).

TEXT BOOKS :

1. Charles k Alexander, Mathew N.O. Sadiku, *"Fundamentals of Electric circuits"*, 4th Edition McGraw-Hill Companies, 2009.
2. D.P. Kothari & I.J. Nagrath , *"Theory and Problems of basic Electrical Engineering"*, 1st Edition, PHI publications, 2010.

REFERENCES:

1. Hughes by I Mckenzie Smith, *"Electrical & Electronic Technology"*, 10th Edition, Pearson Education,2010.

ELECTRONICS ENGINEERING

Course Code: 13EC1141

L	T	P	C
4	0	0	3

Course Educational Objectives:

To provide the students with an introductory and broad treatment of the field of Electronics Engineering.

Course Outcomes:

- ✤ Students get familiarity with amplifiers and oscillators and digital circuits.

UNIT-I (12 lectures)

SEMICONDUCTOR DIODE:

Classification of materials, energy levels, intrinsic and extrinsic semiconductor, conduction in metals and semiconductors. Characteristics of PN junction diode, Applications of Diode- Switch, Rectifier with and without filters.

UNIT-II (12 lectures)

BIPOLAR JUNCTION TRANSISTOR:

Bipolar Junction Transistor structure , Principle of operation, transistor as a switch , transistor as an amplifier, Transistor (BJT) configurations CB, CE, CC, Relation between a, â, ã. Input and output characteristics of BJT.

UNIT-III (12 lectures)

FEEDBACK AMPLIFIERS:

Concept of feedback, advantages & disadvantages of negative feedback amplifier, feedback amplifier topologies, effect of negative feedback on Input and Output Resistances.

OSCILLATORS:

Classification of oscillators, Barkhausen's criterion, RC phase shift oscillator, Hartley and Colpitts oscillators.

UNIT-IV (12 Lectures)

NUMBER SYSTEMS & BOOLEAN ALGEBRA:

Binary number systems and codes, complement representation of negative numbers, Basic Logic Gates and Truth Tables, Boolean algebra, De Morgan's Theorems, Logic Circuits, Encoder, Decoder, Multiplexer, Demultiplexer.

UNIT-V (12 Lectures)

A/D AND D/ACONVERTERS:

Basic Principle of Analog–to-Digital (ADC) and Digital-to-Analog (DAC) Conversion, Successive Approximation type, Dual slope ADCs, Weighted Resistor and R-2R Ladder Type DAC.

TEXT BOOKS:

1. J Millman and C.C.Halkias, *"Electronics Devices and Circuits"* TMH 1998.
2. Morris Mano, *"Digital Design"* PHI, 3rd Edition, 2006.
3. D. Roy Chowdhury , *"Linear Integrated Circuits"* , New Age International (P) Ltd, 2nd Edition,2003.

REFERENCES:

1. B.Visweswara Rao, K.Bhaskara Murthy, K.Raja Rajeswari, P.Chalam Raju Pantulu, *"Electronic Devices and Circuits"*, Pearson Publications, 2nd Edition, 2009.
2. Raju GSN, *"Electronic Devices Electronic Devices and Circuits"*, IK International Publishing House, 1st Edition, 2006.
3. Lal Kishore, *"Electronic Devices & Circuits"*, Vol I",BSP publications, 2nd Edition, 2005.

CHEMISTRY LAB

(common to all Branches)

Course Code: 13BC1103

L	T	P	C
0	0	3	2

Course Educational Objectives:

The course is to develop the basic experimental skills and analytical thinking.

The course attempt to provide information regarding various chemical techniques used in quantitative chemical analysis.

Course Outcomes:

The student will be able to determine the substance quantitatively and analyse the data obtained to resolve the prolem in their respective areas.

LIST OF EXPERIMENTS :

1. Determination of ferrous iron.
2. Determination of ferric iron.
3. Determination of total hardness of water.
4. Determination of carbonate and bicarbonate of water.
5. Determination of dissolved oxygen.
6. Determination of available chlorine in bleaching powder.
7. Determination of zinc by potassium ferrocyanide.
8. Determination of copper by EDTA method
9. Determination of calcium by permanganate.
10. Determination of iron-II by potentiometric method.
11. Determination of viscosity of lubricant by viscometer.
12. Determination of flash and fire points of lubricant.
13. Determination of percentage residue of carbon in oils.

14. Determination of calorific value of solid fuels.
15. Determination of fluoride by spectrophotometric method.
16. Determination of iron in cement by spectrophotometric method.

REFERENCE:

A.I.Vogel, *"A Text book of quantitive chemical analysis"*, 6th Edition, Pearson Education, Pvt. Ltd., 2002.

ENGLISH LANGUAGE LAB
(common to all Branches)

Course Code : 13HE1102

L	T	P	C
0	0	3	2

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

Course Educational Objectives:

- To make students recognise the sounds of English and Phonemic transcription through Audio-Visual aids and Computer Software.
- To help them overcome their inhibitions and self- consciousness while communicating in English and to build their confidence.
- To enable them to speak English intelligibly with focus on Stress and Intonation.

Course Outcomes :

- Students will be able to recognise the sounds of English and Phonemic transcription, practice Stress & Intonation in speech.
- They will learn to communicate in Oral and Written English forms confidently.
- They will also be able to demonstrate skills like Publik Speaking & Oral Presentations. Students will also exhibit debating and discussion skills.

SYLLABUS:

The following course content is prescribed for the English Language Laboratory sessions:

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Listening for Comprehension

4. Situational Dialogues.
5. Oral Presentations- Prepared & Extempore
6. 'Just A Minute' Sessions (JAM)
7. Telephonic communication
8. Group Discussions
9. Debate
10. Team Presentations (PPTs).
11. Reference Skills

REFERENCES:

1. E. Suresh Kumar , P. Sreehari, *"A Handbook for English Language Laboratories"*, Foundation Books, revised edition 2009.
2. Simon Sweeny, *"English for Business Communication"*, CUP, First South Asian Edition, 2010.
3. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
4. Daniel Jones, English Pronouncing Dictionary with CD.
5. T. Balasubramanian, *"A Text book of English Phonetics for Indian Students"*, Macmillan, 1981.
6. Jeremy Comfort, Pamela Rogerson, Trish Stott & Derek Utley, *"Speaking Effectively : Developing Speaking Skills for Business English"*, Cambridge University Press, First South Asian Edition,2002.Reprint 2011.
7. T Samson, *"Innovate With English"*, New Delhi: Foundation Books, 2010.
8. Meenakshi Raman & Sangeeta Sharma, *"Technical Communication Principles & Practice"*, New Delhi: OUP, 2010.

COMPUTER AIDED ENGINEERING DRAWING

(Using any standard package)

Course Code:13ME1104

L	T	P	C
0	0	3	2

Course Educational Objectives

To make the student familiar with the drawing using standard software tool

- Projections of solids
- Projections of section of solids
- Projections of development of surfaces
- Projections of intersection of surfaces
- Isometric views

Course Outcomes:

Student will be able to use software tool to draw

- Projections of solids
- Projections of section of solids
- Projections of development of surfaces
- Projections of intersection of surfaces
- Isometric views
- 3D modeling

Any 10 of the following exercises are to be performed:

1. Introduction to setting up a drawing

   Use of main menu (New, Open, Save, Save As etc.), Opening screen, error correction on screen, units, co-ordinate system, limits, grid, snap, ortho, etc

2. Exercises using basic sketch entities like line, circle, arc, ellipse, etc

3. Exercises using modify commands, dimensioning commands
4. Exercises on practice of 2D drawings using all commands in various tool bars
5. Exercises on projections of solids
6. Exercises on projections of Sections of solids
7. Exercises on development of surfaces
8. Exercises on intersection of surfaces
9. Exercises on orthographic views for simple solids
10. Introduction to 3D modeling using basic solid entities
11. Exercises on isometric views for simple solids using all commands in various tool bars. (Any two given exercises)
12. Conversion of isometric views to orthographic views and vice-versa

Note: Minimum of 2 drawings is to be performed in each exercise.

TEXT BOOKS:

1. N.D. Bhatt and V.M. Panchal, *"Engineering Drawing"*, 48th Edition, Charoter Publishing House, 2005.
2. S.Trayambaka Murthy, *"Computer-Aided Engineering Drawing"*, 3rd Edition, I.K.International Publishing House, 2006.

ENGINEERING WORKSHOP

(Common to all Branches)

Course Code :13MT1101

L	T	P	C
0	0	3	2

Course Educational Objectives:

To provide hands on experience on basic Engineering and IT related skills.

- ✤ To train the student in the basics of computer components, maintenance software(s) installation
- ✤ To train the students in office tools.
- ✤ To give the student exposure to DOS commands and LINUX commands.
- ✤ To demonstrate and train the students in basic professional trades.
- ✤ To train the students to know about different system tools in personal computer.

Course Outcomes:

At the end of the course the student will be able to

- ✤ Identify the peripherals of a computer, components in a CPU and its function
- ✤ Work with MS-OFFICE
- ✤ Work with DOS commands
- ✤ Work with LINUX commands
- ✤ Understands different system tools in personal computer.

COMPULSORY EXERCISES:

- ✤ Identification of the peripherals of a computer, components in a CPU and its function – Block diagram of the CPU along with the configuration of each peripheral. Disassembly and assembly of a personal computer.

- Installation of MS windows on the personal computer.
- One lamp controlled by a one-way switch and (b) Two-way switching for stair-case lamp.

ANY NINE EXPERIMENTS FROM THE FOLLOWING:

Carpentry: Making a Cross-half lap joint using wooden pieces.

Carpentry: Making a Mortise and Tenon joint using wooden pieces.

Fitting: Preparation of a V-fit between mild steel flat pieces.

Fitting: Preparation of a Square-fit between mild steel flat pieces.

Foundry: Preparation of a sand mould using a single piece pattern

Foundry: Preparation of a sand mould using a split piece pattern.

Tin-Smithy: Preparation of a sheet metal pipe-joint using tin-smithy tools.

Tin-Smithy: Preparation of a sheet metal funnel using tin-smithy tools.

Welding: Making a Lap joint through arc welding.

Lathe Machine: Demonstration of turning related activities on Lathe machine.

Black smithy: Demonstration of Plumbing trade.

Plumbing: Demonstration of plumbing trade

Operating System: Changing Boot Device Priority, Installation of Linux, putting passwords, Enabling and disabling external devices, Connectivity Boot Camp.

Hands on Exposure on Linux shell commands: Using man, info commands for finding information about commands. Using file processing commands (ls, cp, mv, ln, mkdir, rmdir, chmod etc..), Using text processing commands (grep, egrep, sed etc…), Using disk utility commands, mount commands (du, df, mount etc..), Vi-Editor.

MS-Word: Using Ms-Word, creating project abstract, creating newsletter, creating feedback form

MS- Excel: Excel orientation, creating scheduler, calculating CGPA, Performance Analysis

MS-PowerPoint: PPT Orientation, Slide Layouts, Custom Animation, Hyperlinks, inserting Images, Clip Art, Audio, Video, Objects, Tables, Charts.

System tools, Hardware Troubleshooting, Software Troubleshooting and Installations of Anti Virus.

Multimedia Flash (Adobe)

a. Introduction to Flash interface

b. Introducing the tools

c. Putting text into Flash

d. Smoothen/straighten drawings

e. Animation Part 1: Using layers, key frames and motion tweening

f. Animation Part 2: Shape tweening, motion guide and frame by frame animation

SYLLABI FOR III SEMESTER

PROBABILITY AND STATISTICS

(Common to CHE and ME)

Subject Code: 13BM1105

L	T	P	C
4	1	0	3

Pre requisites:

- ✤ Fundamentals of Set theory.
- ✤ Basic concepts of Probability.
- ✤ Basic concepts of calculus.

Course Educational Objectives:

To acquaint students with the fundamental concepts of probability and statistics and to develop an understanding of the role of statistics in engineering.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- ✤ Calculate fundamental concepts such as the cumulative distribution function, expectations, and distributions of random variables.
- ✤ Evaluate estimators, construct confidence intervals, and perform hypothesis tests.

UNIT-I **(12 Lectures)**

Discrete Random Variables, Mean and variance of a discrete distribution, Chebyshev's theorem, binomial distribution, Poisson Distribution, Poisson Process. (4.1, 4.2, 4.4, 4.5, 4.6, 4.7)

UNIT-II **(12 Lectures)**

Continuous Random variables - Probability density, Distribution. Calculating probabilities from Probability density, Determining Mean and Variance using Probability density, Normal Distribution- Density and Properties. Calculating Normal Probabilities, Normal Approximation to Binomial Distribution, Uniform Distribution. (5.1, 5.2, 5.3, 5.5)

UNIT-III **(12 Lectures)**

Population and sample, Sampling distribution of the mean(s known), Central Limit theorem (without Proof) and Problems, Sampling distribution of the mean(s unknown), Point Estimation, Maximum error and determination of sample size, Interval Estimation (Large sample and small sample)
(6.1, 6.2, 6.3, 7.1, 7.2)

UNIT-IV **(12 Lectures)**

Tests of Hypotheses (Introduction, Null hypotheses, Alternative hypotheses, Type –I,II errors, Level of significance, Hypotheses concerning one mean (Large and Small samples), Inference concerning two means (Large and Small samples), Paired t-test.

Estimation of Variances (point and Interval estimation), Hypotheses concerning one variance, Hypotheses concerning two variance, Estimation of Proportions, Hypotheses concerning one Proportion, Hypotheses concerning several Proportions.
(7.3, 7.4, 7.5, 7.8, 8.1, 8.2, 8.3, 9.1, 9.2, 9.3)

UNIT-V **(12 Lectures)**

Correlation regression: The method of least squares, curvilinear regression, multiple regression, correlation (excluding causation).
(11.1, 11.3, 11.4, 11.6)

TEXT BOOK:

Miller. Freund's, *"Probability and Statistics for Engineers"*, Richard A.Johnson, Seventh edition, Pearson education, 2005.

REFERENCE:

S.C. Gupta and V.K. Kapoor, *"Fundamentals of Mathematical Statistics"*, Ninth Revised Edition , Sultan Chand & Sons Educational Publishers, 2007.

MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTING

Course Code : 13HM1101

L	T	P	C
4	0	0	3

Course Educational Objectives :

To explain the basic principles of managerial economics, accounting practices and financial management techniques for effective business decision making and to promote entrepreneurial abilities among the budding engineers.

Course Outcomes :

To understand the economic environment and to give an idea on various accounting concepts and financial management techniques for effective utilization of economic resources.

UNIT-I (12 Lectures)

INTRODUCTION TO MANAGERIAL ECONOMICS & DEMAND:

Definition, Nature and Scope of Managerial Economics, Factors influencing managerial decision making process

Demand Analysis: Definition-types of demand - Demand Determinants, Law of Demand and its exceptions.

Elasticity of Demand: Definition, Types, Significance of Elasticity of Demand. Demand Forecasting: definition, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

UNIT-II (12 Lectures)

THEORY OF PRODUCTION AND COST ANALYSIS:

Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Types of Cost, Break-even Analysis (BEA)-Determination of Break-Even Point (Simple numerical problems) - Managerial Significance and limitations of BEA.

UNIT-III (10 Lectures)

BUSINESS & ENVIRONMENT:

Features of Business Organization, Features, Advantages & limitations of Sole Proprietorship, Partnership, and Joint Stock Company, Steps for formation and Registration of the company- Internal and External factors affecting business environment (PESTLE analysis)- Impact of environment on business

UNIT-IV (12 Lectures)

INTRODUCTION TO FINANCIAL ACCOUNTING:

Accounting Principles, Concepts & conventions, Double-Entry Book Keeping, Journal, Ledger, Trial Balance

UNIT-V (18 Lectures)

PREPARATION AND ANALYSIS OF FINANCIAL STATEMENTS:

Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments) - Financial statement Analysis (Comparative and Common Size Statements)- Ratio analysis (Liquidity Ratios, Activity ratios, Solvency and Profitability ratios)

TEXTBOOKS :

1 A R Aryasri, *"Managerial Economics and Financial Analysis"*, 2nd Edition, TMH, 2009

2 S A Siddiqui & A. S. Siddiqui, *"Managerial Economics & Financial Analysis"*, 1st Edition, New Age Publishers, 2005.

3 P Venkata Rao, J.V.Prabhakar Rao *"Managerial Economics and Financial Analysis"*, 1st Edition, Maruti Publications, 2012.

4 R.L.Varshney & K.L Maheswari, *"Managerial Economics"*, 5th Edition, S.Chand Publishers, 2005.

REFERENCES :

1 D N Dwivedi, *"Managerial Economics"*, 8th Edition, PHI, 2010.

2 S P Jain & KL Narang, *"Cost and Management Accounting"*, 3rd Edition Kalyani Publishers, 2004.

3 P.K.Sharma & Shashi K. Gupta, *"Management Accounting Principles and Practice"*, 1st Edition, Kalyani Publishers, 2004.

MECHANICS OF SOLIDS

Course Code:13ME1105

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student

- ✤ Study different types of stresses
- ✤ Know the stress and strain at any point in a member
- ✤ Understand the torsional behaviour of solid and hollow shafts
- ✤ Learn to draw shear force and bending moment diagrams

Course Outcomes:

The student will be able to

- ✤ Identify different types of stresses and strains
- ✤ Estimate the combined stresses due to torsion and bending for circular shafts
- ✤ Draw shear force and bending moment diagrams
- ✤ Draw Mohr's circle for stresses
- ✤ Evaluate the shear stresses in beams
- ✤ Apply Castigliano's theorem to find strain energy
- ✤ Calculate the lateral deflection at any point in a beam

UNIT-I (12 Lectures)

Tension, compression, shear and axially loaded members: Introduction to mechanics of materials, normal stress and strain, mechanical properties of materials, elasticity, plasticity and creep, linear elasticity, Hooke's law and Poisson's ratio, shear stress and strain, allowable stresses and allowable loads, design for axial loads and direct shear, changes in lengths of axially loaded members, changes in lengths of non uniform bars, statically indeterminate structures, thermal effects, stresses on inclined planes, strain energy and impact loading.

Analysis of stress and strain : Introduction, plane stress, principal stresses and maximum shear stresses, Mohr's circle for plane stress and Hooke's law for plane stress.

UNIT-II (12 Lectures)

TORSION:

Introduction, torsional deformations of a circular bar, circular bars of linearly elastic materials, non uniform torsion, stresses and strains in pure shear, relationship between moduli of elasticity E, G and K, transmission of power by circular shafts, strain energy in torsion.

UNIT-III (12 Lectures)

SHEAR FORCES AND BENDING MOMENTS:

Introduction, types of beams, loads and reactions, shear forces and bending moments, relationships between load, shear force and bending moment, shear force and bending moment diagrams.

Stresses in beams (basic topics): Introduction, pure bending and non uniform bending, curvature of a beam, longitudinal strains in beams, normal stresses in beams, design of beams for bending stresses, non prismatic beams, shear stresses in beams of rectangular cross section, shear stresses in beams of circular cross section, shear stresses in the webs of beams with flanges.

UNIT-IV (12 Lectures)

DEFLECTION OF BEAMS:

Introduction, differential equation of the deflection curve, deflections by integration of the bending moment equation, deflections by integration of the shear force and load equations, moment area method, Castigliano's theorem, strain energy of bending.

UNIT-V (10 Lectures)

THIN AND THICK CYLINDERS:

Thin cylinders, circumferential and longitudinal stresses, thick cylinders, derivation of formula for radial and hoop stresses, compound cylinders.

TEXT BOOKS:

1. James M.Gere, *"Mechanics of Materials"* 5th Edition, CBS publishers and distributors, 2004, New Delhi. (Unit I to IV).
2. S.Ramamrutham and R. Narayanan, *"Strength of Materials"* Dhanpatrai Publishers,16th Edition, 2008, New Delhi.(Unit V).

REFERENCES:

1. Beer and Johnston, *"Mechanics of Materials"*, Mc Graw Hill Publications, 6th Edition, 2011.
2. Rajput, *"Strength of Materials"*, S.Chand Publishers, 5th Edition, 1999.
3. Bansal, *"Strength of Materials"*, Lakshmi Publications, 4th Edition, 2005.

MATERIALS SCIENCE

Course Code: 13ME1106

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student

- ✤ To acquire fundamental knowledge about metals and materials used in engineering
- ✤ To understand crystal systems, constitution of alloys and phase diagrams.
- ✤ To select ferrous and non ferrous alloys and recognize their relative merits and demerits
- ✤ To acquire knowledge about ceramic, composite and nano materials.
- ✤ To understand basics of powder metallurgy technique

Course Outcomes:

The student will be able to

- ✤ Explain the constitution of alloys
- ✤ Apply phase diagrams for the study of alloys.
- ✤ Select various ferrous and non ferrous materials for engineering applications
- ✤ Select ceramic and composite materials for engineering applications

UNIT-I (12 Lectures)

STRUCTURE OF METALS:

Bonds in solids-metallic bond-crystal structure-BCC, FCC, HCP, unit cells, packing factor, crystallization of metals, grains and grain boundaries, effect of grain boundaries on properties of metals, crystal imperfections, determination of grain size.

MECHANICAL BEHAVIOR OF MATERIALS:

Elastic deformation, plastic deformation- twinning, fracture, fatigue, creep.

UNIT-II (12 Lectures)

CONSTITUTION OF ALLOYS:

Necessity of alloying, types of solid solutions, Hume Rothery rules, intermediate alloy phases and electron compounds.

Equilibrium diagrams: Phase rule, experimental method of construction of equilibrium diagrams, isomorphous alloy systems, equilibrium cooling and heating of alloys. lever rule, coring, miscibility gaps, eutectic systems. congruent melting intermediate phases, peritectic reaction, transformations in solid state – allotropy, eutectoid, peritectoid reactions, relationship between equilibrium diagrams and properties of alloys. study of important binary phase diagrams: Cu-Ni, Al-Cu, Bi-Cd.

UNIT-III (12 Lectures)

Metallurgy of iron and steel: Fe-Fe_3C equilibrium diagram, micro constituents in steels, classification of steels, structure and properties of plain carbon steels.

Heat treatment of steels- annealing, normalizing, hardening, TTT diagrams, tempering, hardenability, surface hardening methods, age hardening treatment

Effect of alloying elements on Fe-Fe_3C system, low alloy steels, stainless steels, Hadfield manganese steels, tool steels and die steels, structure and properties of white cast iron, malleable cast iron, grey cast iron and spheroidal grey cast iron.

UNIT-IV (12 Lectures)

Non-ferrous metals and alloys: Structure and properties of copper and its alloys, aluminum and its alloys and titanium and its alloys.

Polymeric materials: Structure and properties of polymeric materials and their applications

UNIT-V (12 Lectures)

CERAMIC MATERIALS:

Crystalline ceramics, glasses, cermets, abrasive materials, Nano materials-definition, properties and applications of the above.

COMPOSITE MATERIALS:

Classification of composites, particle reinforced materials, fiber reinforced materials, metal ceramic mixtures, metal-matrix composite and C-C composites. Introduction to powder metallurgy.

TEXT BOOKS:

1. Sidney H Avner, *"Introduction to Physical Metallurgy"*, Tata McGraw Hill, 2nd Edition, 2011.
2. Kodgire, *"Materials Science and Metallurgy"*, Everest Publishing House, 3rd Edition, 2012
3. Kalpakjian S, Schmid S, *"Manufacturing Engineering and Technology"*, Pearson Edu., 2009.

REFERENCES:

1. Van Vlack, *"Elements of materials science and Engineering"*, Dorling Kindersley (India) Pvt. Ltd., 2009.
2. V.Raghavan, *"Elements of materials science"*, Pearson Education, 2005.
3. Callistar, "Metallurgy and Materials Science", Wiley India, 2010.

THERMODYNAMICS

Course Code: 13ME1107

L	T	P	C
4	1	0	3

Course Educational Objectives:

To make the student understand

- Laws of thermodynamics, work, heat and entropy
- Properties of pure substances as functions of pressure and temperature
- Properties of ideal and real gases
- Thermodynamic relations and Clausius-Claypeyron equation
- Properties of atmospheric air and psychrometry

Course Outcomes:

The student will be able to

- Explain the basic principles, and the first, second and third laws of thermodynamic
- Explain the concept of entropy
- Read Mollier diagram and calculate thermodynamic properties of steam
- Estimate the latent heats of pure substances from thermodynamic relations
- Obtain humidity of atmospheric air from psychrometric chart

UNIT-I (11 Lectures)

BASIC CONCEPTS:

Thermodynamic system and control volume – closed, open and isolated systems - intensive and extensive properties – quasi-static process – pure substance – concept of continuum, work and heat - Zeroth law – measurement of temperature – comparison of thermometers – gas thermometers - ideal gas temperature scale – electrical resistance thermometer and thermocouple

FIRST LAW OF THERMODYNAMICS:

Joule's experiment and equivalent of work and heat - First law applied to a cycle - first law for a closed system undergoing a change of state

UNIT-II (12 Lectures)

FIRST LAW APPLIED TO FLOW PROCESSES:

Mass balance, energy balance - examples of steady flow processes: nozzle and diffuser, throttling device, turbine and compressor

SECOND LAW OF THERMODYNAMICS:

Distinction between heat and work - cyclic heat engine – energy reservoirs - Kelvin-Planck statement of second law - Clausius statement of second law – refrigerator and heat pump – equivalence of Kelvin-Planck and Clausis statements - reversibility and irreversibility

UNI-III (13 Lectures)

ENTROPY:

Clausius theorem - The property of entropy – the inequality of Clausius – Entropy change in an irreversible process – Entropy principle – applications of entropy principle to the processes of transfer of heat through a finite temperature difference, and mixing of two fluids maximum work obtainable from a finite body and a thermal energy reservoir – entropy transfer with heat flow - entropy generation in a closed system – entropy generation in an open system

UNIT-IV (12 Lectures)

PROPERTIES OF PURE SUBSTANCES:

P-v diagram for a pure substance, triple point line, critical point, saturated liquid and vapor lines. P-T diagram for a pure substance - T-s diagram for a pure substance – h-s diagram (Mollier diagram) for a pure substance – dryness fraction – problems using steam tables.

PROPERTIES OF GASES:

Ideal gas equation – entropy change of an ideal gas – heat and work in a polytropic process - Van der Waals' equation of state – compressibility factor - law of corresponding states.

UNIT-V (12 Lectures)

THERMODYNAMIC RELATIONS:

Maxwell's equations - Joule-Kelvin effect - Clausius-Claypeyron equation

PSYCHROMETRICS:

Properties of atmospheric air – humidity – degree of saturation – dry and wet bulb temperatures – psychrometric chart.

Psychrometric processes: sensible heating or cooling, cooling and dehumidification - heating and humidification.

TEXT BOOK:

P.K. Nag, *"Engineering Thermodynamics"*, 4th Edition, Tata McGraw Hill Education Private Limited, New Delhi, 2010

REFERENCES:

1. Y.A. Cengel and M.A. Boles, *"Thermodynamics – An Engineering Approach"*, 5th Edition in SI Units, Tata McGraw Hill Publishing Company Limited, New Delhi, 2006.
2. C. Borganakke and R.E. Sonntag, *"Fundamentals of Thermodynamics"*, 7th Edition, Wiley India, Delhi, 2012.

FLUID MECHANICS

Course Code: 13ME1108

L	T	P	C
4	0	0	3

Course Educational Objectives:

To familiarize the student with

- Properties of the fluid
- The different types of flows and their governing equations
- Solving different fluid flow problems
- Application of fluid mechanics principles

Course Outcomes:

The student will be able to

- Recognize the type of fluid flow that is occurring in a particular physical system.
- Use the governing equations for mathematical modeling of fluid flow system
- Solve the problems of internal and external fluid flows in a physical system
- Demonstrate the fluid flow measuring devices
- Apply the fluid mechanics principles in hydraulic machines and systems

UNIT-I (12 Lectures)

Mass density, specific weight, specific volume, specific gravity, viscosity, vapor pressure, compressibility, surface tension, capillarity. fluid pressure at a point, variation of pressure in a fluid, Pascal's law, atmospheric, absolute, gauge and vacuum pressures, total pressure and center of pressure, total pressure and center of pressure on horizontal, vertical and inclined plane surfaces.

Velocity and acceleration of fluid particle, types of fluid flow, description of the fluid pattern, continuity equation, rotational and irrotational motions, velocity potential, stream function, stream lines, equipotential lines.

UNIT-II **(12 Lectures)**

Forces acting on fluid in motion, Euler's and Bernoulli's equation derivation (along stream line only), vortex motion. Impulse momentum equation, forces on pipe bend.

Boundary layer theory - Introduction, thickness of boundary layer, boundary layer along a long thin plate, boundary layer equations, momentum integral equation of the boundary layer, laminar boundary layer, turbulent boundary layer, laminar sub layer, separation of boundary layer, methods of controlling boundary layer, drag and lift (basic concepts only).

UNIT-III **(12 Lectures)**

Laminar flow- Relation between shear and pressure gradient, steady laminar flow in circular pipes and steady laminar flow through inclined pipes, steady laminar flow between parallel flat plates-both plates at rest and one plate is moving and other at rest.

Flow through pipes - Reynolds experiment, energy loss due to friction - Darcy-Weisbach equation, other energy losses, hydraulic gradient line and energy grade line, pipes in series, equivalent pipe, pipes in parallel, siphon, transmission of power through pipes, flow through nozzle at the end of pipe.

UNIT-IV **(12 Lectures)**

Flow of compressible fluids - Thermodynamic relations, continuity equation, momentum equation, energy equation, propagation of elastic waves due to compression of fluid-velocity of sound, Mach number and its significance, propagation of elastic waves due to disturbance in fluid , Mach angle, propagation of pressure waves and stagnation properties, flow of compressible fluid with negligible friction through a pipe flow of varying cross section, flow of compressible fluid in convergent divergent passages.

UNIT-V **(12 Lectures)**

Manometers, simple manometers, differential manometers, pressure gauges, venturimeter and orifice meter, Pitot tube, flow through notches- rectangular notch, V- notch and trapezoidal notch, measurement of compressible fluid flow.

TEXT BOOKS:

1. P.N.Modi and S.M.Seth, *"Hydraulics and Fluid Mechanics including Hydraulic Machines"*, Standard Publications, New Delhi, 18th Edition, 2011.

REFERENCES:

1. K.L.Kumar, *"Engineering Fluid Mechanics"*, S.Chand & Co., 17th Edition, 2008.
2. D.S.Kumar, *"Fluid Mechanics and Fluid Power Engineering"*, S.K. Kataria and Sons, 2009.
3. Yunus A.Cengel and John M.Cimbala, *"Fluid Mechanics"*, Tata McGrawHill, 2006.

MATERIALS TESTING LAB

Course Code:13ME1109

L	T	P	C
0	0	3	2

Course Educational Objectives

To make the student

- To determine the tensile properties different materials
- To determine the hardness of different materials
- To determine the impact strength of steel
- To observe microstructures of ferrous and non ferrous alloys, and heat treated metals
- To identify various phases present in alloys
- To determine hardenability of ferrous metals

Course Outcomes:

The student will be able to

- draw the stress-strain the diagram
- to find the Young's modulus of a material
- to find the modulus of rigidity of steel
- Identify and sketch various phases in pure metals and alloys
- Draw hardenability curve of ferrous metals
- Select various ferrous and non ferrous materials for engineering applications.

LIST OF EXPERIMENTS

MECHANICS OF SOLIDS LAB

1. Direct tension test
2. Bending test on
   a) Simply supported beam
   b) Cantilever beam

3. Hardness test a) Brinells hardness test b) Rockwell hardness test
4. Test on springs
5. Compression test on cube
6. Impact test a) Izod Impact Test b) Charpy Impact Test
7. Maxwell's reciprocal theorem-verification

METALLURGY LAB

1. Preparation and study of microstructure of pure metals i) Copper ii) Aluminium
2. Preparation and study of microstructure of low and medium carbon steels
4. Preparation and study of microstructure of cast irons
   i) White
   ii) Grey
   iii) Spheroidal Graphite
   iv) Malleable cast iron
5. Preparation and study of microstructure of non ferrous alloys á+ â brass
6. Simple heat treatment of steels and study of the microstructure of heat treated steels
7. Hardenability by Jominy end quench test.

ELECTRICAL & ELECTRONICS LAB

Course code: 13ME1110

L	T	P	C
0	0	3	2

Prerequisites: Basic Electric Engineering, Basic Electronics

Course Educational Objectives:

To study the characteristics of electronic devices and circuits.

To impart experimental skills and also to verify the theoretical principles learned in the subject of BEE.

Course Outcomes:

After this lab course, the student will be able to design a circuit for any experiment in the syllabus and will get the confidence to understand the practical circuits in an industry.

List of Experiments:

1. Diode characteristics.
2. Zener Diode Characteristics
3. Half wave and full wave Rectifier.
4. Common emitter characteristics.
5. Common emitter amplifier.
6. RC Phase shift oscillator.

Note: Five experiments are to be conducted from (Two to Seven) and first experiment is compulsory.

1. Demonstration of the following and their working:
   (a) Fuse
   (b) Rheostat
   (c) Meters
   (d) Switches

2. Verification of KCL and KVL.
3. Speed control of DC shunt motor.
4. OC and SC Test on a single phase transformer.
5. Brake Test on 3- Phase Induction motor.
6. Regulation of Alternator by Synchronous Impedance Method.
7. Speed control of Slip- ring Induction Motor

SYLLABI FOR IV SEMESTER

NUMERICAL METHODS

Course Code: 13BM1108

L	T	P	C
4	1	0	3

Pre requisites:

1. Fundamental concepts of Calculus.
2. Ordinary differential equations.

Course Educational Objectives:

To teach basic numerical methods required for typical scientific and engineering applications. Give students experience in understanding the properties of different numerical methods so as to be able to choose appropriate methods and interpret the results for engineering problems that they might encounter.

Course Outcomes:

Upon successful completion of the course, the students should be able to

- Use numerical method in modern scientific computing.
- Use numerical methods to interpolate functions and their derivatives.
- Solve ordinary differential equations using numerical methods.

UNIT-I (12 Lectures)

SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS:

Introduction to Numerical Methods, Solution of algebraic and transcendental equations, Bisection method, method of false position, Newton's method, fixed point iteration method, Introduction to Finite differences, Differences of a polynomial, Difference operators, finding one or more missing terms. (28.1, 28.2, 29.1, 29.2 & 29.4, 29.5)

UNIT-II (12 Lectures)

INTERPOLATION:

Newton's interpolation formulae, Central difference interpolation formulae (Gauss forward, Gauss backward and Stirling's formulae), Interpolation with unequal intervals: Lagrange's formula, Newton's divided difference formula, Inverse interpolation. (29.6 – 29.13)

UNIT-III (12 Lectures)

NUMERICAL DIFFERENTIATION AND INTEGRATION

Numerical Differentiation: Derivatives using forward, backward and central difference formula (Stirling's formula), maxima and minima of a tabulated function.

NUMERICAL INTEGRATION:

Newton-cotes quadrature formula, Trapezoidal rule, Simpson's 1/3rd rule, Simpson's 3/8th rule, Weddle's rule, Boole's rule. (30.1- 30.10)

UNIT-IV (12 Lectures)

(EMPIRICAL LAWS AND CURVE FITTING)

Curve fitting: Introduction, Graphical method, Laws reducible to the linear law, Principles of least squares, Method of least squares, fitting of Exponential curves, Gas equation, Method of group averages, fitting of parabola, Method of moments. (24.1 - 24.9)

UNIT-V (12 Lectures)

NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS:

Introduction, Picard's method, Taylor's series method, Euler's method, Modified Euler method , Runge's method, Runge-Kutta method, Predictor-corrector methods: Milne's method, Adams-Bashforth method. (32.1 - 32.10)

TEXT BOOK:

Dr.B.S.Grewal, *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCES:

1. M.K.Jain, S.R.K.Iyengar and R.K.Jain, *"Numerical Methods for scientific and Engineering Computation"*, New age International Publishers, 4th Edition, 2004.
2. S. S. Sastry, *"Introductory Methods of Numerical Analysis"*, Prentice Hall India Pvt., Limited, 5th Edition, 2012.
3. Samuel Daniel Conte, Carl W. De Boor, *"Elementary Numerical Analysis: An Algorithmic Approach"*, Tata McGraw- Hill, 3rd Edition, 2005.

COMPUTER AIDED MACHINE DRAWING

(Using any standard package)

Course Code:13ME1111	L	T	P	C
	1	0	3	3

Pre requisites: Engineering Drawing

Course Educational Objectives:

To make the student

- ✤ To learn about basic machine parts, conventions of machine elements.
- ✤ To apply the principles of basic engineering drawing in drafting simple machine components.
- ✤ To gain the knowledge of assembly and details of various machine parts.

Course Outcomes:

Student will be able to use software tool

- ✤ Draw the basic proportionate drawings for bearings, couplings, rivet joints and screws etc.
- ✤ Assemble various components to form an assembly of a machine component like connecting rod, stuffing box, eccentrics, tail stock, stop valve etc.
- ✤ Draw the sectional views of assembled components.

Note: First angle projection to be adopted.

MACHINE DRAWING CONVENTIONS:

Need for drawing conventions – introduction to is conventions

A) Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.

B) Types of sections – selection of section planes and drawing of sections and auxiliary sectional views. Parts not usually sectioned.

I. Drawing of machine elements and simple parts

Selection of views, additional views for the following machine elements and parts with easy drawing proportions.

A) Standard forms of screw threads, bolts, nuts, stud bolts, tap bolts, set screws.

B) Keys, cotter joint and knuckle joint.

C) Riveted joints for plates

D) Shaft coupling, spigot and socket pipe joint.

E) Journal bearing and foot step bearing.

II. Assembly drawings:

Drawings of assembled views for the part drawings of the following using conventions and easy drawing proportions.

A) Engine parts – eccentric, petrol engine connecting rod, piston assembly.

B) Other machine parts - screw jack, machine vice, plummer block, lathe tailstock.

C) Valves- steam stop valve, non return valve and feed check valve.

TEXT BOOK:

K.L.Narayana, P.Kannaiah and K. Venkata Reddy, *“Machine Drawing”*, 3rd Edition, New Age Publishers, 2007.

REFERENCES:

1. N D Bhatt, *“Machine Drawing”*, 44th Edition, Charotar Publishers, 2009.
2. Dhawan, *“Machine Drawing”* , S.Chand Publications, 2005.
3. P.S.Gill. *“Machine Drawing”* , S.Chand Publications, 2005.

FLUID MACHINERY

Course Code:13ME1112

L	T	P	C
4	0	0	3

Pre requisites: Fluid Mechanics

Course Educational Objectives:

To familiarize the student with

- Different types of vanes used in hydraulic machines
- Different types of turbines , pumps and their working principles
- Performance of turbines under different working conditions
- Parameters required for the design of hydraulic turbines and pumps
- Operational problems and remedies of hydraulic turbines and pumps
- Working principles of hydraulic devices

Course Outcomes:

The student will be able to

- Explain the working of turbines and pumps.
- Apply the governing equations for the design of turbines and pumps.
- Study the performance of turbines and pumps under different working conditions
- Explain the operational problems and remedies associated with turbines and pumps
- Select the turbine or pump under the available conditions
- Explain the working of hydraulic devices

UNIT-I **(12 Lectures)**

Force exerted by fluid jet on stationary flat plate, force exerted by fluid jet on moving flat plate, force exerted by a fluid jet on stationary curved vane, force exerted by a fluid jet on moving curved vane, torque exerted on a wheel with radial curved vanes.

UNIT-II (12 Lectures)

Elements of hydraulic power plants, head and efficiencies of hydraulic turbines, classification of turbines, Pelton wheel, Francis, Kaplan and Propeller turbines – work done, efficiencies working proportions and design, draft tube theory.

Performance under unit head – unit quantities, performance under specific conditions – specific speed, performance characteristic curves, model testing of turbines, cavitation in turbines, selection of turbines, governing of turbines.

UNIT-III (12 Lectures)

Reciprocating pumps: Main components and working of a reciprocating pump, types of reciprocating pumps, work done by reciprocating pump, coefficient of discharge and slip, effect of acceleration of piston on velocity and pressures in the suction and delivery pipes, indicator diagrams, air vessels, operating characteristic curves of reciprocating pumps.

UNIT-IV (12 Lectures)

CENTRIFUGAL PUMPS:

Component parts and working of centrifugal pump, types of centrifugal pumps, work done by the impeller, head of the pump, losses and efficiencies, effect of vane angle on manometric efficiency, effect of finite number of vanes of the impeller on head and efficiency, minimum starting speed, loss of head due to reduced or increased flow, diameters of impeller and pipes.

Specific speed, model testing of pumps, multistage pumps, pumps in parallel, performance of pumps-characteristics curves, limitation of suction lift, NPSH, cavitation, priming devices, pump troubles, and remedies.

UNIT-V (12 Lectures)

HYDRAULIC SYSTEMS:

Hydraulic accumulator, hydraulic intensifier, hydraulic ram, hydraulic press, hydraulic lift, hydraulic crane, hydraulic couplings and torque converters. gear and vane pumps, air lift pump, hydraulic control valves - direction control valve, pressure control valves, and flow control valves.

TEXT BOOKS:

P.N.Modi and S.M.Seth,"Hydraulics and Fluid Mechanics including Hydraulic Machines", Standard Publications, New Delhi, 18th Edition, 2011.

REFERENCES:

1. Banga and Sharma, *"Hydraulic Machines"*, 6th Edition, Khanna Publishers, 2001.
2. D.S.Kumar, *"Fluid Mechanics and Fluid Power Engineering"*, S.K. Kataria and Sons, 2009.
3. D. Rama Durgaiah, *"Fluid Mechanics & Hydraulic Machinery"*, New Age International Publishers, 2007.
4. Anthony Esposito, *"Fluid Power with Applications"*, Pearson, 2003.

THERMAL ENGINEERING-I

Course Code:13ME1113

L	T	P	C
4	0	0	3

Pre requisites: Basic thermodynamics

Course Educational Objectives:

To make the student understand

- ✤ Theory and application of thermodynamic cycles
- ✤ Working principles of IC engines
- ✤ Testing and performance of IC engines
- ✤ Types of air compressors

Course Outcomes:

The student will be able to

1. Differentiate between various thermodynamic cycles
2. Explain working principles of IC engines and their systems
3. Evaluate the performance of IC engines
4. Explain the working of air compressors

UNIT-I (12 Lectures)

POWER CYCLES:

Otto, Diesel, Dual Combustion cycles, Sterling cycle, Atkinson cycle, Ericcson cycle, Lenoir cycle, Brayton cycle – description and representation on P–V and T-S diagram, thermal efficiency, mean effective pressures on air standard basis – comparison of cycles.

UNIT-II (14 Lectures)

I.C. ENGINES AND SYSTEMS:

Introduction- Basic Engine components and nomenclature- working principles of engines- classification of engines- application of IC engines-valve timing & port timing diagrams- air/fuel ratios- fuels- introduction – important qualities of engine fuels.

carburetion- definition - factors affecting carburetion- air/fuel mixtures- mixture requirements at different loads and speeds- principle of carburetion.

Fuel injection system (Mechanical)- Classification -injection pump- fuel injector and ignition – battery ignition system & magneto ignition system - firing order- ignition timing and engine parameters. Cooling: liquid cooled and air cooled systems- comparison lubrication: function of lubrication- lubrication system.

UNIT-III (12 Lectures)

COMBUSTION IN SI ENGINES:

Introduction- homogeneous mixture- stages of combustion in SI engines- flame front propagation- factors influencing the flame speed- rate of pressure rise- abnormal combustion, phenomenon of knock in SI engines, effect of engine variables on knock fuel requirements and fuel rating, anti knock additives, combustion chamber – requirements, types.

COMBUSTION IN CI ENGINES:

Stages of combustion- factors effecting delay period - effect of engine variables- the phenomenon of knock- comparison of knock in SI and CI engines- combustion chambers- fuel requirements and fuel rating.

UNIT-IV (08 Lectures)

TESTING AND PERFORMANCE:

Introduction- friction power- indicated power- brake power- fuel consumption, air consumption – speed- exhaust and cooling temperature- engine power- engine efficiencies- heat balance.

UNIT-V (14 Lectures)

AIR COMPRESSORS:

Reciprocating compressors- construction and working- single stage compressor- equation for work (with clearance)- isothermal efficiency- volumetric efficiency- effect of clearance- actual PV indicator diagram for single stage- multi stage compression- free air delivered (F.A.D) and displacement.

Roots blower, vane sealed compressor– working – efficiency considerations

Axial flow compressors: Construction and working- velocity diagram- degree of reaction- work done factor- isentropic efficiency- pressure rise calculations, polytrophic efficiency- losses- surging, choking and stalling- comparison between reciprocating and rotary compressors.

TEXT BOOKS:

1. V. Ganesan, *"IC Engines"*, TMH Publications, 2007 (Units II to IV).
2. R.K. Rajput, *"Thermal Engineering"*, Lakshmi Publications, 2010 (Units I & V).

REFERENCES:

1. Mathur, and Sharma, *"IC Engines"*, Danpath Rai and Sons, 4th Edition, 2010.
2. Nag, P.K., *"Engineering Thermodynamics"*, TMH, 4th Edition, 2008.

KINEMATICS OF MECHANISMS

Course Code:13ME1114

L	T	P	C
4	1	0	3

Pre requisites: Engineering Mechanics

Course Educational Objectives:

To make the student

- ✤ Aware of the basic elements of machines and their relevant theory
- ✤ Identify the underlying mechanism in a given machine
- ✤ Determine graphically and analytically, in a given mechanism, quantities like velocity, acceleration
- ✤ Recognize the relative merits and demerits of tooth forms like involute tooth form , cycloidal form

Course Outcomes:

The student will be able to

- ✤ Identify and analyze the kinematic chain in a given machine
- ✤ Be familiar with various practical mechanisms like quick-return, crank-rocker, straight-line motion, steering gears, Hooke's joint
- ✤ Determine, graphically and analytically, the velocities and accelerations in any simple mechanism
- ✤ Synthesize a suitable cam profile for a desired follower motion
- ✤ Analyze a given belt drive and a gear drive

UNIT-I (12 Lectures)

SIMPLE MECHANISMS:

Link or element – types of links – rigid, flexible and fluid links – kinematic pairs – sliding, turning, rolling, screw and spherical pairs – lower and higher pairs, types of constrained motion – completely, incompletely and successfully constrained motion

Kinematic chain - mechanism – inversion – types of kinematic chains – four bar or quadric cycle chain – single slider crank chain – double slider crank chain and their inversions.

UNIT-II **(12 Lectures)**

MECHANISMS WITH LOWER PAIRS:

Pantograph – straight line motion mechanisms – exact straight line motion mechanisms made of turning pairs – Peaucellier mechanism, Hart's mechanism – exact straight line motion consisting of one sliding pair - Scott Russel mechanism – approximate straight line motion mechanisms - Grass hopper – Watt –Chebyschev -Robert mechanism- steering mechanism - condition for correct steering – Davis steering gear-Ackerman steering gear. Hooke's joint – ratio of shaft velocities – maximum and minimum speed of driven shaft – condition for equal speeds – Angular acceleration of driven shaft – Double Hooke's joint.

UNIT-III **(12 Lectures)**

VELOCITY IN MECHANISMS:

Relative velocity method – velocity of point on a link- application of relative velocity method to four bar mechanism and slider crank mechanism – rubbing velocity of a joint – instant centre method –velocity of point on a link by instant centre method, location of instant centre – Kennedy-Arnhold theorem and its application to simple mechanisms.

ACCELERATION IN MECHANISMS:

Acceleration diagram of a link - acceleration diagram for a four bar mechanism and slider crank mechanism - analytical expression for the determination of velocity and acceleration of the piston of a reciprocating engine - Coriolis component of acceleration - acceleration diagram for crank and slotted-lever quick-return mechanism.

Analytical expressions for displacement, velocity and acceleration for four-bar mechanism.

UNIT-IV **(12 Lectures)**

CAMS:

Classification of followers and cams – terms used in radial cams – displacement, velocity and acceleration diagrams when the follower moves with uniform velocity, uniform acceleration and retardation, simple harmonic motion – construction of cam profiles – cams with specified contours – tangent cam with roller follower – circular arc cam with flat faced follower.

BELT DRIVES:

Types of belt drives, materials used for belts, slip and creep in belt drives, length of belt in open and crossed belt drives, ratio of belt tensions in flat and V- belt drives – initial tension, centrifugal tension, maximum tension in belt, condition for transmission of maximum power.

UNIT-V (12 Lectures)

TOOTHED GEARING:

Classification of toothed wheels – terms used in gears - law of gearing – velocity of sliding of teeth – forms of teeth – cycloidal and involute teeth – standard proportions of gear teeth – length of arc of contact – path of contact – contact ratio- interference in involute teeth - minimum number of teeth to avoid interference. Introduction to helical and spiral gears.

GEAR TRAINS:

Simple, compound and reverted gear trains – epicyclic gear train – velocity ratio of epicyclic gear train — sun and planet wheels – torques in epicyclic gear trains.

TEXT BOOK:

Rattan SS , *"Theory of Machines"*, 3rd Edition, Tata McGraw Hill Education Publishers, New Delhi, 2011.

REFERENCES:

1. Thomas Bevan, *"The Theory of Machines: A textbook for Engineering students"*, Pearson, New Delhi, 2010.
2. Norton RC, *"Kinematics and Dynamics of Machinery"*, Third Edition in SI Units, Tata McGraw Hill Education Pvt Ltd, 2011.
3. Bansal RK, *"Theory of Machines"*, 4th Edition, Laxmi Publications, New Delhi,2010

MANUFACTURING TECHNOLOGY – I

Course Code: 13ME1115

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student

- Familiar with the details of various manufacturing processes
- To acquire knowledge about various aspects of metal casting technology
- to understand various welded joints and welding methods for fabrication of the components
- To understand various metal forming techniques like rolling, forging, extrusion and sheet metal operations
- To understand various manufacturing methods for plastics

Course Outcomes:

The student will be able to

- Explain various foundry operations and identify materials required for foundry operations.
- Explain the various welding processes
- Design and manage a metal forming unit
- Control the technical aspects of plastic technology

UNIT-I (12 Lectures)

Casting, steps involved in making a casting, advantages and applications of metal casting, patterns, pattern making, pattern materials, types of pattern, pattern allowances, mold materials.

Sand testing procedure - moisture content test, permeability test, strength test, grain fineness test.

Principles of gating system, functions of gating system , gating ratio, design of gating systems, risers , types and functions of risers.

Solidification of casting, solidification of pure metal and alloys, short and long freezing range, special casting processes-centrifugal, investment, die casting, continuous casting, Casting defects, methods of melting- types of furnaces, crucible melting and cupola operation.

UNIT-II **(12 Lectures)**

JOINING PROCESSES:

Classification of welding process, advantages and disadvantages of welding, applications of welding, safety recommendations in welding , welded joints ,gas welding , arc welding, MIG and TIG welding, electro slag welding, plasma arc welding, gas cutting.

Resistance welding, spot welding, projection welding, ultrasonic welding, friction welding , thermit welding, electron beam welding, laser beam welding , heat affected zone, welding distortion, welding defects, soldering, brazing, adhesives.

UNIT-III **(12 Lectures)**

Hot working, cold working, strain hardening, recrystallisation, grain growth, grain structure. Rolling- hot and cold rolling, types of rolling mills and products, tube rolling, characteristics of hot rolled and cold rolled components.

Forging - types of forging, smith forging, drop forging, roll forging, forging hammers, advantages and disadvantages of forging, limitations, forging defects and remedies.

UNIT-IV **(12 Lectures)**

Metal forming processes, roll forming, flexible die forming, peen forming, swaging, cold heading, thread rolling, spinning, drawing - rod drawing, wire drawing, tube drawing. Presses and press tools - types of presses, blanking, piercing, bending, embossing, coining.

UNIT-V **(12 Lectures)**

Extrusion - methods of extrusion, hot and cold extrusion, forward and backward extrusion, impact extrusion, hydrostatic extrusion, tube extrusion.

Plastics: Introduction to polymers, types and properties, applications of plastics, plastics moulding processes- compression moulding, transfer moulding, injection moulding, blow moulding, extrusion moulding.

TEXT BOOK:

Rao P. N., *"Manufacturing Technology"*, 2nd Edition, Tata Mc Graw Hill, 2008.

REFERENCES:

1. Shan, H.S., *"Manufacturing Processes"*, Vol - I, 1st Edition, Pearson, 2012.
2. Kalpakjain S, Schimd S, *"Manufacturing Technology"*, Pearson Education, 2009.

FLUID MECHANICS AND MACHINERY LAB

Course Code:13ME1115

L	T	P	C
0	0	3	2

Pre requisites: Fluid Mechanics and Fluid Machinery

Course Educational Objectives:

To conduct experimentation for

- ✤ Calibration of flow measuring devices
- ✤ Determination of friction factor for pipes
- ✤ Determination of minor losses in pipes
- ✤ Verification of Bernoulli's theorem.
- ✤ Studying the performance of hydraulic turbines and pumps

Course Outcomes:

The student will be able to

- ✤ Calibrate flow measuring devices such as Venturimeter, orifice meter and v-notch
- ✤ Determine friction factor in pipes
- ✤ Determine minor losses in the pipes
- ✤ Verify Bernoulli's theorem.
- ✤ Understand the performance of hydraulic turbine and pumps under different working conditions

Any TEN of the following experiments are to be performed during the semester

LIST OF EXPERIMENTS:

1. Calibration of Venturi meter.
2. Calibration of Orifice meter.
3. Verification of Bernoulli's theorem

4. Determination of friction factor for a given pipe line.
5. Determination of minor losses in a pipeline
6. Calibration of V - Notch
7. Impact of jets on vanes.
8. Performance test on Pelton wheel.
9. Performance test on Francis turbine.
10. Performance test on single stage centrifugal pump.
11. Performance test on multi stage centrifugal pump.
12. Performance test on reciprocating pump.

PRODUCTION TECHNOLOGY LAB

Course Code: 13ME1117

L	T	P	C
0	0	3	2

Pre requisites: Manufacturing Technology - I

Course Educational Objectives:

To make the student to know

- Design and manufacture of simple patterns
- Sand testing
- Arc welding, gas welding and resistance welding equipment for the fabrication of welded joints
- Pipe bending and injection molding equipment

Course Outcomes:

The student will be able to

- Design and manufacture simple patterns
- Control sand properties in foundry
- Operate arc welding, gas welding and resistance welding equipment
- Use pipe bending and injection moulding equipment

Any TEN of the following experiments are to be performed during the semester

LIST OF EXPERIMENTS

I. METAL CASTING:

1. Pattern design and making (2 exercises)
2. Sand properties testing (2 exercises)
3. Moulding, melting and casting

II. WELDING:

1. Arc welding for lap joint and butt joint (2 exercises)
2. Spot welding
3. Gas welding
4. TIG welding
5. Gas cutting

III. MECHANICAL WORKING :

1. Pipe bending

IV. PROCESSING OF PLASTICS :

1. Injection moulding
2. Blow moulding

ENVIRONMENTAL STUDIES
(Common to all Branches)

Course Code: 13NM1102

L	T	P	C
2	0	0	0

Course Educational objectives:

This course introduces the students to the following

- ✤ Important & Scope of the Environment.
- ✤ Awareness about the resources and their limitations.
- ✤ Appreciate the variedness of nature and role of different species in nature.
- ✤ The importance of understanding the impact of any development of nature.
- ✤ Population control and its importance.

Course Outcomes:

After studying the course the student will have good understanding of

- ✤ Environment and its conservation.
- ✤ The impacts of human action on nature and remedial measures.
- ✤ Being proactive instead of reactive.

UNIT-I (8 Lectures)

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES & NATURAL RESOURCES

Definition, Scope and Importance – Need for Public Awareness.

Renewable and non-renewable resources– Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems -Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources,

case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Case studies. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT-II (7 Lectures)

ECOSYSTEMS, BIODIVERSITY AND ITS CONSERVATION:

Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Definition: genetic, species and ecosystem diversity.- Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a mega diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. - Endangered and endemic species of India Conservation of biodiversity: In-situ and Exsitu conservation of biodiversity.

UNIT-III (7 Lectures)

ENVIRONMENTAL POLLUTION:

Definition, Cause, effects and control measures of a) Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards.

SOLID WASTE MANAGEMENT:

Causes, effects and control measures of urban and industrial wastes. – Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT-IV (6 Lectures)

SOCIAL ISSUES AND THE ENVIRONMENT:

From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, and watershed management -Resettlement and rehabilitation of people; its problems and concerns. Case Studies Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. -Wasteland reclamation. -Consumerism and waste products. –Environment.

Protection Act. -Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution)

Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

UNIT-V (8 Lectures)

HUMAN POPULATION AND THE ENVIRONMENT:

Population growth, variation among nations. Population explosion - Family Welfare Programme. -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. -Women and Child Welfare. -Role of information Technology in Environment and human health. – Case Studies.

FIELD WORK:

Visit to a local area to document environmental assets

River /forest grassland/hill/mountain -Visit to a local polluted site-

Urban/ Rural/industrial/ Agricultural Study of common plants, insects, birds. - Study of simple ecosystems-pond, river, hill slopes, etc.

TEXT BOOKS:

1. Bharucha. E., "*Textbook of Environmental Studies for Undergraduate Courses*", University Press, 2005.
2. Rajagopalan. R., "*Environmental Studies*", Oxford University Press, 2005.

REFERENCE:

AnjiReddy. M., "*Textbook of Environmental Sciences and Technology*", BS Publications, 2010.

SYLLABI FOR
V SEMESTER

MANUFACTURING TECHNOLOGY - II

Course Code:13ME1118

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student to understand

- ✤ Course educational basic principles of theory of metal cutting
- ✤ Machine tools like lathe, shaping, slotting, planning, milling, drilling and grinding machines.
- ✤ Various surface finishing operations
- ✤ The importance of jigs and fixtures

Course Outcomes:

Student will be in a position to

- ✤ Apply the knowledge of course in solving the industrial problems and meeting the production targets by choosing the proper input parameters for machine tools.
- ✤ Explain the mechanisms of working and material removal of conventional machine tools
- ✤ Explain the influence of cutting parameters on output parameters

UNIT-I (12 Lectures)

Elementary treatment of metal cutting theory: Element of cutting process – geometry of single point tool and angles, chip formation and types of chips – chip breakers mechanics of orthogonal cutting –merchant's force diagram, tool life, coolants, machinability – tool materials.

UNIT-II (12 Lectures)

Lathe: Principle of working, specification of lathe – types of lathe – work holders, tool holders – box tools, taper turning, thread cutting.

Turret and capstan lathes-collet chucks– tool holding devices –tool layout. Principal features of automatic lathes. Classification – Single spindle and multi-spindle automatic lathes– tool layout.

UNIT-III **(14 Lectures)**

Shaping, slotting and planning: Principle of working – principle parts– specification, classification, operations performed, machining time calculation.

Drilling and boring: Principle of working, specifications, types, and operations performed – tool holding devices – twist drill – boring machines – fine boring machines – jig boring machine, deep hole drilling machine.

UNIT-IV **(14 Lectures)**

Milling: Principle of working – specifications – classifications of milling machines – principal features of horizontal, vertical and universal milling machines– milling operations , geometry of milling cutter – milling cutters – methods of indexing – accessories to milling machines.

Jigs and fixtures: Classification of Jigs and Fixtures – Principles of location and clamping – Types of clamping and work holding devices. Typical examples of jigs and fixtures

UNIT-V **(12 Lectures)**

Grinding: Fundamentals – theory of grinding – classification of grinding machine– cylindrical and surface grinding machine – tool and cutter grinding machine – special types of grinding machines –different types of abrasives – bond specification of a grinding wheel and selection of a grinding wheel.

Lapping, honing and broaching: Comparison to grinding – lapping and honing, broaching-types of broaching machines, broaching tools, broaching operations.

TEXT BOOK:

1. B.S. Raghuwanshi, *"Workshop Technology"*, Vol. II , 10^{th} Edition, Dhanpat Rai and Co., 2010.

REFERENCES:

1. R.K. Jain and S.C. Gupta, *"Production Technology"*, 16th Edition, Khanna Publishers, 2001.
2. H.M.T. (Hindustan Machine Tools), *" Production Technology"*, 1st Edition, TMH, 2004.
3. Kalpakjian and S R Schmid, *"Manufacturing Engineering and Technology"*, 5th Edition, Pearson, 2006.

DYNAMICS OF MACHINERY

Course Code:13ME1119

L	T	P	C
4	0	0	3

Pre requisites: Engineering Mechanics

Course Educational Objectives:

To make the student

- ✤ Understand the forces, torques and energy involved in different machine members
- ✤ Understand theory involved in the analysis of clutches, brakes, dynamometers and flywheels
- ✤ Aware of situations like speed fluctuations, rotor imbalance and machine vibration which appear in industry

Course Outcomes:

The student will be able to

- ✤ Analyze the effect of a gyroscope on ships, aeroplanes and automobile
- ✤ Explain the working of important machine elements like clutches, brakes, flywheels, governors
- ✤ Analyze the theory involved in balancing of rotating and reciprocating members
- ✤ Estimate the unbalanced forces in a multi-cylinder reciprocating engine
- ✤ Understand longitudinal, transverse and torsional vibrations so as to avoid resonance

UNIT-I **(14 Lectures)**

FRICTION AND FRICTION CLUTCHES:

Basics, inclined planes, screw thread forms (square, v), screw jack, rolling friction, journal friction. Friction axis of a link, four-bar mechanism, film friction. pivots and collars, uniform pressure, uniform wear. Types of clutches – disc, multiplate, cone and centrifugal.

BRAKES AND DYNAMOMETERS:

Types of brakes – Block brake, band brake, disc brake, band and block brake, internal expanding shoe brake, effect of brake. Types of dynamometers - Prony, rope brake, belt transmission, epicyclic train, Bevis-Gibson torsion dynamometers.

UNIT-II (14 Lectures)

FLYWHEELS:

Engine force analysis, turning moment of crankshaft, dynamically equivalent system, inertia of connecting rod. Turning moment diagrams, fluctuation of energy, flywheels, dimensions of flywheel rim, applications.

GOVERNORS:

Types - Watt, Porter, Proell, Hartung. Wilson-Hartnell, spring-controlled gravity governor, inertia governor. Sensitiveness, hunting, isochronism, stability, power, effort, controlling force of a governor.

UNIT-III (10 Lectures)

BALANCING:

Static and dynamic balancing of rotating masses, force balancing of fourbar linkage, Primary and Secondary balancing of reciprocating engine, balancing inline engine (2,4,6, cylinders), V-engines, W-engines and radial engines, direct and reverse crank method, balancing machines – static, dynamic. theory of field balancing.

UNIT-IV (10 Lectures)

GYROSCOPES:

Angular velocity, angular acceleration, gyroscopic couple, gyroscopic effect on Aeroplanes, ships. Static and dynamic force analysis of planar mechanisms, Stability of four-wheel and two- wheel automobiles, rigid disc at an angle fixed to a rotating shaft.

UNIT-V (11 Lectures)

VIBRATIONS:

Definitions, types, basic features, degrees of freedom, free longitudinal vibration – equilibrium method, energy method, Rayleigh‘s method, displacement, velocity, acceleration, effect of mass of spring, damped vibration, logarithmic decrement. forced longitudinal vibrations - harmonic excitation, magnification factor, vibration isolation and transmissibility.

Transverse vibrations, single concentrated load, uniformly distributed load, several loads, Dunkerley's method, whirling of shafts. Torsional vibrations – single rotor.

TEXT BOOK:

S.S Rattan, *"Theory of Machines"*, Third Edition, Tata McGraw Hill, New Delhi, 2011.

REFERENCES:

1. Thomas Bevan, *"The Theory of Machines: A textbook for Engineering students"*, Pearson, New Delhi, 2010.
2. Norton RC, *"Kinematics and Dynamics of Machinery"*, Third Edition in SI Units, Tata McGraw Hill Education Pvt Ltd, 2011.

DESIGN OF MACHINE ELEMENTS - I

Course Code: 13ME1120

L	T	P	C
4	1	0	3

Pre requisites:

Engineering Mechanics, Mechanics of solids and Material science

Course Educational Objectives:

To learn,

- ✤ Overall design considerations, concepts of force flow, critical sections material properties.
- ✤ Design of straight and curved beams, columns and basics of finite element analysis.
- ✤ Prediction of failure with principal stresses and stress concentration, uses safety factors in calculations.
- ✤ Predict failure by fatigue under variable loading, S-N curves, Goodman and Soderberg principles.
- ✤ Types of wear, contact stresses, surface fatigue.
- ✤ Design of welded joints under static or dynamic loads.

Course Outcomes:

- ✤ Identify the critical section in a given component
- ✤ Calculate the stress, normal and shear, bending ,direct, torsional, axial, at a given point on the body
- ✤ For static loading calculate the principle stresses and predict the mode of failure
- ✤ For dynamic loading estimate fatigue stresses, impact stresses, surface damage as the case may be
- ✤ S-N curves, estimate endurance strength, fatigue life, remaining life
- ✤ Design of parts against surface damage, welded joints.

UNIT-I (16 Lectures)

MECHANICAL ENGINEER'S DESIGN IN BROAD PERSPECTIVE AND LOAD ANALYSIS:

Overview, safety, ecological, societal and overall design considerations, systems of units, methodology, work and energy, power, conservation of power, Introduction to load analysis, equilibrium equations and free body diagrams, beam loading, force flow concept, critical sections, redundant supports, force flow concept applied to redundant ductile structures.

Materials: Introduction, static tensile stresses, engineering stress-strain curves, true stress – strain curves, energy – absorbing capacity, hardness tests, machinability, materials selection charts.

UNIT-II (12 Lectures)

STATIC BODY STRESSES:

Introduction, axial loading, direct shear loading, torsional loading, pure bending in straight beams, transverse shear, combined stresses – Mohr circle, 3-D stresses, stress concentration factory Kt.

Deflection and stability: Introduction, deflection and spring rate, beam deflection, determining elastic deflection by secant formula, equivalent column stresses, and finite element analysis of plane truss.

UNIT-III (10 Lectures)

FAILURE THEORIES, SAFETY FACTORS, RELIABILITY:

Introduction, types of failure, theories of static failure, maximum normal stress theory, maximum shear theory, maximum distortion energy theory, modified selection and use of failure theories, concept of safety factors, selection, reliability, normal distribution.

UNIT-IV (14 Lectures)

FATIGUE:

Introduction, fatigue strength for rotation, bending, reverse bending and reverse biaxial loading, influence of size and surface on fatigue strength, summary of estimated fatigue strength for completely reversed loads, SN curves, effect of mean stress on fatigue strength, Goodman and Soderberg principles, effect of stress concentration with completely reversed fatigue loads and with mean and alternating loads, fatigue life prediction with random variable loads (Palmgren-Miner method)

UNIT-V (08 Lectures)

SURFACE DAMAGE:

Introduction, types of wear, adhesive, abrasive, fretting, analytical approach to wear, Hertz contact stresses, surface fatigue failure.

Impact: Introduction, stress-deflection caused by linear and bending impact, causes by torsional impact, effect of stress raisers on impact strength.

TEXT BOOK:

R.C. Juvinall and K M Marshek, *"Fundamental of Machine Components Design"*, John Wiley&Sons, 4th Edition, 2000.

REFERENCES:

1. Shigley and Mishke, *"Design of Machine Elements"*, McGraw Hill Publication, 5th Edition. 1983.
2. Hall, Holowenko and Laughlin, *"Theory and problems of Machine Design"*, Schaums Outline series, Tata McGraw-Hill, New Delhi, Fifth reprint 2011.
3. V.B. Bhandari, *"Design of Machine Elements"*, 3rd Edition, TMH, 2010.

Note: Design data book will not be permitted during examination.

THERMAL ENGINEERING - II

Course Code: 13ME1121

L	T	P	C
4	1	0	3

Pre requisites: Thermodynamics

Course Educational Objectives:

The student is

- Exposed to the principles and working of various components associated with thermal power plants
- Exposed to the working and applications of gas turbines
- Introduced to jet propulsion engines
- Introduced to principle of rocket engine and its application

Course Outcomes:

The student will

- Gain knowledge about the various components of thermal power plants and their functions
- Understand the working and applications of gas turbines
- Know the various types of jet propulsion engines and evaluate their performance
- Learn the working principle and application of rocket engines

UNIT-I **(14 Lectures)**

Basic steam power cycles – Rankine cycle – Modified Rankine cycle-Regeneration and Reheating.

Boilers: Classification, Working Principle of L.P and H.P Boilers, boiler mountings and accessories-working principles, performance, equivalent evaporation, efficiency and heat balance, boiler draught – classification – height of the chimney for a given draught, discharge, condition for maximum discharge and efficiency of the chimney – artificial draught – induced and forced.

UNIT-II (10 Lectures)

STEAM NOZZLE:

Introduction- steam flow trough nozzle-nozzle efficiency - supersaturated flow or metastable expansion of steam in nozzle-general relationship between area, velocity and pressure in nozzle flow.

Steam Turbine: Introduction-Classification – impulse turbine: mechanical details – velocity diagram – effect of friction – power developed, axial thrust, blade or diagram efficiency – condition for maximum efficiency.

UNIT-III (12 Lectures)

IMPULSE TURBINE:

Methods to reduce rotor speed-velocity compounding, pressure compounding and velocity & pressure compounding, velocity and pressure variation along the flow – combined velocity diagram for a velocity compounded impulse turbine, condition for maximum efficiency.

Reaction Turbine: Mechanical details – principle of operation, thermodynamic analysis of a stage, degree of reaction –velocity diagram – Parson's reaction turbine – condition for maximum efficiency – calculation of blade height.

UNIT-IV (09 Lectures)

STEAM CONDENSERS:

Introduction-organs of a steam condensing plant – classification – sources of air in condensers-air leakage and its effects - types vacuum efficiency – condenser efficiency – determination of mass of cooling water- air pumps-cooling towers-simple problems.

UNIT-V (15 Lectures)

GAS TURBINES:

Simple gas turbine plant layout, classification of gas turbines- open cycle gas turbine – intercooling, reheating and regeneration - effect of variables, closed and semi closed cycles – efficiency, pressure ratio, merits and demerits of open and closed cycles.

JET PROPULSION:

Introduction- the ramjet engine -the pulse jet engine - the turboprop engine-the turbojet engine –thrust & thrust equation - specific thrust of the turbojet engine – efficiencies- performance evaluation- thrust augmentation – methods

Rocket Propulsion: Introduction –classification–principle of rocket propulsion- propeller type – solid propellant rocket engines-propellant and their characteristics.

TEXT BOOKS:

1. R.K. Rajput, *"Thermal Engineering"*, Lakshmi Publications, 2005.
2. V. Ganesan, *"Gas Turbines"*, TMH Publications, , 3rd Edition, 2010.

REFERENCES:

1. D.S. Kumar, *"Thermal Science and Engineering"*, S.K. Kataria and Sons, 4th Edition, 2010.
2. Mathur, M.L., Mehta, F.S., *"Thermal Engineering"*, Jain Brothers, 2012.

OPERATIONS RESEARCH

Course Code: 13ME1122

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student to

- ✤ Understand the various methods for optimization.
- ✤ Know how to control the inventory and when to replace the items.
- ✤ Understand the different strategies used to gain profit in a competitive market situation.
- ✤ Know how to sequence the jobs in different machines.

Course Outcomes:

The student will be able to

- ✤ Acquire knowledge in applying various optimization methods for any situation.
- ✤ Know different methods used to obtain optimum inventory.
- ✤ Find the replacement period for items.
- ✤ Acquire knowledge in sequencing the jobs in different machines.

UNIT-I (12 Lectures)

Linear programming problem - Introduction to or, linear programming, mathematical formulation of the problem, graphical solution, general LPP, canonical and standard form of LPP.

Simple method: introduction, computational procedure, use of artificial variables, degeneracy in LPP

Transportation problem - Introduction, LP formulation of transportation problem, the transportation table, solution of transportation problem, finding IBFS: North-West corner rule, least – cost method and VAM, test for optimality, degeneracy in transportation problem, transportation algorithm.

UNIT-II **(12 Lectures)**

Assignment problem - Introduction, Mathematical formulation of the problem, Hungarian assignment method only, special cases in assignment problems, formulation of the travelling salesman problem.

Sequencing problem - Introduction, Problem of Sequencing, Processing n jobs through two machines. Processing n jobs through k- machines, Processing 2 jobs through two machines, maintenance crew scheduling

UNIT-III **(12 Lectures)**

Game theory - Introduction, Two person zero sum games, maximin - minimax principle, games without saddle points- mixed strategies, graphical solution of 2Xn, mX2 games, and dominance property.

UNIT-IV **(12 Lectures)**

Inventory control - Introduction, types of inventories, costs associated with inventories, the concept of EOQ, deterministic inventory problems with no shortages, with shortages.

Queuing theory - Introduction, queuing system, elements of queuing system operating characteristics of a queuing system, classification of queuing models.

UNIT-V **(12 Lectures)**

Replacement problem - Introduction, replacement of items that deteriorate gradually, replacement of items that fails suddenly.

Dynamic programming - Introduction, the recursive equation approach, dynamic programming algorithm, solution of discrete DPP

TEXT BOOK:

Kanthi Swarup, P.K.Gupta and Man Mohan, *"Operations Research"*, Sultan Chand and Sons New Delhi, Fourteenth Edition -2008.

REFERENCES:

1. Hamdy. A. Taha, *"Operations Research an Introduction"*, Pearson Education, 17th Edition, 2002.
2. S.D Sharma, *"Operation Research"*, Kedar Nath and Ram Nath - Meerut , 2008.

ENGINEERING METROLOGY

Course Code: 13ME1123

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student

- ✤ Understand systems of limits and fits
- ✤ Study the basic principles of different measuring instruments.
- ✤ Learn how to measure surface roughness of the surface
- ✤ Understand machine tool alignment tests

Course Outcomes:

The student will be able to

- ✤ Become aware of existing systems of limits and fits.
- ✤ Explain the theory of linear and angular measurements
- ✤ Know various types of measuring instruments and surface roughness measuring methods
- ✤ Explain machine tool alignment tests

UNIT-I (14 Lectures)

SYSTEMS OF LIMITS AND FITS:

Introduction, nominal size, tolerance limits, deviations, allowance, fits and their types – unilateral and bilateral tolerance system, hole and shaft basis systems – interchangeability and selective assembly. Indian standard Institution system – British standard system, International standard system for plain and screwed work.

LIMIT GAUGES:

Taylor's principle – Design of GO and NO GO gauges, plug, ring, snap, gap, taper, profile and position gauges.

UNIT-II (10 Lectures)

LINEAR MEASUREMENT:

Length standard, line and end standards, slip gauges – calibration of the slip gauges, dial indicator, micrometers.

Measurement of angles and tapers: Different methods – bevel protractor – angle slip gauges – spirit levels– sine bar – sine plate, rollers and spheres

UNIT-III (12 Lectures)

FLAT SURFACE MEASUREMENT:

Measurement of flat surfaces – instruments used – straight edges– surface plates – optical flat and auto collimator.

OPTICAL MEASURING INSTRUMENTS:

Tool maker's microscope and its uses, collimators, optical projector, optical flats and their uses, interferometer.

SURFACE ROUGHNESS MEASUREMENT:

Differences between surface roughness and surface waviness-numerical assessment of surface finish– CLA, R.M.S Values , Rz values, methods of measurement of surface finish-Tomlinson's surface meter, profilograph, Talysurf, ISI symbols for indication of surface finish.

UNIT-IV (12 Lectures)

SCREW THREAD MEASUREMENT:

Elements of measurement – errors in screw threads – measurement of effective diameter, angle of thread and thread pitch, profile thread gauges.

Measurement through comparators: Comparators – Mechanical, Electrical and Electronic comparators, pneumatic comparators and their uses in mass production.

GEAR MEASUREMENT:

Gear measuring instruments, gear tooth profile measurement, measurement of diameter, pitch, pressure angle and tooth thickness.

UNIT-V (12 Lectures)

MACHINE TOOL ALIGNMENT TESTS:

Alignment tests on lathe, milling, drilling machine tools, coordinate measuring machine (CMM): Types of CMM, Role of CMM, and applications of CMM.

Computer aided quality control: Terminology in quality control, computer in quality control, contact inspection methods, noncontact inspection methods.

TEXT BOOKS:

1. I C Gupta, *"Engineering Metrology"*, 5th Edition, Danapath Rai & Co, 2008.
2. P.N.Rao, *"CAD/CAM Principles and Applications"*. 2nd Edition, 2008.

REFERENCES:

1. R.K. Jain, *"Engineering Metrology"*. 20th Edition, Khanna Publishers, 2007.
2. M. Mahajan, *"Engineering Metrology"*, Dhanapati Rai publications, 2007.
3. BIS standards on Limits & Fits (IS 919), Surface Finish (IS 2073), Machine Tool Alignment, 1993.

THERMAL ENGINEERING LAB

Course Code:13ME1124

L	T	P	C
0	0	3	2

Pre requisites: Thermal Engineering.

Course Educational Objectives:

- To conduct experiments on two stroke and four stroke I.C. Engines
- To conduct experimentation on reciprocating compressor
- To conduct experiments on refrigeration and air conditioning test rigs
- To study the boiler models

Course Outcomes:

- By conducting the experiment, the student will be able
- To explain performance of the I.C. engine
- To prepare heat balance sheet of the I.C. engine
- To explain performance of the reciprocating compressor
- Determine the cop (coefficient of performance) of the R&AC machinery
- To identify the different parts of the boilers and its mountings

Any TEN of the following experiments are to be performed during the semester.

LIST OF EXPERIMENTS

1. I. C. Engines valve / port timing diagrams.
2. I .C Engines performance Test on four-stroke Diesel Engines.
3. I.C. Engines performance Test on two-stroke Petrol Engine.
4. Evaluation of engine friction by conducting morse test on 4-S multi cylinder petrol engine retardation and motoring test on 4- S diesel engine.

5. I.C. Engines heat balance sheet.
6. I.C Engines A/F Ratio and volumetric efficiency.
7. Performance test on a variable compression ratio engine..
8. Performance test on 2 stage reciprocating air – compressor unit
9. COP of a refrigeration Unit.
10. Study of boilers.
11. Dis-assembly/assembly of engines.
12. Performance of air-conditioning system.

TECHNICAL COMMUNICATION AND SOFT SKILLS LAB

Course Code : 13HE1103

L	T	P	C
0	0	3	2

Introduction:

The introduction of the Advanced English Communication skills Lab is considered essential at B.Tech. level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context. The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

- Gathering ideas and information: organizing ideas relevantly and coherently
- Engaging in debates
- Participating in group discussions
- Facing interviews
- Writing project proposals / technical reports
- Making oral presentations
- Writing formal letters and essays
- Transferring information from non-verbal to verbal texts and vice versa
- Taking part in social and professional communication

Course Educational Objectives:

The Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the students' accuracy and fluency in English through a well-developed vocabulary, and enable them to listen to English

spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.

- ✤ To enable students face competitive exams such as, GRE, TOEFL, IELTS, UPSC and other Bank examinations.
- ✤ To enable them communicate their ideas relevantly and coherently in writing.

Course Outcomes:

- ✤ Students will be able to use language accurately, fluently and appropriately.
- ✤ They will be able to show their skills of listening, understanding and interpreting.
- ✤ They will be able to write project reports, reviews and resumes.
- ✤ They will be able to express their ideas relevant to given topics.
- ✤ Students will also exhibit advanced skills of interview, debating and discussion.

LIST OF TASKS :

1. Listening comprehension – Achieving ability to comprehend material delivered at relatively fast speed; comprehending spoken material in Standard Indian English, British English, and American English; intelligent listening in situations such as interview in which one is a candidate.
2. Vocabulary building, Creativity, using Advertisements, Case Studies etc.
3. Personality Development: Decision-Making, Problem Solving, Goal Setting, Time Management & Positive Thinking
4. Cross-Cultural Communication : Role-Play/ Non-Verbal Communication.
5. Meetings- making meeting effective, chairing a meeting, decision-making, seeking opinions , interrupting and handling interruptions, clarifications, closure- Agenda, Minute writing

6. Group Discussion – dynamics of group discussion, Lateral thinking, Brainstorming and Negotiation skills
7. Resume writing – CV – structural differences, structure and presentation, planning, defining the career objective
8. Interview Skills – formal & informal interviews,concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing
9. Writing Skills - Business Communication, Essays for competitive examinations.
10. Technical Report Writing/ Project Proposals – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.- Feasibility, Progress and Project Reports.

REFERENCES:

1. Simon Sweeny, *"English for Business Communication"*, CUP, First South Asian Edition, 2010.
2. M. Ashraf Rizvi, *"Effective Technical Communication"*, Tata McGraw-Hill Publishing Company Ltd. 2005.
3. Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, *"English Language Communication: A Reader cum Lab Manual"*, Anuradha Publications, Chennai, 2006.
4. Dr. Shalini Verma, *"Body Language- Your Success Mantra"*, S. Chand, 2006.
5. Andrea J. Rutherford, *"Basic Communication Skills for Technology"*, 2nd Edition, Pearson Education, 2007.
6. Sunita Mishra & C. Muralikrishna, *"Communication Skills for Engineers"*, Pearson Education, 2007.
7. Jolene Gear & Robert Gear, *"Cambridge Preparation for the TOEFL Test"*, 2010.
8. Meenakshi Raman & Sangeeta Sharma, *"Technical Communication"*, Oxford University Press, 2011.

9. Nick Ceremilla & Elizabeth Lee- Cambridge *"English for the Media"* CUP, 2010.

10. R.C. Sharma, Krishna Mohan, *"Business Correspondence and Report writing"*, 4th Edition, Tata Mcgraw-Hill Publishing Co. Ltd., 2010.

11. DELTA's key to the Next Generation TOEFL Test: *"Advanced Skill Practice,"* New Age International (P) Ltd., Publishers, New Delhi. 2010.

12. Books on TOEFL/GRE/GMAT/CAT by Barron's/ CUP, 2011.

13. IELTS series with CDs by Cambridge University Press, 2010.

BASIC COMPUTATIONS LAB

Course code: 13ES11BC

L	T	P	C
0	0	3	2

Course Educational Objectives:

The objective of the laboratory is to enable the student to learn the basics of MATLAB Toolbox and to solve general mathematical problems.

Course Outcomes :

- ✤ Student will able to solve mathematical problems numerically.
- ✤ The student able to solve ODE-IVP, ODE-BVP, Regression using MAT LAB.

LIST OF EXERCISES:

1. Basic commands like representing arrays, matrices, reading elements of a matrix, row and columns of matrices, random numbers.
2. Round, floor ceil, fix commands.
3. Eigen values and Eigen vectors of a matrix.
4. Plotting tools for 2-D and 3-D plots, putting legends, texts, using subplot tool for multiple plots, log-log and semilog plots.
5. Linear Regression and polynomial regression, Interpolation.
6. Non linear regression.
7. Solving non linear algebraic equations.
8. ODE IVP problems using Runge - Kutta method.
9. Using quadrature to evaluate integrals (1-D, 2-D and 3-D cases).
10. Control statements like switch, if else statement etc.
11. To find the damping coefficient for a given "mass-spring damper system" and natural frequency using SIMULINK module of MATLAB.
12. To calculate the internal energy, enthalpy and entropy of a gas as functions of temperature using MATLAB

SYLLABI FOR VI SEMESTER

INDUSTRIAL MANAGEMENT
(Mechanical Engineering)

Course Code: 13HM1103

L	T	P	C
4	0	0	3

Course Educational Objectives:

To familiarize with the process of management and to provide the basic insights in effective and efficient running of an industry using its human and non-human resources in order to achieve its set goals and objectives

Course Outcomes:

To understand the management processes and evolve management levels for effective decision making

UNIT-I (10 Lectures)

MANAGEMENT AND ORGANIZATION:

Definition – meaning and nature of management- Functions of management- Evolution of management thought- Taylor's Scientific management- Fayol's Principles of management- Basic concepts related to organization- Departmentation, Delegation and Decentralization, Type of organization structures- authority, responsibility and accountability

UNIT-II (12 Lectures)

MOTIVATION THEORIES AND LEADERSHIP :

Definition, Meaning and Types of Motivation – Theories of Motivation- Douglas Mc Gregor Theory X and Theory Y, Mayo's Hawthorne Experiment- Herzberg two factor theory of motivation, Maslow's hierarchy of human needs

Leadership: Definition, Meaning, Features and Types of Leadership (Autocratic, Democratic and Lassie Faire)

UNIT-III (12 Lectures)

PLANT LOCATION & LAYOUT:

Plant location – Definition, factors affecting the plant location, comparison of rural and urban sites- methods of selection of plant. Plant layout-definition, objectives, types of production, types of plant layout-various data analyzing forms-travel chart

UNIT-IV (12 Lectures)

WORK STUDY:

Definition- objectives, method study- definition, objectives, steps involved – various types of associated charts- difference between micromotion and memomotion studies. Work measurement- definition, time study, steps involved – equipment, different methods of performance rating- allowances, standard time calculation. Work Sampling- definition and steps involved.

UNIT-V (14 Lectures)

INDUSTRIAL RELATIONS & LABOR WELFARE:

Definition of Industrial dispute – causes of Industrial dispute – (Internal & External) – machinery to solve industrial disputes, grievance management, attendance and leave, labor Act-2003, Factories Act-1948, Social security measures in labor laws. Introduction in social security laws; Payment of gratuity act – 1972, Employees fund & Miscellaneous Provisions Act-1952, Employees State Insurance Act- 1948, workmen's Compensation Act- 1923

Labor welfare: Meaning- Statutory and Non Statutory Act

TEXTS BOOKS:

1 O P Khanna, "*Industrial Engineering and Management*", 2nd Edition, Dhanpat Rai, 2004.

2 Martand Telsang, *"Industrial Engineering and Management"*, 2nd Edition, S. Chand & Comapany, 2008.

REFERENCES:

1 Dr. O P Khanna, *"Industrial Engineering and management"* 2nd Edition, Dhanpat Rai, 2004.

2 Dr. C Nadha Muni Reddy and Dr. K Vijaya Kumar Reddy *"Reliability Engineering & Quality Engineering",* 1st Edition, Galgotia Publications, 2008.

MECHANICAL MEASUREMENTS

Course Code:13ME1125

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student to

- ✤ Impart the knowledge of basic engineering measurement systems for pressure, temperature, level, velocity, flow and vibration
- ✤ Introduce to electronic control systems associated with automatic control of measuring parameters.
- ✤ Apply the principles of measurement to engineering situations

Course Outcomes:

Student will be able to

- ✤ Identify appropriate instrument for measurement of specific parameter.
- ✤ Calibrate the instruments
- ✤ State the applications, important features and limitations of various measuring instruments

UNIT-I (12 Lectures)

INTRODUCTION:

Definition – Basic principles of measurement – measurement systems, generalized configuration and functional descriptions of measuring instruments – examples. Dynamic performance characteristics –sources of error, classification and elimination of error.

Measurement of force, torque and power: Elastic force meters, load cells, torsion meters, dynamometers.

UNIT-II (12 Lectures)

MEASUREMENT OF DISPLACEMENT:

Theory and construction of various transducers to measure displacement

– piezo electric, inductive, capacitance, resistance, ionization and photo electric transducers, calibration procedures.

MEASUREMENT OF TEMPERATURE:

Classification , ranges, various principles of measurement, expansion, electrical resistance, thermistor , thermocouple, pyrometers , temperature indicators.

UNIT-III (12 Lectures)

MEASUREMENT OF PRESSURE :

Units, classification , different principles used., manometers, piston, bourdon pressure gauges, bellows– diaphragm gauges. low pressure measurement – thermal conductivity gauges – ionization pressure gauges, Mcleod pressure gauge, Knudsen gauge. calibration of pressure gauges.

Measurement of level : Direct method – indirect methods– capacitative, ultrasonic, magnetic, cryogenic fuel level indicators – bubler level indicators.

FLOW MEASUREMENT:

Rotameter, magnetic, ultrasonic, turbine flow meter, hot – wire anemometer, laser Doppler anemometer (LDA).

UNIT-IV (12 Lectures)

MEASUREMENT OF SPEED:

Mechanical tachometers, electrical tachometers, stroboscope, noncontact type of tachometer.

MEASUREMENT OF VIBRATION:

Different simple instruments, principles of seismic instruments – vibrometer and accelerometer using this principle.

STRAIN MEASUREMENTS:

Various types of stress and strain measurements – electrical strain gauge – gauge factor – method of usage of resistance strain gauge for bending compressive and tensile strains – usage for measuring torque, Strain gauge Rosettes. Strain gauge calibration.

UNIT-V (12 Lectures)

Measurement of humidity - Moisture content of gases, sling psychrometer, absorption psychrometer, dew point meter.

ELEMENTS OF CONTROL SYSTEMS:

Introduction, importance – classification – open and closed systems servomechanisms–examples with block diagrams–temperature, speed & position control systems.

TEXT BOOK:

1. D.S Kumar, *"Measurement Systems: Applications & design"*, 6th Edition, Metropolitan, 2002.

REFERENCES:

1. A.K.Sawhney, *"Mechanical Measurement and Instrumentation"*, 3rd Edition, Dhanpat Rai, 2004.
2. Holman, *"Experimental Methods for Engineers"*, 3rd Edition, McGraw-Hill, 2000.
3. B.C.Nakra & K.K.Choudhary, *"Instrumentation measurement & analysis"*, 4th Edition, TMH, 1999.

DESIGN OF MACHINE ELEMENTS -II

Course Code:13ME1126

L	T	P	C
4	1	0	3

Pre requisites:

Engineering Mechanics, Mechanics of Solids, Material Science, Kinematics of Machines, Dynamics of Machinery and Design of Machine Elements-I

Course Educational Objectives:

The student will be able to:

- ✤ Apply theoretical principles leant in subjects like Engineering Mechanics, Mechanics of Solids, Materials Science, Design of Machine Elements-1 to actual design of machine components
- ✤ Analyse the forces, couples, torques etc., in machine members like bolts, power screws, springs, bearings, gears, shafts, couplings, chain drives, wire ropes etc.
- ✤ Apply concepts leant in Design of Machine Elements-1 like factor of safety, theories of failure, fatigue, impact to design situations
- ✤ Refer design data handbook and extract suitable data like stress concentration factors, properties of engineering materials
- ✤ Refer manufacturers' catalogues for selection of bearings, ropes, chains

Course Outcomes:

The student will be able to:

- ✤ Identify the various machine elements in a given machine as listed above
- ✤ Draw free body diagrams for the given component, analyse the loads and calculate the resulting stresses, deflections etc. and dimensions of the machine elements.

- estimate the factor of safety and expected life of the component

UNIT-I (12 Lectures)

THREADED FASTENERS:

Introduction, threaded forms, terminology, standards, threaded fastener types, materials, bolt tightening, initial tension, thread locking, bolt design for static loads, axial and eccentric and fatigue loads.

POWER SCREWS:

Introduction, comparison of types of power screw threads, differential and compound power screws, derivations for torque for lifting, lowering, self locking conditions , efficiency, effect of collar friction, design of power screws, applications, screw jack, C- clamp.

UNIT-II (12 Lectures)

SHAFT, KEYS AND COUPLINGS:

Introduction, terminology, overall shaft design, axial bending and torsional loading design for torsional rigidity, keys, pins and splines, types of couplings, concept of shaft alignment.

WELDED JOINTS:

Introduction, types of welded joints, static, axial, direct shear, torsion, bending loads, fatigue considerations

UNIT-III (12 Lectures)

BEARINGS:

Introduction, sliding bearings, basic concepts of hydrostatic and hydrodynamic lubrication, Petroff, Steinbeck, Mc Kee's equations, bearing design, design charts, heat dissipation and equilibrium oil film temperature, rolling contact bearings – Introduction, types, comparison with sliding element bearings, design and selection of rolling bearings – static loads dynamic load, life, reliability, influence of axial load, variable loads.

UNIT-IV (12 Lectures)

SPRINGS:

Introduction, types and terminology, design of helical springs – static and fluctuating loads, shear stress, deflection, spring rate, initial compression, types of ends, buckling, surging, helical torsion springs, leaf springs – bending stress, deflection.

Chain drives, wire ropes: Introduction to chain drives, roller chains, inverted – tooth chains, geometric relationships, polygon effect, power rating, design of chain drives. Wire rope types – construction, breaking strength, selection of wire ropes

UNIT-V **(12 Lectures)**

Spur and helical gears: Spur Gears, gear tooth strength, basic analysis of gear tooth bending stress (Lewis equation), velocity factor, service factor, overload correction factor, Buckingham equation for incremental dynamic load, gear tooth surface durability and fatigue analysis, helical gears – geometry, force analysis, tooth bending, surface fatigue strength.

TEXT BOOKS:

1. RC Juvinall & K M Marshek, *"Fundamental of Machine Components Design"*, John Wiley&Sons, 5th Edition, 2011.
2. Design Data Hand Book, PSG College of Technology, Coimbatore, 1992.

REFERENCE:

V. B. Bhandari, *"Design of Machine Elements"*, 3rd Edition, Tata McGraw-Hill, 2010.

Note: Design Data Book to be permitted during the examination

HEAT TRANSFER

Course Code:13ME1127

L	T	P	C
4	1	0	3

Pre requisites: Thermodynamics, Fluid Mechanics

Course Educational Objectives:

To make the student understand

- ✤ Different modes of heat transfer
- ✤ Theory of insulations and fins
- ✤ Concept of dimensional analysis
- ✤ Concepts of hydrodynamic and thermal boundary layers
- ✤ Processes of boiling and condensation heat transfer
- ✤ Design methods of heat exchangers
- ✤ Radiation properties and radiation exchange between surfaces

Course Outcomes:

The student will be able to

- ✤ Explain different modes of heat transfer and their applications
- ✤ Estimate fin heat transfer and insulation thickness in design calculations
- ✤ Dimensional analysis to processes of heat transfer
- ✤ Explain the phenomena of boiling and condensation
- ✤ Apply LMTD and NTU methods for the design of heat exchangers
- ✤ Estimate radiation exchange between surfaces

UNIT-I (12 Lectures)

INTRODUCTION:

Modes of heat transfer – Fourier's law of heat conduction – general heat conduction equation in Cartesian and cylindrical coordinates.

One dimensional steady state heat conduction: Composite slab, coaxial cylinders and concentric spheres – conduction- convection systems - overall heat transfer coefficient - electrical analogy - critical radius of insulation - types of fins – rectangular fin with insulated tip – fin effectiveness and fin efficiency - application to error measurement of temperature.

UNIT-II (12 Lectures)

ONE DIMENSIONAL TRANSIENT HEAT CONDUCTION:

Lumped heat capacity analysis - Biot and Fourier numbers - solution of transient conduction systems for slabs, cylinders and spheres using Heisler's charts.

FUNDAMENTALS OF CONVECTION:

Velocity and thermal boundary layers in flow on a horizontal flat plate - velocity and thermal boundary layers in laminar flow through a circular pipe – hydrodynamic and thermal entry lengths.

UNIT-III (11 Lectures)

DIMENSIONAL ANALYSIS:

Buckingham-ð theorem – dimensional analysis applied to forced convection and natural convection – significance of Reynolds, Prandtl and Nusselt numbers

FORCED CONVECTION:

Empirical correlations for Nusselt numbers for flow over flat plates – Empirical correlations for Nusselt numbers for flow through pipes

NATURAL CONVECTION:

Velocity and thermal boundary layers in heat transfer by natural convection from a vertical plate (derivations not included) - empirical correlations for vertical plates and cylinders

UNIT-IV (12 Lectures)

BOILING AND CONDENSATION:

Regimes of saturated pool boiling - laminar filmwise condensation on a vertical plate

HEAT EXCHANGERS:

Parallel and counter flow double pipe heat exchangers - overall heat transfer coefficient – fouling factors - LMTD method of heat exchanger analysis – effectiveness - NTU method of heat exchanger analysis.

UNIT-V (13 Lectures)

THERMAL RADIATION:

Emissive power – black body – Stefan-Boltzmann's law - Emissivity – Kirchhoff's law radiation heat exchange between two black isothermal surfaces – concept of radiation shape factor, heat exchange between two large gray planes, and concentric cylinders – exchange between a small gray body in a large enclosure

TEXT BOOK:

R.C. Sachdeva, "Fundamentals of Engineering Heat and Mass Transfer (SI Units)", 4th Edition, New Age International, 2010.

REFERENCES:

1. D.S. Kumar, *"Heat and Mass Transfer (SI Units)",* 7th Edition, S.K. Kataria & Sons, 2008.
2. J.P. Holman, *"Heat Transfer"*, 9th Edition, Tata McGraw Hill, 2004.
3. F.P. Incropera, D.P. Dewitt, T.L. Bergman, A.S. Lavine, KN Seetharamu and T.R. Seetharam, *"Fundamentals of Heat and Mass Transfer"*, 1st Edition, Wiley India, 2013.

PRODUCTION PLANNING AND CONTROL
(Elective – I)

Course Code: 13ME1128

L	T	P	C
4	0	0	3

Pre requisites: Industrial Engineering and Management.

Course Educational Objectives:

To make the student

- ✤ To introduce to various inherent concepts of production systems, planning systems and control systems of Manufacturing Industry.
- ✤ To gain knowledge in preparation of process planning sheets for the product.
- ✤ To maintain proper knowledge in inventory control methods.

Course Outcomes:

- ✤ To understand the functions of production, planning and control.
- ✤ To know about the different types of production.

UNIT-I **(10 Lectures)**

Introduction - Definition – Objectives of production planning and control – functions of production planning and control – elements of production control – types of production – organization of production planning and control department

UNIT-II **(08 Lectures)**

Forecasting – Importance of forecasting – types of forecasting, their uses– general principles of forecasting – forecasting techniques – qualitative methods and quantitative methods.

UNIT-III **(13 Lectures)**

INVENTORY MANAGEMENT:

Functions of inventories – relevant inventory costs – ABC analysis – VED analysis – EOQ model – Inventory control systems – P–Systems and Q-Systems.

Introduction to MRP & ERP, LOB (Line of Balance), JIT inventory, and Japanese concepts, Introduction to supply chain management.

UNIT-IV **(13 Lectures)**

ROUTING :

Definition – routing procedure – route sheets – bill of material – factors affecting routing procedure. scheduling – definition – difference with loading ,scheduling policies – techniques, standard scheduling methods.

UNIT-V **(13 Lectures)**

Line balancing, aggregate planning, chase planning, expediting, controlling aspects.

Dispatching – activities of dispatcher – dispatching procedure – follow up – definition – reason for existence of functions – types of follow up, applications of computer in production planning and control.

TEXT BOOKS:

1. Samuel Eilon, *"Elements of Production Planning and Control"*, 1st Edition, Universal Publishing Corp., 1999.

REFERENCES:

1. P Rama Murthy, *"Production and Operations Management"*, 1st Edition, New Age, 2002.
2. Baffa & Rakesh Sarin, *"Modern Production / Operations Management"*, 8th Edition, John Wiley & Sons, 2002.
3. S.N. Chary, *"Operations Management"*, 1st Edition, TMH, 1996.
4. Joseph Monks, *"Operations Management Theory and Problems"*, 3rd Edition, McGraw-Hills,1987.
5. S L Narasimhan, McLeavey, Billington, *"Production Planning and Inventory Control"*, 2nd Edition, PHI, 2002.
6. John E. Biegel, *"Production Control A Quantitative Approach"*, 1st Edition, 1963.

POWER PLANT ENGINEERING
(Elective – I)

Course Code: 13ME1129

L	T	P	C
4	0	0	3

Pre requisites: Thermal Engineering.

Course Educational Objectives:

Through this course the Student is

- Exposed to different technologies adopted for production of electrical energy
- Taught various methods for pollution control and the economic aspects of power plant operation
- Introduced to non-conventional energy sources like solar energy- wind energy and so on.
- Introduced with economics of power industry and pollution control.

Course Outcomes:

The student

- Gains knowledge and develops an awareness of the different technologies adopted in the world for the generation of electrical energy
- Understands material flow- energy conversion from steam- gas and diesel oil and nuclear materials.
- Apply the concepts of non-conventional energy sources.
- Knows the controlling techniques of pollution and power plant economics

UNIT-I **(12 Lectures)**

Thermal power plants: Introduction to the sources of energy. plant layout, fuel handling – types of coals, grades of coal, coal handling – layout of fuel handling equipments, coal handling, choice of handling equipment, coal storage.

COMBUSTION:

combustion equipment for solid fuels – burning of coal – burners – fluidized bed combustion - ash handling – dust collectors - draught system (no mathematical treatment) – cooling ponds and cooling towers - feed water treatment – advantages and disadvantages

UNIT-II (16 Lectures)

HYDRO-ELECTRIC POWER PLANTS:

Water power – hydrological cycle / flow measurement – drainage area characteristics – hydrographs – storage and pondage – classification of dams and spill ways.

HYDRO PROJECTS AND PLANT:

Classification – typical layouts – plant auxiliaries – plant operation pumped storage plants.

NON-CONVENTIONAL ENERGY SOURCES:

utilization of solar- collectors- principle of working, wind energy – types – HAWT, VAWT -Tidal Energy. Direct energy conversion: solar cell, fuel cells, MHD generation.

UNIT-III (14 Lectures)

DIESEL POWER PLANTS:

Introduction – IC engines, types, construction– plant layout with uxiliaries – fuel supply system, air starting equipment, lubrication and cooling system – super charging.

GAS TURBINE POWER PLANTS:

Introduction – application - selection of site - classification – plant layout – components of gas turbine plant - combined cycle power plants - advantages and disadvantages.

UNIT-IV (10 Lectures)

NUCLEAR POWER PLANTS:

Nuclear fuel – breeding and fertile materials – nuclear reactor –reactor operation.

TYPES OF REACTORS:

Pressurized water reactor, boiling water reactor, sodium-graphite reactor, fast breeder reactor, homogeneous reactor, gas cooled reactor, radiation hazards and shielding – radioactive waste disposal.

UNIT-V (08 Lectures)

POWER PLANT ECONOMICS AND IMPACT ON ENVIRONMENT:

Capital cost, investment of fixed charges, operating costs, general arrangement of power distribution, load curves, load duration curve.

definitions of connected load, maximum demand, demand factor, average load, load factor, diversity factor – related exercises.

Pollution: Introduction – pollution from thermal power plants - pollution from nuclear power plants - pollution from hydroelectric power plants.

TEXT BOOK:

R K Rajput, *"A text book of power plant engineering"*, Laxmi Publications, New Delhi, 2012.

REFERENCES:

1. P. K. Nag, *"Power plant engineering"*. 3rd Edition, Tata McGraw-Hill- New Delhi, 2007.
2. Arora and Domkundwar, *"A course in Power plant engineering"*, 3rd Edition, Tata McGraw-Hill, New Delhi, 1988.
3. Manoj kumar Gupta, *"Power plant engineering"*, Prentice Hall Inc., New Delhi, 2012.

ADVANCED MECHANICS OF SOLIDS
(Elective – I)

Course Code: 13ME1130

L	T	P	C
4	0	0	4

Pre requisites:
Engineering Mechanics and Mechanics of Solids.

Course Educational Objectives:
To make the student
- Acquire knowledge in stress and strain transformation
- Understand the concepts of fixed and continuous beams
- Learn application of Castigliano theorem to beams and trusses
- Calculate the bending stresses for various cross sections of curved bars
- Acquire knowledge of torsional behavior of non circular shafts
- Understand stresses due to rotation

Course Outcomes:
The student will be able to
- Calculate in-plane principal stresses and strains
- Draw and analyze shear force and bending moment diagrams for fixed and continuous beams
- Estimate torsional stresses of non-circular shafts
- Calculate stresses due to rotation in wheel rims and discs

UNIT-I (12 Lectures)
STRESS AND STRAIN TRANSFORMATION:

Plane stress transformation, general equations of plane stress transformation, plane strain transformation, general equation of plane strain transformation, strain rosettes.

THEORY OF ELASTICITY:

compatibility equations, generalized Hooke's law, stress function, equilibrium and compatibility equations in polar coordinates.

UNIT-II (12 Lectures)

FIXED BEAMS:

Fixing moments for a fixed beam of uniform and variable sections, effect of Sinking support, slope and deflection.

Continuous beams: Analysis of continuous beams, reaction at the supports, and theorem of three moments, Propped cantilevers.

UNIT-III (12 Lectures)

ENERGY METHODS:

External work and strain energy, elastic strain energy for various types of loading, conservation of energy, impact loading, principle of virtual work, trusses, method of, Applications of Castigliano theorem I and II.

TORSION OF NONCIRCULAR SHAFTS:

Torsion of noncircular prismatic bars, Saint Venant's Theory, open and closed sections and shear flow,

Unsymmetrical loading of thin walled members: Shear Centre

UNIT-IV (12 Lectures)

STRESSES IN CURVED BARS:

Determination of factor m in bars of circular, rectangular and trapezoidal sections, stresses in hooks.

STRESSES DUE TO ROTATION:

Wheel rim, rotating disc of uniform thickness and disc of uniform strength, permissible speed of a solid disc

UNIT-V (12 Lectures)

VISCO ELASTICITY:

Representation by means of functional, representation by means of internal variables.

VISCO PLASTICITY:

Visco plasticity with elastic domain, plasticity as a limit case of visco plasticity, a concept of general visco plasticity.

TEXT BOOKS:

1. R.C.Hibbeler, *"Mechanics of materials"*, 6th Edition Pearson education2007.
2. B.C.Punmia, Ashok Jain, Arun kumar jain, *"Mechanics of materials"*, Laxmi publications, New Delhi.2001
3. P Haupt, *"Continum Mechanics and Theory of Materials"*, 2nd Edition 2002, Springer publications (UNIT –V)

REFERENCES:

1. Beer,P.F and Johnston,E.R, *"Mechanics of Materials"*, 6th Edition, McGraw Hill Inc,2013
2. B.C.Punmia,Ashok jain, Arun kumar jain, *"Strength of materials and Theory of Structures"*,Vol-II,9th Edition, Laxmi publications, New Delhi.
3. Timoshenko S.P. and Goodier J N, *"Theory of Elasticity"*, McGraw Hill, New Delhi, 2010.
4. Irving H. Shames and James M. Pitaressi, *"Introduction to Solid Mechanics"*, 3rd Edition, Prentice Hall, New Delhi, 2009.

FOUNDRY TECHNOLOGY

(Elective – I)

Course Code:13ME1131

L	T	P	C
4	0	0	3

Prerequisite: Metallurgy and Engineering materials

Course Educational Objectives:

To make the student to

- ✤ Understand the basic concepts of design and manufacture of simple patterns.
- ✤ Understand solidification processes and casting techniques
- ✤ Know the various casting defects and detection methods

Course Outcomes:

The student will be able to

- ✤ Design and manufacture simple patterns
- ✤ Acquire the ability to work in industrial workplaces or in self-employment in the field of foundry technology.
- ✤ Conduct research in the area of foundry operations.

UNIT-I (10 Lectures)

INTRODUCTION:

Introduction to moulding and casting processes - steps involved advantages, limitations, application of casting process. Patterns - types, applications, pattern allowances-pattern materials, colour coding as per BIS, pattern making, core and core making, core boxes, core prints, core blowers, core shooters.

Sand mould making: Moulding and core sands, ingredients, properties, types of sands, sand selection - machine moulding, types of machines, applications.

UNIT-II (13 Lectures)

CASTING PROCESSES:

Sand preparation and sand reclamation-sand control tests. Sand casting process, types of moulding processes - plaster mould casting , die casting process - die casting methods. centrifugal casting, continuous casting ,shell moulding ,CO2 moulding - investment casting , full mould process.

UNIT-III (13 Lectures)

MELTING, POURING AND TESTING:

Foundry remelting furnaces – selection of furnaces – crucible furnaces -oil fired furnace, electric furnaces – resistance, arc, induction furnaces –cupola steel melting , non-ferrous melting practices - pouring equipments – cleaning and inspection of casting –destructive and non-destructive testing - defects in sand casting and remedies.

UNIT-IV (10 Lectures)

GATING, FEEDING AND MECHANIZATION:

Elements of gating system, functions, types and design of gating systems, gating ratio, risers, functions, types and designs, methods controlling solidification, solidification time calculations, foundry mechanization.

UNIT-V (14 Lectures)

FOUNDRY PRACTICE ON FERROUS AND NON FERROUS METALS:

Production of iron castings - Steel foundry practice - Copper alloy foundry practice - Aluminium alloy foundry practice - Magnesium alloy foundry practice - Zinc alloy foundry practice.

Foundry metallurgy: Heat treatment of castings, inspection, testing and quality control in foundries, salvage in defective castings, foundry mechanization.

Foundry environment, health and safety: Dust problems in foundries, preventive maintenance in foundries, returning a sick foundry to profitability.

TEXT BOOKS:

1. O.P. Khanna, *"A Text Book of Foundry Technology"*, Dhanpat Rai & Sons, 15th Edition, 2011.
2. P.N. Rao, *"Manufacturing Technology"*, TMH, 5th Edition, 2013.

REFERENCES:

1. Richard. W. Heine and Rosenthal, *"Principles of Metal Castings"*, TMH, 2nd Edition, 2001.
2. R.K. Jain, *"Production Technology"*, Khanna Publishers, 17th Edition, 2011.

COMPOSITES
(Elective –II)

Course Code: 13ME1132

L	T	P	C
4	0	0	3

Pre requisites: Material Science

Course Educational Objectives:

To make the student

- ✤ Understand concepts of composites and their various manufacturing methods.
- ✤ Acquire knowledge on elastic behavior of composite materials
- ✤ Understand failure mechanisms of composite structures
- ✤ Learn the applications of nano-composites

Course Outcomes:

The student will be able to

- ✤ Select suitable composite material for a given application
- ✤ Apply the theory of mechanics to compute stresses and strains in composite materials
- ✤ Explain mechanisms of failure of composites
- ✤ Suggest suitable method for the preparation of composites

UNIT-I **(12 Lectures)**

INTRODUCTION AND BASIC CONCEPTS:

Geometric and physical definitions, types and classification of composites , natural and man- made composites, aerospace and structural applications.

Matrix materials, interfaces, polymer matrix composites, metal matrix composites, ceramic matrix composites, carbon fibre composites.

UNIT-II **(12 Lectures)**

REINFORCEMENTS:

Fibres- glass, silica, kevlar, carbon, boron, silicon carbide, and born carbide fibres, particulate composites, polymer composites, thermoplastics, thermosets, metal matrix and ceramic composites.

UNIT-III (12 Lectures)

MECHANICS OF COMPOSITES:

Unidirectional composites, constituent materials and properties, Hooke's law for different types of materials, transformation of stress and strain.

elastic behavior of unidirectional composites: Relationship between engineering constants and reduced stiffness and compliances, analysis of laminated composites.

UNIT-IV (12 Lectures)

FAILURE THEORIES:

Micro mechanics of failure, failure mechanisms, strength of an orthotropic lamina, failure envelope, first ply failure, free-edge effects.

UNIT-V (12 Lectures)

MANUFACTURING METHODS:

Autoclave, tape production, moulding methods, filament winding, man layup, pultrusion, RTM.

NANO COMPOSITES:

Introduction to nano-materials, basic definition of nano-composites, processing, applications of nano-composites.

TEXT BOOKS:

1. R. M. Jones, *"Mechanics of Composite Materials"*, Taylor & Francis Group, 2nd edition, 1998.
2. Isaac and M.Daniel, *"Engineering Mechanics of Composite Materials"*, Oxford University Press, 2005.

REFERENCES:

1. B. D. Agarwal and L. J. Broutman, *"Analysis and Performance of Fibre Composites"*, Wiley-Interscience, New York, 1980.
2. L.R. Calcote, *"Analysis of Laminated Composite Structures"*, Van Nostrand Rainfold, New York, 1969.

MATERIALS HANDLING

(Elective –II)

Course Code:13ME1133	L	T	P	C
	4	0	0	3

Course Educational Objectives:

This subject is a highly specialized area in mechanical engineering. In almost all engineering industries, materials handling equipment are required for handling raw materials, semi-finished and finished goods. They are useful for bulk goods, piece goods and for automation. This course introduces the principles of operation of important materials handling equipment like belt, apron, flight, screw and overhead conveyors, cranes and stockyard equipment like, wagon tipplers and stackers and reclaimers, their description.

Course Outcomes:

- The student becomes aware of the importance of material mechanization.
- The student will be able to identify the different handling equipments in industry
- The student will know how to connect loading stations to the different discharge or unloading conditions
- The student will be able to appreciate industrial plant layouts

UNIT-I **(12 Lectures)**

Introduction to materials handling, examples of materials equipment classification of materials handling equipment, continuous conveying, intermittent conveying, examples, lifting, hoisting, handling of bulk goods and piece goods, cranes and conveyors, principles of calculation of conveying equipment, cycle time, bulk materials and bulk density, angle of repose, example for a belt conveyor and a simple hoist.

UNIT-II (12 Lectures)

Belt conveyors, constructional details, toughing angle, idlers, belt specifications, chutes, skirt boards, ploughs, belt conveyor layouts, belt trippers, and typical examples, roller conveyors, overhead conveyors, apron conveyors, component parts and operational details and applications with typical layouts.

UNIT-III (12 Lectures)

Bucket elevators, screw conveyors, flight conveyors, component parts, operational details and applications with typical layouts. Hoists, EOT cranes, specifications, component parts, ropes, pulley layouts, hoisting drums, arrangement of drive.

Wire rope specifications and selection, simple calculation of bridge girder, types of crane hooks.

UNIT-IV (12 Lectures)

Jib cranes, like wallmounted and travelling type, stability criteria, wheel loads, wheel trucks and bogeys, number of mechanisms in jib cranes, jib construction. Harbour cranes, luffing and levelluffing cranes, shipyard gantry cranes, portal frames and slewing rings and bearings typical stability calculations of portal cranes.

UNIT-V (12 Lectures)

Special materials handling equipment, wagon tipplers, stackers, reclaimers, their construction aldetails, pneumatic conveyers, typical materials handling layouts and applications.

TEXT BOOKS:

1. Rudenko, *"Material Handling Equipment"*, MIR Publishers, 1965.
2. Spivakowsky, *"Conveying Equipment"*, MIR Publishers, 1965.

REFERENCES:

1. R.O. Bailey, *"Bulk material handling by conveyor belt I & II"*, M.A. Alspaugh
2. Fruchtbaum, *"Bulk solids handling"*

MECHANICAL VIBRATIONS AND CONDITION MONITORING

(Elective II)

Course Code: 13ME1134

L	T	P	C
4	0	0	3

Pre requisites: Theory of Machines

Course Educational Objectives:

- Provides the importance of study of vibration
- Enhances the vibration analysis procedure for physical systems
- Determines the amount of damping for a given system
- Finds the response of an un damped system under harmonic force
- Creates awareness about the vibration isolation materials
- Writing the equations of motion for physical systems

Course Outcomes:

- Finds the natural frequencies for a single and multi degree of freedom systems
- Provides the information about the vibration measurements
- Gives the knowledge about signal analysis
- Determines the response of the systems under periodic and no periodic forces
- Importance of the machine condition monitoring
- Analysis of the free and forced vibration of viscously damped systems

UNIT-I **(12 Lectures)**

HARMONICALLY EXCITED VIBRATION:

Introduction, equation of motion, response of an undamped system under harmonic force, response of a damped system under the harmonic motion of the base, response of a damped system under rotating unbalance, forced vibration with coulomb and hysteresis damping.

TWO DEGREES OF FREEDOM SYSTEMS:

Introduction, equations of motion for forced vibration, free vibration analysis of an undamped system, torsional system, coordinate coupling and principal coordinates, forced vibration analysis.

UNIT-II (14 Lectures)

MULTI DEGREE OF FREEDOM SYSTEMS:

Introduction, modelling of continuous systems as multi degree of freedom systems, influence coefficients, potential and kinetic energy expressions in matrix form, generalized coordinates and generalized forces, using Lagrange's equation to derive equations of motion ,equations of motion of undamped systems in matrix form, eigen value problem, solution of the eigen value problem, free vibration of undamped systems, forced vibrations of undamped systems using modal analysis, forced vibration of viscously damped system.

UNIT-III (12 Lectures).

NONLINEAR VIBRATIONS:

Introduction, examples of non linear vibration problems, exact methods, approximate analytical methods, sub harmonic and super harmonic oscillations, systems with time dependent coefficients, graphical methods, stability of equilibrium states, limit cycles, chaos.

UNIT-IV (11 Lectures)

VIBRATION CONTROL:

Introduction, vibration nomograph and vibration criteria, reduction of vibration at the source, balancing of rotating machines, whirling of rotating shafts, balancing of reciprocating engines, control of vibration, control of natural frequencies, introduction of damping, vibration isolation, vibration absorbers.

UNIT-V (11 Lectures)

FAULT DIAGNOSIS:

Dynamic testing of machines and structures, experimental modal analysis, machine condition monitoring and diagnostics.

Condition monitoring and signature analysis applications: Introduction, noise monitoring, temperature monitoring, wear behaviour monitoring, corrosion monitoring, performance trend monitoring, selection of condition monitoring techniques, diagnosis.

TEXT BOOK:

1. Rao S.S., *"Mechanical Vibrations"*, 4th Edition, Pearson Education, Inc., 2004.
2. B.C. Nakra and K.K. Chowdary, *"Mechanical Measurements"*, 2nd Edition, TMH, New Delhi, 2004.

REFERENCES:

1. William T Thomson & Marie Dillon Dahleh, *"Theory of Vibrations with application"*, 5th Edition, Pearson Education Publication, 2007.
2. Tse, Morse and Hinkel, *"Mechanical Vibrations"*, Chapman and Hall, 1991.
3. Den Hartong J.P., *"Mechanical Vibrations"*, McGraw Hill, 1986.
4. V.P.Singh, *"Mechanical vibrations"*, 3rd Edition, DhanpatRai & Co., 2006.
5. G.K. Grover, *"Mechanical Vibrations"*, Nemchand& Bros, Roorke, 8th Edition, 2009.

VALUE ENGINEERING
(Elective-II)

Course Code: 13ME1135

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student to understand

- ✤ The concept of most effective cost reduction efforts available.
- ✤ Various terms, techniques and processes involved in value engineering so as to familiarize with this essential tool.

Course Outcomes:

The student will able to acquire knowledge on solving skills and appreciation of the difficulties involved in resolving their complexities.

UNIT-I (10 Lectures)

INTRODUCTION:

Value engineering concepts, advantages, applications, problem recognition, and role in productivity, criteria for comparison, element of choice.

ORGANIZATION:

Level of value engineering in the organization, size and skill of VE staff, small plant, VE activity, unique and quantitative evaluation of ideas.

UNIT-II (13 Lectures)

VALUE ENGINEERING JOB PLAN:

Introduction, orientation, information phase, speculation phase, analysis phase. Selection and Evaluation of value engineering Projects, Project selection, methods selection, value standards, application of value engineering methodology.

ANALYSIS FUNCTION:

Anatomy of the function, use esteem and exchange values, basic vs.

secondary vs. unnecessary functions. Approach of function, Evaluation of function, determining function, classifying function, evaluation of costs, evaluation of worth, determining worth, evaluation of value.

UNIT-III (12 Lectures)

VALUE ENGINEERING TECHNIQUES :

Selecting products and operation for value engineering action, value engineering programmes, determining and evaluating function(s) assigning rupee equivalents, developing alternate means to required functions, decision making for optimum alternative, use of decision matrix, queuing theory and Monte Carlo method make or buy, measuring profits, reporting results, Follow up, Use of advanced technique like Function Analysis System.

UNIT–IV (13 Lectures)

VERSATILITY OF VALUE ENGINEERING:

Value engineering operation in maintenance and repair activities, value engineering in non hardware projects. Initiating a value engineering programme Introduction, training plan, career development for value engineering specialties.

Fast diagramming: cost models, life cycle costs

UNIT–V (12 Lectures)

VALUE ENGINEERING LEVEL OF EFFORT:

Value engineering team, co-coordinator, designer, different services, definitions, construction management contracts, value engineering case studies.

TEXT BOOK:

Anil Kumar Mukhopadhyaya, "Value Engineering: Concepts Techniques and applications", SAGE Publications 2010.

REFERENCES:

1. Alphonse Dell'Isola, *"Value Engineering: Practical Applications for Design, Construction, Maintenance & Operations"*, R S Means Co., 1997.
2. Richard Park, *"Value Engineering: A Plan for Invention"*, St. Lucie Press, 1999.

3. Del L. Younker, *“Value Engineering analysis and methodology”*, Marcel Dekker Inc, New York, 2004.
4. Miles, L.D., *“Techniques of Value Analysis and Engineering”*, McGraw Hill second Edition, 1989.
5. Khanna, O.P., *“Industrial Engineering and Management”*, Dhanpat Rai & Sons, 1993.
6. Anil Kumar Mukhopadhyaya, *“Value Engineering Mastermind: From concept to Value Engineering Certification”*, SAGE Publications, 2003

MACHINE SHOP PRACTICE

Course Code: 13ME1136

L	T	P	C
0	0	3	2

Pre requisites: Manufacturing Technology and Engineering Metrology

Course Educational Objectives:

- ✤ To provide hands-on experience on basic mechachine tools
- ✤ To acquire knowledge in system of limits and fits.
- ✤ To know how to measure surface roughness

Course Outcomes:

The student will be able to

- ✤ Understand the basic working principle and material removal mechanism of conventional machine tools
- ✤ Perform different operations on various machine tools
- ✤ Use different types of measuring instruments
- ✤ Estimate the errors of the measuring instruments

Any SIX from the each section of the following experiments are to be performed during the semester

LIST OF EXPERIMENTS

SECTION - A: MACHINE TOOLS

1. Introduction of general purpose machines-Lathe, Drilling machine, machine, Shaper, Planing machine, Slotting machine, Cylindrical Grinder, Surface grinder and tool and cutter grinder.
2. Step turning and taper turing on lathe machine.
3. Thread cutting and Knurling on lathe machine.
4. Drilling and Tapping
5. Shaping and Planing.

6. Slotting.
7. Milling.
8. Cylindrical surface Grinding.
9. Grinding Tool angles.

SECTION - B: METROLOGY

1. Measurement of lengths, diameters by vernier calipers micrometers etc.
2. Measurement of bores by internal micrometers and dial bore indicators
3. Use of gear tooth vernier calipers checking the chordal addendum and chordal height of spur gear
4. Machine tool alignment test on the lathe.
5. Machine tool alignment test on milling machine
6. Toolmakers microscope and its application.
7. Angle and taper measurements by Bevel protractor, Sine bars,etc.
8. Use of spirit level in finding the flatness of surface plate
9. Thread measurement by Two wire/Three wire method or Tool makers microscope
10. Surface roughness measurement using Talysurf

HEAT TRANSFER LAB

Course Code: 13ME1137

L	T	P	C
0	0	3	2

Pre requisites: Heat Transfer

Course Educational Objectives:

To conduct experiments on

- Pin fin apparatus
- Natural and forced convection heat transfer
- Composite slab and sphere
- Parallel and counter flow heat exchangers
- Boiling heat transfer
- Transient heat conduction

Course Outcomes:

The student will be able to evaluate

- The effectiveness of the pin fin
- The overall thermal resistance of composite slab and composite sphere
- Heat transfer coefficients in natural and forced convection heat transfer
- The critical heat flux in pool boiling of water
- Biot and Fourier numbers in unsteady state heat transfer.
- Effectiveness and overall heat transfer coefficient of parallel and counter flow heat exchangers

Any TEN of the following list of experiments to be conducted

LIST OF EXPERIMENTS

1. Heat transfer from a pin fin under forced convection conditions

2. Estimation of critical heat flux in pool boiling of water
3. Natural convection heat transfer from a vertical cylinder
4. Forced convection heat transfer to air in tube flow
5. Estimation of thermal conductivity of the given metal rod.
6. Parallel flow heat exchanger - Estimation of effectiveness and overall heat transfer coefficient
7. Heat transfer from a pin fin under natural convection conditions
8. Estimation of emissivity of a surface
9. Heat transfer through composite slab
10. Heat transfer through composite sphere
11. Counter flow heat exchanger-Estimation of effectiveness and overall heat transfer coefficient
12. Transient heat conduction – Estimation of Biot and Fourier numbers

INTELLECTUAL PROPERTY RIGHTS AND PATENTS

(Common to all Branches)

Course Code: 13NM1103	L	T	P	C
	2	0	0	0

Course Educational Objectives:

- To acquaint the learners with the basic concepts of Intellectual Property Rights.
- To develop expertise in the learners in IPR related issues and sensitize the learners with the emerging issues in IPR and the rationale for the protection of IPR.

Course Outcomes:

At the end of this course, the student will be able to

- Gain knowledge on Intellectual Property assets and generate economic wealth
- Assist individuals and organizations in capacity building and work as a platform for development, promotion, protection, compliance, and enforcement of Intellectual Property & knowledge.

UNIT-I (7 Lectures)

Introduction to intellectual property Act and Law-the evolutionary past-the IPR tool kit- legal tasks in intellectual property law-ethical obligations in Para legal tasks in intellectual property law

UNIT-II (8 Lectures)

Introduction to trade mark – Trade mark registration process-Post registration procedures-Trade mark maintenance – transfer of rights- inter party's proceeding – Infringement-Dilution ownership of trade mark-likelihood of confusion – trademark claims- trademark litigations

UNIT-III **(6 Lectures)**

Introduction to copy rights- principles of copyright – subjects matter of copy right- rights afforded by copyright law- copyright ownership- transfer and duration – right to prepare derivative works- right of distribution- right to perform the work publicity- copyright formalities and registrations

UNIT-IV **(7 Lectures)**

Introduction to patent law- Rights and limitations- Rights under patent law- patent requirements- ownership – transfer- patent application process- patent infringement- patent litigation

UNIT-V **(6 Lectures)**

Introduction to transactional law- creating wealth and managing risk – employment relationship in the Internet and technologic cal sector- contact for internet and technological sector

TEXT BOOKS:

1 Kompal Bansal and Praishit Bansal, "Fundamentals of IPR for Engineers", 1st Edition, BS Publications, 2012.

2 Prabhuddha Ganguli, *"Intellectual Property Rights"*, 1st Edition, TMH, 2012.

REFERENCES:

1 R Radha Krishnan & S Balasubramanian, *"Intellectual Property Rights"*, 1st Edition, Excel Books, 2012.

2 M Ashok Kumar & mohd Iqbal Ali, *"Intellectual Property Rights"*, 2nd Edition, Serial publications, 2011.

SYLLABI FOR VII SEMESTER

CAD/CAM

Course Code:13ME1138

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student understand

- ✤ Basic understanding of modern trends in design and manufacturing using CAD/CAM
- ✤ Advanced aspects of enabling computer aided technologies used in design
- ✤ Fundamental theories and technologies in computer aided manufacturing

Course Outcomes:

The student will be able to

- ✤ Explain different types of modeling techniques
- ✤ Perform various geometrical transformations
- ✤ Explain numerical control in manufacturing
- ✤ Explain the concept of group technology, adaptive control and FMS
- ✤ Write NC part program for simple machining operations

UNIT-I (14 Lectures)

Introduction to CAD/CAM: Product cycle, design process, application of computers for design, benefits of CAD, CAD / CAM hardware: Design workstation, graphics terminal, input devices, output devices, CPU, storage devices.

COMPUTER GRAPHICS:

Coordinate systems, database structures for graphic modeling, two dimensional and three dimensional transformations – scaling, rotation, reflection, rotation about an axis, concatenation

UNIT-II (12 Lectures)

GEOMETRIC MODELLING:

Requirements, geometric models, geometric construction methods, wire frame model, wireframe entities, parametric curve representation method, parametric representation of synthetic curves, hermite cubic splines, Bezier curves, B-splines, rational curves

SURFACE AND SOLID MODELLING:

Surface model, surface entities, surface representation, Parametric representation of surfaces, plane surface, ruled surface, surface of revolution, tabulated cylinder, Hermite Bi-cubic surface, Bezier surface, B- Spline surface, COONs surface, solid modeling, solid representation,boundary representation (B-rep), constructive solid geometry (CSG).

UNIT-III (12 Lectures)

NUMERICAL CONTROL:

Basic components of NC system, NC procedure, coordinate systems, NC motion control systems, applications, adaptive control

CNC PROGRAMMING:

Part programming fundamentals, manual part programming, preparatory functions, miscellaneous functions, canned cycles, computer aided part programming, APT language structure, geometry commands, motion commands and post processor commands.

UNIT-IV (10 Lectures)

GROUP TECHNOLOGY:

Introduction, part families, parts classification and coding, features of parts classification and coding system, OPITZ, MICLASS, Product Flow Analysis, composite part concept, machine cell design and applications.

COMPUTER AIDED PROCESS PLANNING:

Introduction, retrieval CAPP system, generative CAPP systems, benefits of CAPP.

UNIT-V **(12 Lectures)**

FLEXIBLE MANUFACTURING SYSTEMS:

Introduction, types of FMS, components, FMS layout configurations, computer control system, human resources, applications and benefits.

CIM: Integration, CIM implementation, benefits of CIM, introduction to lean manufacturing.

TEXT BOOKS:

1. P.N. Rao, *"CAD / CAM Principles and Applications"*, TMH, 2nd Edition, 2008.
2. M.P. Groover and E.W. Zimmers, "CAD/CAM", PHI, 1st Edition, 1995.

REFERENCES:

1. Ibrahim Zeid, *"CAD / CAM Theory and Practice"*, TMH, Special Indian Edition, 2007.
2. T.K. Kundra, P.N. Rao and N.K. Tewari, *"Numerical control and computer aided manufacturing"*, TMH, 1st Edition, 2002.

ROBOTICS

Course Code:13ME1139

L	T	P	C
4	1	0	3

Course Educational Objectives:

To impart knowledge on

- Robot configurations and components
- Sensors and actuators used in robotics
- Kinematic and dynamic analysis for basic robot configurations
- Trajectory planning and programming techniques for industrial robots

Course Outcomes:

The student will be able to

- Identify various robot configurations and components
- Select appropriate actuators and sensors for a robot based on specific application
- Carry out kinematic and dynamic analysis for simple serial kinematic chains
- Write a program for pick and place operations
- Plan trajectory for straight line and point to point motion

UNIT-I (12 Lectures)

INTRODUCTION :

Automation and robotics, CAD/CAM and robotics, an overview of robotics, present and future applications, classification by coordinate system and control system.

ROBOT APPLICATIONS IN MANUFACTURING:

Material transfer - material handling, loading and unloading; processing - spot and continuous arc welding & spray painting; assembly and inspection.

UNIT-II (08 Lectures)

COMPONENTS OF THE INDUSTRIAL ROBOTICS:

Function line diagram representation of robot arms, common types of arms, components, architecture, number of degrees of freedom; requirements and challenges of end effectors, determination of the end effectors.

UNIT-III (14 Lectures)

MOTION ANALYSIS:

Coordinate frames, homogeneous transformations – for rotation matrix, translation matrix, and composite transformation matrix – problems.

MANIPULATOR KINEMATICS:

Specifications of matrices, D-H notation, joint coordinates and world coordinates, forward and inverse kinematics – problems.

UNIT-IV (14 Lectures)

ROBOT DYNAMICS:

Differential transformation and manipulators, Jacobians – problems, Dynamics: Lagrange-Euler and Newton- Euler formations – Problems.

TRAJECTORY PLANNING:

Trajectory planning and avoidance of obstacles, path planning, skew motion, joint integrated motion, straight line motion, robot programming, languages and software packages.

UNIT-V (12 Lectures)

ROBOT ACTUATORS:

Actuators: pneumatic, hydraulic actuators, servo motors, stepper motors.

Feedback components: Position sensors – potentiometers, resolvers, encoders; velocity sensors; tactile, proximity and range sensors.

TEXT BOOKS:

1. Mittal R K & Nagrath, *"Robotics and Control"*, 2nd Edition, TMH, 2008. (Unit III, IV, V)
2. Groover M P, *"Industrial Robotics"*, TMH, 2nd Edition, 2012.

REFERENCES:

1. Fu K S, *"Robotics"*, McGraw Hill, 2004.
2. P. Coiffet and M. Chaironze, *"An Introduction to Robot Technology"*, Kogam Page Ltd., 1983 London.
3. Richard D. Klafter, *"Robotic Engineering"*, Prentice Hall, 1998.
4. John J Craig, *"Introduction to Robotics"*, Pearson Edu. 2005.
5. Mark W. Spong and M. Vidyasagar, "Robot Dynamics & Control", John Wiley & Sons (ASIA) Pvt. Ltd.

MECHATRONICS

Course Code:13ME1140

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student

- ✤ Understand various elements of a mechatronic system and how they integrate.
- ✤ Understand the concept of signal conditioning and digital signal processing.
- ✤ Know various components of hydraulic and pneumatic systems.
- ✤ Know the working of electrical actuation systems.
- ✤ Learn how different types of control systems are used for various practical applications.

Course Outcomes:

The student will be able to

- ✤ Grasp the significance of a mechatronics system
- ✤ Describe the functions of various signal conditioning and digital processing devices.
- ✤ List various components of hydraulic and pneumatic systems
- ✤ Explain the working of electrical actuation systems
- ✤ Illustrate the use of control systems for various applications.
- ✤ Explain how complex systems integrate various elements in the mechanical, fluid power, and controls domain.
- ✤ Work in a team environment with people of different areas of expertise.

UNIT-I (12 Lectures)

INTRODUCTION:

Elements of mechatronic system, system, measurement systems, control systems - open loop, closed loop systems, feedback and feed forward control systems, servomechanisms, applications of mechatronic system.

BASIC SYSTEM MODELS:

Basic concepts of mechanical, electrical, fluid and thermal systems building blocks.

UNIT-II (12 Lectures)

SIGNAL CONDITIONING:

Introduction, analog signal processing; operational amplifiers- circuits for inverting, non- inverting, difference amplifiers, integrator, differentiator, comparator, sample and hold applications (no analytical treatment.)

NOISE REDUCTION AND FILTERING:

Passive and active filters, types of filters, ADC, DAC, Data acquisition, digital signal processing.

UNIT-III (12 Lectures)

ACTUATION SYSTEMS:

Pneumatic and hydraulic systems, overview of components of hydraulic system, overview of components of pneumatic system, basic hydraulic circuits-single acting cylinder, double acting cylinder, sequencing circuit

ELECTRICAL ACTUATING SYSTEMS:

Relays, types of DC motors, AC motors, stepper motor, servo motor, induction motor.

UNIT-IV (12 Lectures)

INTRODUCTION TO DIGITAL LOGIC:

Logic gates-AND, OR, NOT, NAND, NOR, XOR, Boolean algebra, simple applications of logic gates, sequential logic, Introduction to flip-flops, registers.

MICROPROCESSORS AND MICROCONTROLLERS OVERVIEW:

Structure of microcomputer, block diagram of microprocessor, block diagram of microcontroller, applications of microprocessor control:

temperature monitoring system, washing machine system.

Process controllers- Introduction to P, PI, PID Control modes.

UNIT-V **(12 Lectures)**

Programmable logic controllers - Basic structure, programming, ladder diagram, timers, internal relays, counters, shift registers, master and jump controls.

PROGRAMMABLE MOTION CONTROLLERS:

Multi axis Interpolation, PTP, Linear, Circular; Core functionalities: Home, Record position, Go to Position.

DESIGN OF MECHATRONIC SYSTEM:

coin counter, engine management system, antilock brake system.

TEXT BOOKS:

1. Bolton W., *"Mechatronics – Electronics Control Systems in Mechanical and Electrical Engineering"*, 4th Edition, Pearson Education Press, 2010.
2. R.K. Rajput, *"A text book of Mechatronics"*, 1st Edition, S. Chand and Company Ltd., 2007.

REFERENCES:

1. K.P. Ramachandran, *"Mechatronics-integrated mechanical Electronic systems"*, 1st Edition, Wiley India Pvt, Ltd., 2008.
2. Histand B.H., Alciatore D.G., *"Introduction to Mechatronics and Measurement Systems"*, 3rd Edition, Tata McGraw Hill Publishing Company Ltd, 2007.

FINITE ELEMENT METHOD

Course Code:13ME1141

L	T	P	C
4	1	0	3

Pre requisites:

Theory of Machines and Design of Machine Elements

Course Educational Objectives:

To make the student

- ✤ Understand concepts of discretization, nodes, degrees of freedom, global stiffness matrix, load vector and isoparametric representation
- ✤ Formulate simplex elements like bar element, truss element and triangular element
- ✤ Formulate field problems like heat transfer
- ✤ Perform dynamic analysis for extracting frequencies

Course Outcomes:

The student will be able to

- ✤ Discretize a given body in to various elements
- ✤ Solve static, dynamic and thermal problems using FEM
- ✤ Solve axi-symmetric problems using FEM
- ✤ Work using FEM packages

UNIT-I (12 Lectures)

Introduction to finite element method for solving field problems, stress and strain, equilibrium equations, strain–displacement relations, stress–strain relations potential energy approach, Galerkin approach, assembly of global stiffness matrix and load vector. finite element equations, treatment of boundary conditions, quadratic shape functions

UNIT-II (12 Lectures)

ANALYSIS OF PLANE TRUSSES:

local and global coordinate systems, transformation matrix, element stiffness matrix, stress calculations. one-dimensional problems: finite element modelling, coordinates and shape functions.

UNIT-III **(12 Lectures)**

Two dimensional problems using constant strain triangles, isoparametric representation, problem modelling and boundary conditions.

axi-symmetric solids subjected to axi-symmetric loading with triangular elements.

UNIT-IV **(12 Lectures)**

Two-dimensional four-noded, iso-parametric elements and numerical integration.

Steady state heat transfer analysis, one dimensional analysis of a fin and two dimensional analysis of thin plate.

UNIT-V **(12 Lectures)**

ANALYSIS OF BEAMS:

element stiffness matrix for two- node, two degrees of freedom per node, beam element.

Dynamic analysis, formulation of finite element model, element matrices, evaluation of eigen values and eigen vectors for a stepped bar and a beam.

TEXT BOOK:

Chandrupatla TR, and Belegundu AD, *"Introduction to Finite Elements in Engineering"*, Prentice Hall of India, 3rd Edition, 2009.

REFERENCES:

1. SS Rao, *"The Finite Element Methods in Engineering"*, Pergamon Press, 2nd Edition, 1999.
2. JN Reddy, *"An introduction to Finite Element Method"*, McGraw Hill, 3rd Edition, 2007.
3. Zienkiewicz, *"The Finite Element Method in Engineering Science"*, McGraw Hill, 1971.

AUTOMOBILE ENGINEERING

Course Code:13ME1142

L	T	P	C
4	0	0	3

Pre requisites: Thermal Engineering

Course Educational Objectives:

The student will be made to learn

- The anatomy of the automobile in general
- The location and importance of each part
- The functioning of the engine and its accessories, gear box, clutch, brakes, steering, axles and wheels
- Suspension, frame, springs and other connections
- Emissions, ignition, controls, electrical systems and ventilation

Course Outcomes:

The student will be able to

- Identify the different parts of the automobile
- Explain the working of various parts like engine, transmission, clutch, brakes
- Describe how the steering and the suspension systems operate.
- Understand the environmental implications of automobile emissions
- Develop a strong base for understanding future developments in the automobile industry

This is a first course in automobile engineering introducing the anatomy and the functioning of all major components of the modern automobile. With an introduction to the engine and its accessories, the course deals in detail with the description of automobile components like clutch, transmission, final drive, axles, wheels, suspension, steering, electrical systems among others. Concepts of modern automobile controls are also included.

UNIT-I **(12 Lectures)**

General introduction, types of automobiles, classification of automobiles, chassis and body, frames, frameless construction, sub-frames, defects in frames. Different systems in an automobile, brief introduction to important parts. Automobile engines, different parts and auxiliary systems, engine terminology, four-stroke and two-stroke operation, multi-cylinder engines, engine balance, power overlap. Engine accessories, engine lubrication, points of lubrication, types of lubrication systems, wet sump and dry sump, lubrication schedule, properties of lubricants, oil pumps, oil filters, crankcase dilution and crankcase ventilation.

UNIT-II **(12 Lectures)**

Fuel induction in SI and CI engines, fuel pumps and air cleaners, problems in carburetors, direct injection of gasoline, MPFI and TBI, advantages and disadvantages, concepts of electronic injection, diesel injection systems, concepts of supercharging and turbo-charging, waste-gating principle. Principle of ignition, ignition coil, condenser and distributor, ignition systems without storage battery, electronic ignition, ignition timing and ignition advance, spark plugs. Combustion in SI engines and CI engines, swirl and turbulence, types of combustion chambers in automobile engines. Engine cooling, heat balance, effects of improper cooling, air cooling, radiator details and functioning, thermostats, anti-freeze additives, heater core

UNIT-III **(12 Lectures)**

Manual transmission and types of gear box, sliding-mesh, constant-mesh and synchromesh gear boxes, types of dog clutches, gear shift mechanism, principles of automatic transmission. Clutch operation and types, multi-plate and cone clutches, clutch construction and lining. Propeller shafts, universal joints, slip joint, Hotch-Kiss drive and torque tube drive, transaxle and transfer case, radius rods, four wheel drive arrangement. Automobile emissions, their harmful effects, pollution control measures, catalytic converters, exhaust system layout, mufflers, resonators.

Engine parameters, brief discussion of testing devices, engine service, engine tuning, engine re-boring, cyaniding, nitriding, de-carbonisation.

UNIT-IV **(12 Lectures)**

Braking systems, layouts for mechanical braking, hydraulic braking, pneumatic braking, master cylinder, wheel cylinder, tandem cylinder, shoe brakes, disc brakes, requirements of brake fluid, power brakes, concept of ABS and traction control, parking brakes. Steering system, principles and need of steering, components parts, steering gear, steering ratio, steering lock, turning radius, centre point. Steering, wheel geometry, power steering principle and typical schemes,

Front axle scheme and end connections, rear axle, functions, types of rear axle, loads on rear axles, axle casing.

UNIT-V **(12 Lectures)**

Suspension system, functions of suspension, component parts, coil springs, leaf springs, air springs, shock absorbers, torsion bars, stabilizer bars, typical combinations of components in suspension systems, MacPherson strut suspension, its merits.

Wheel and tyres, wheel assembly and parts, pressed wheels and cast wheels, wheel rim, tyres, aspect ratio, tyres with tubes and tubeless tyres, advantages, construction of a tyre, plies, radial plies, tyre treads and tyre specifications.

Electrical systems, generator circuit and need for cut-out, starting with solenoid and over-running clutch, lighting points in a passenger car, high beam and restricted high beam from head lights, circuits for flashers, horn, wind screen wiper, fuel level indicator, speedometer

Cabin heating and cooling, simple schemes.

TEXT BOOKS:

1. Kamaraju Ramakrishna, *"Automobile Engineering"*, PHI Learning, New Delhi, 1st Print, 2012.
2. Jain &Asthana, *"Automobile Engineering"*, Tata McGraw-Hill, New Delhi, 2002.

REFERENCES:

1. Heinz Heisler, *"Advanced Vehicle Technology"*, Elsevier, New Delhi, 2011.
2. Crouse &Anglin, *"Automotive Mechanics"*, Tata McGraw-Hill, New Delhi, 10th Edition 2007.

RENEWABLE SOURCES OF ENERGY
(ELECTIVE - III)

Course Code: 13ME1143

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student

- Introduce to the technology of renewable sources of energy
- Learn about the solar radiation, its applications and radiation measuring instruments
- Learn about the various types of geothermal resources and its applications
- Study the biomass energy resources , bio-mass systems
- Learn the methods of energy extraction from the wind and oceans
- Learn to the technology of direct energy conversion methods

Course Outcomes:

Student will be able to

- Take up small scale projects- as entrepreneurs- since the cost of investment is minimal in some of the sources.
- Apply the technology to capture the energy from the renewable sources like sun, wind, ocean, biomass, geothermal

UNIT-I (16 Lectures)

INTRODUCTION:

Conventional & non conventional energy sources-prospects of renewable energy sources.

SOLAR ENERGY:

Extra terrestrial radiation- spectral distribution-solar constant- solar radiations on earth- measurement of solar radiations-solar radiation geometry- longitude- latitude- declination angle- surface azimuth angle- hour angle- zenith angle- solar altitude angle expression for angle between incident beam and the normal to a plane surface (no derivation) - local apparent time- apparent motion of sun- day length- solar radiation data for India.

SOLAR COLLECTORS:

Solar thermal power and its conversion- solar collectors- flat plate- performance analysis of flat plate collector- solar concentrating collectors- types of concentrating collectors- cylindrical collectors- thermal analysis of solar collectors- tracking CPC and solar swing .

ENERGY STORAGE:

Different systems- solar pond, applications.

Photovoltaic system: photovoltaic effect- efficiency of solar cells- semiconductor materials for solar cells- solar photovoltaic system- standards of solar photovoltaic system- applications of PV system- PV hybrid system.

APPLICATIONS OF SOLAR ENERGY:

Water heating- space heating & cooling- solar distillation-solar pumping- solar cooking- greenhouses.

UNIT-II (10 Lectures)

WIND ENERGY:

Principles of wind energy conversion- availability of wind energy in

India- wind velocity- components of wind energy conversion systems(WECS)- classification of WECS- Horizontal and Vertical axis wind mills- elementary design principles- performance characteristics- Betz criteria coefficient –analysis of aerodynamic forces acting on blade- applications- energy storage-environmental aspects- economic issues- recent developments.

GEOTHERMAL ENERGY:

Structure of earth's interior- geothermal sites- earthquakes & volcanoes- geothermal resources- hot springs-steam ejection- principle of working- types of geothermal station with schematic representation- site selection for geothermal power plants-problems associated with geothermal conversion-applications-geothermal energy prospects in India.

UNIT-III (12 Lectures)

BIO-MASS & BIO-GAS:

Principles of bio mass-conversion-photosynthesis- bio gas production-aerobic and anaerobic bio-conversion process- raw materials- properties of bio gas- producer gas- transportation of bio gas-classification of bio gas plants-advantages and disadvantages-types of bio gas plants - community biogas plants-problems involved in bio gas production- bio gas applications-biomass conversion techniques- biomass gasification-energy recovery from urban waste- power generation from liquid waste-biomass cogeneration- energy plantation- fuel properties- biomass resource development in india.

UNIT-IV (10 Lectures)

ELECTROCHEMICAL EFFECTS AND FUEL CELLS:

Principle of operation of an acidic fuel cell- classification of fuel cells-other types of fuel cells- comparison between acidic and alkaline hydrogen oxygen fuel cells- efficiency and EMF of fuel cells- operating characteristics of fuel cells- advantages of fuel cell power plants- future potential of fuel cells.

HYDROGEN ENERGY:

Properties of hydrogen in respect of its use as source of renewable energy- sources of hydrogen- production of hydrogen- storage and transportation- safety and management-development of hydrogen cell-economics of hydrogen fuel and its use.

UNIT-V (12 Lectures)

OCEAN ENERGY:

principle of ocean thermal energy conversion-wave energy conversion machines- power plants based on ocean energy-problems associated with ocean thermal energy conversion systems-thermoelectric OTEC-developments of OTEC.

TIDAL POWER:

Tides and waves as sources of energy- fundamentals of tidal power- use of tidal energy- limitations of tidal energy conversion systems.

Direct energy conversion: Need for DEC- Carnot cycle- limitations- principles of DEC. thermo-electric generators- Seebeck-Peltier and Joule-Thompson effects- figure of merit- materials- applications-MHD generators- principles- dissociation and ionization- Hall effect-magnetic flux- MHD accelerator- MHD engine- power generation systems-electron gas dynamic conversion- economic aspects.

TEXT BOOK:

Rai G.D, "*Non-Conventional energy Sources*", Khanna Publishers, fourth editon, 2008.

REFERENCES:

1. Suhas. P. Sukhatma and Nayak. J.K., *"Solar Energy"*, TMH, New Delhi, 3rd Edition, 2008.
2. D.P. Kothari, Rakesh Ranjan and K.C. Singal., *"Renewable Energy Resources and Emerging Tech."*, Prentice Hall of India Pvt. Ltd., 2nd Edition, 2011.
3. Sawhney, G.S., *"Non-Conventional Energy Sources"*, Prentice Hall Inc., Delhi, 2012.

AUTOMATION IN MANUFACTURING
(Elective – III)

Course Code: 13ME1144

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student

- ✤ To familiarize the various automated systems that are established and incorporated in various production industries.
- ✤ To know about the different types of handling systems and storage systems that are used in automation.
- ✤ To overcome the difficulties in manual manufacturing process through automation concepts.

Course Outcomes:

The student will be able

- ✤ To identify and correlate the concepts of automation in production systems.
- ✤ To identify the different handling equipments in industry.
- ✤ To know how to connect loading stations to the different discharge or unloading conditions.
- ✤ To incorporate, modify and adopt the automation concepts between manual line and assembly line production in industries to meet the requirements.

UNIT-I (10 Lectures)

AUTOMATION IN PRODUCTION SYSTEM:

Types of automation, reasons for automation, automation principles and strategies, advanced automation functions, levels of automation.

types of equipment in material handling systems, material transport equipment, analysis of material transport systems, simple problems.

types of material stored in a factory, conventional methods of storage methods and equipment, automated storage and retrieval systems.

UNIT-II (13 Lectures)

AUTOMATED PRODUCTION LINES:

Fundamentals of automated production lines (automated flow lines): line type, rotary type, work part transfer- continuous transfer, intermittent transfer, asynchronous transfer, walking beam transfer, chain drive conveyor system, analysis of transfer lines – starving, blocking, analysis using upper bound approach, analysis using lower bound approach, analysis of flow lines with storage, simple problems on automated production lines.

UNIT-III (13 Lectures)

FUNDAMENTALS OF ASSEMBLY LINES:

Assembly workstations, work transport systems line pacing, coping with product variety. line balancing problems and line balancing algorithms: Largest candidate Rule, Kilbridge and Wester Method, ranked positional weights method. Simple problems on line balancing using the mentioned algorithms.

UNIT-IV (14 Lectures)

AUTOMATED ASSEMBLY SYSTEMS:

Fundamentals of automated assembly systems: system configurations, parts delivery at work stations. Parts delivery system at workstations, multi-station assembly machines, single station assembly machines, partial automation.

UNIT-V (10 Lectures)

CAD/CAM/CIM:

Computer aided design, computer aided manufacturing, computer integrated manufacturing. product design and CAD, application of computers in design. Fundamentals of computer aided process planning, concurrent engineering and design for manufacturing.

TEXT BOOK:

M.P. Groover, Automation, "Production Systems and Computer Integrated Manufacturing," Pearson and PHI, 3rd Edition, 2009.

REFERENCES:

1. Yoram Coreom, *"Computer control of Manufacturing Systems"*, McGraw-Hill Education – Europe, International Edition, 1984.
2. P. Radhakrishnan and S. Subramanyam, *"CAD/CAM/CIM"*, New Age International Pvt Ltd., 3rd Edition, 2009.

COMPUTATIONAL FLUID DYNAMICS
(Elective – III)

Course Code:13ME1145

L	T	P	C
4	0	0	3

Pre requisites: Fluid Mechanics and Heat Transfer.

Course Educational Objectives:

To make the student understand

- Luid flow modeling in engineering problems
- Grid generation techniques in implementation of numerical methods
- A basic knowledge about finite difference and finite volume method
- Some case studies using FDM and FVM methods

Course Outcomes:

The student will be able to

- explain different simplified models in fluid flow
- Explain suitable grid generation techniques to engineering problems
- Solve problems involving Navier-Stokes equations
- Can understand and use the commercial CFD software packages with ease

UNIT-I **(12 Lectures)**

BASIC CONCEPTS OF FLUID FLOW:

Philosophy of computational fluid dynamics (CFD), review of equations of change for transfer processes, simplified flow models such as incompressible, in viscid, potential and creeping flow - flow classification

UNIT-II **(12 Lectures)**

GRID GENERATION:

Structured and unstructured grids, choice of suitable grid, grid transformation equations, some modern developments in grid generation for solving engineering problems

UNIT III (13 Lectures)

Finite Difference Method (FDM): Discretization of ODE and PDE, approximation for first, second and mixed derivatives, implementation of boundary conditions, discretization errors, applications to engineering problems

UNIT-IV (12 Lectures)

Finite Volume Method (FVM): Discretization methods, approximations of surface integrals and volume integrals, interpolation and differential practices, implementation of boundary conditions, application to engineering problems.

UNIT-V (11 Lectures)

Special Topics: Case studies using FDM and FVM, flow and heat transfer in pipes and channels, square cavity flows, furnaces and fire systems. Overview of finite element method (FEM).

TEXT BOOK:

Fletcher, C.A.J., *"Computational Techniques for Fluid Dynamics, Vol. 1: Fundamental and General Techniques"*, Springer-Verlag. 1998.

REFERENCES:

1. Fletcher, C.A.J., *"Computational Techniques for Fluid Dynamics, Vol. 2: Specific Techniques for Different Flow Categories"*, Springer-Verlag. 1998.
2. Patankar, S.V., *"Numerical Heat Transfer and Fluid Flow"*, Taylor and Francis, 2004.
3. H. K. Versteeg and W. Malalasekera, *"An Introduction to Computational Fluid Dynamics: the Finite Volume Method"*, Pearson, 2nd Edition, 2010.
4. J. H, Ferziger and M. Peric, *"Computational Methods for Fluid Dynamics"*, 3rd Revised Edition, Springer, 2002.

INTRODUCTION TO AIRCRAFT SYSTEMS
(Elective – III)

Course Code:13ME1146

L	T	P	C
4	0	0	3

Pre requisites: Mechanics of Solids.

Course Educational Objective:

The aim and objective of the present course is to provide the basic knowledge of flight and aircraft systems

Course Outcomes:

- ✤ After completing the course, the student will have understood the fundamentals of flight and the systems of aircraft.
- ✤ The student will be in a position to appreciate the difficulties in the actual design and manufacture of an aircraft.
- ✤ The student will be able to understand the operating and control systems of an aircraft including maneuverability.

UNIT-I **(12 Lectures)**

Aircraft industry overview: A brief history of aeronautics, evolution and history of flight, types of aerospace industry, key players in aerospace industry, aerospace industry trends, advances in engineering/CAD/CAM/CAE tools and materials technology, global Aircraft scenario

Introduction to aircraft: Anatomy of the airplane, basic components of an aircraft, structural members, aircraft axis system, aircraft motions, control surfaces, and high lift devices.

UNIT-II **(12 Lectures)**

Types of aircrafts - Lighter than air/heavier than air aircraft, conventional design, configurations based on power plant location, wing vertical location, intake location, tail unit arrangements, landing gear arrangements

Basic principles of flight: Incompressible and compressible one-dimensional flow, significance of speed and sound, air speed and ground speed, properties of atmosphere, Bernoulli's equation, forces on the airplane, airflow over wing section, pressure distribution over a wing section, generation of lift.

UNIT-III (12 Lectures)

Drag, pitching moments: Two-dimensional flow, types of drag, lift curve, drag curve, lift/drag ratio curve, factors affecting lift and drag

Aerofoil nomenclature: Types of aerofoil, wing section- aerodynamic center, aspect ratio, effects of lift, drag, speed, air density on drag, compressibility drag, supersonic flow, Mach waves, Mach angles

UNIT-IV (12 Lectures)

AERODYNAMIC PERFORMANCE & MANOEUVRES:

Taking-off, climbing, cruise, landing, range, endurance, power curves, pull out dives, the load factor, loads during a turn, correct and incorrect angles of bank, control and steep banks, inverted manoeuvres, manoeuvrability

UNIT-V (12 Lectures)

STABILITY AND CONTROL:

Meaning of stability and control, degree of stability- lateral, longitudinal and directional stability, dihedral and anhedral angles, control of an aeroplane, mechanical systems, electrical and electronic systems.

AIRCRAFT SYSTEMS:

Environmental control systems (ECS), pneumatic systems, hydraulic systems, fuel systems, landing gear systems, engine control systems, air conditioning systems, steering and brakes systems

TEXT BOOKS:

1. Shevell, *"Fundamentals of Flight"*, Pearson Education, 2nd Edition.
2. Lombardo, Davi A, *"Aircraft Systems"*, Tata McGraw-Hill, New Delhi, 2009

REFERENCES:

1. Dave Anderson, *"Introduction to Flight"*,Mc Graw Hill Publishers, 1999.
2. A.C Kermode, *"Flight Without Formulae"*, Pearson Education,10th Edition
3. A.C Kermode, *"Mechanics of Flight"*, Pearson Education, 5th Edition

WEB RESOURCES:

1. http://www.aero.org/
2. http://www.rl.af.mil/rrs/resources/griffiss_aeroclub/aircraft.html
3. http://en.wikipedia.org/wiki/Tesla_turbine
4. http://ameslib.arc.nasa.gov/randt/1999/aero/aero.html
5. http://www.ctas.arc.nasa.gov/project_description/pas.html
6. http://www.moog.com/noq/_acoverview__c463/

CAD/CAM LAB

Course Code:13ME1147

L	T	P	C
0	0	3	2

Pre requisites: CAD/CAM.

Course Educational Objectives:

- To provide the students basic understanding of modern trends in design and manufacturing using CAD/CAM
- To develop an understanding of the advanced aspects of enabling computer aided technologies used in design

Course Outcomes:

At the end of this course students will be able to

- Perform various analysis using different analysis softwares.
- Understand numerical control in manufacturing.
- Write NC part program for various machining operations

Any 10 exercises of the following are to be performed

FINITE ELEMENT ANALYSIS

1. Introduction to software commands
2. Static analysis of 2D truss
3. Static analysis of 3D truss
4. Static analysis of corner bracket
5. Static analysis of beams with different types of loads
6. Static analysis of plate with hole
7. Dynamic analysis of beams with different types of loads
8. Steady state heat transfer analysis.

SIMULATION OF MANUFACTURING OPERATION & NC CODE GENERATION

9. Introduction to software commands
10. Generation of NC code for drilling operation

11. Generation of NC code for pocket milling operation
12. Generation of NC code for turning operation

SOFTWARE PACKAGES:

ANSYS, NASTRAN, Master CAM, UG-NX etc.

INSTRUMENTATION AND MECHATRONICS LAB

Course Code:13ME1148

L	T	P	C
0	0	3	2

Pre requisites: Mechanical Measurements and Mechatronics

Course Educational Objective:

To make the student

- ✤ Gain practical experience of how measurement systems work
- ✤ Know how to calibrate the instrument and to learn to make electrical connections necessary for various measurements
- ✤ Trigger the interest in the area of innovation and research

Course Outcomes:

At the end of this lab student should be able to

- ✤ Prepare experimental set up, electrical connections and take measurement reading from the instruments.
- ✤ Calibrate various instruments like Pressure gauge, thermometer, tachometer etc.
- ✤ Gain the awareness of sources of errors in measurement and steps to eliminate it.

Note: Any five from Instrumentation Lab and any five from Mechatronics Lab

INSTRUMENTATION LAB

1. Calibration of pressure gauges
2. Calibration of thermistor for temperature measurement.
3. Study and calibration of LVDT transducer for displacement measurement.
4. Calibration of strain gauge for temperature measurement.

5. Calibration of thermocouple for temperature measurement.
6. Calibration of capacitive transducer for angular displacement.
7. Study and calibration of photo and magnetic speed pickups for the measurement of speed.
8. Calibration of resistance temperature detector for temperature measurement.
9. Study and calibration of a rotameter for flow measurement.
10. Study and use of a seismic pickup for the measurement of vibration amplitude of an engine bed at various loads.
11. Study and measurement of vibration of stretched string.
12. Study and calibration of Mcleod gauge for low pressure

MECHATRONICS LAB

1. PTP control and linear interpolation of a linear conveyor using PMC.
2. PTP control and circular interpolation of a rotary table using PMC.
3. Simulation of basic hydraulic circuits for automating systems
4. Simulation of basic pneumatic circuits for automating systems.
5. Simulation of basic electro-hydraulic circuits for automating systems
6. 3-D Robot simulation for operation of pick-place robot.
7. PLC programming in ladder logic and functional block diagram

SOFTWARE PACKAGES:

P-Simulator, H-Simulator, Control-X, Robo-X, PLC Simulator

SYLLABI FOR VIII SEMESTER

ADVANCED MANUFACTURING PROCESS

Course Code:13ME1149

L	T	P	C
4	0	0	3

Pre requisites: Manufacturing Technology.

Course Educational Objectives:

To make the student

- ✤ Acquire knowledge about nontraditional machining process
- ✤ Understand theory involved material removal mechanism
- ✤ Study the different process parameters
- ✤ Know the material addition processes

Course Outcomes:

The student will be able to

- ✤ Differentiate between various nontraditional machining process
- ✤ Identify suitable nontraditional machining process
- ✤ Be familiar with various material removal mechanisms
- ✤ Explain the phenomena of material addition processes

UNIT-I (12 Lectures)

MATERIAL REMOVAL PROCESSES:

Introduction, history of machining, traditional machining processes, nontraditional machining processes, hybrid machining processes. need for non-traditional machining processes.

MECHANICAL PROCESSES:

Ultrasonic machining - Introduction, the machining system, material removal process, factors affecting material removal rate, dimensional accuracy and surface quality, applications.

Water jet machining - Introduction, The machining system, Process parameters, Applications, Advantages and disadvantages of WJM.

Abrasive jet machining - Introduction, Machining system, Material removal rate, Applications, Advantages and limitations of AJM.

UNIT-II (12 Lectures)

CHEMICAL PROCESSES:

Chemical Milling - Introduction, Tooling for CHM, Process parameters, Material removal rate, Accuracy and surface finish, Advantages, Limitations, Applications

Photochemical Milling - Introduction, Process description Applications, Advantages

Electro Polishing - Introduction, Process parameters, Applications, Process limitations.

ELECTROCHEMICAL PROCESSES:

Electro Chemical Machining: Introduction, Principles of electrolysis, Theory of ECM, ECM equipment, Basic working principles, Process characteristics, Process control, Applications

Basics of Electrochemical Drilling, Electro-Chemical Deburring, and Electro stream drilling

UNIT-III (08 Lectures)

HYBRID ELECTROCHEMICAL PROCESSES:

Electro Chemical Grinding - Introduction, Material removal rate, Accuracy and surface quality, Applications, Advantages and disadvantages

Electrochemical Honing - Introduction, Process characteristics, Applications

Electrochemical Super Finishing - Introduction, Material removal process, Process accuracy

Electrochemical Buffing - Introduction, Material removal process

UNIT-IV (14 Lectures)

THERMAL PROCESSES:

Introduction, Mechanism of material removal, The machining system, Material removal rates, Heat-affected zone, Applications. Wire EDM-principle, Process parameters, surface finish and machining accuracy, applications. Laser beam machining - Introduction, material removal mechanism, applications, advantages and limitations.electron beam machining - introduction, basic equipment and removal mechanism, applications, advantages and disadvantages. Plasma beam machining - introduction, machining systems, material removal rate, accuracy and surface quality, applications, advantages and disadvantages. Ion beam machining - introduction, material removal rate, accuracy and surface effects, applications

UNIT-V (14 Lectures)

MATERIAL ADDITION PROCESSES: INTRODUCTION, CLASSIFICATION :

Liquid-Based Techniques – stereo-lithography, holographic interference solidification, beam interference solidification, solid ground curing-liquid thermal polymerization, fused deposition, modelling, multi jet modelling, ballistic particles manufacturing, shape deposition manufacturing. Powder-based processes - selective laser sintering, laser engineered net shaping, three-dimensional printing. Solid-Based techniques -solid foil polymerization, laminated object modeling.

TEXT BOOKS:

El-Hofy, Hassan Abdel-Gawad, *"Advanced Machining Processes: Nontraditional And Hybrid Machining Processes"*, McGraw-Hill, 2005.

REFERENCES:

1. Pandey P.C. and Shah H.S, *"Modern Machining Processes"*, 1st Edition, TMH, 2010.
2. Bhattacharya A, *"New Technology, the Institution of Engineers"*, India 1984.
3. V. K. Jain, *"Advanced machining processes"*, 1st Edition, Allied publishers, 2010.

DESIGN OPTIMIZATION
(Elective – IV)

Course Code: 13ME1150

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student

- ✤ Acquire knowledge about different optimization methods
- ✤ Learn single and multi variable optimization problems
- ✤ Formulate constrained and unconstrained optimization problems
- ✤ Aware of soft computing techniques like genetic algorithms and neural networks

Course Outcomes:

The student will be able to

- ✤ Solve single and multi variable optimization problems
- ✤ Solve non linear constrained and unconstrained optimization problems
- ✤ Apply optimization techniques for solving various engineering problems
- ✤ Save material and thus reduce cost of production of equipment

UNIT-I (12 Lectures)

INTRODUCTION:

General Characteristics of mechanical elements, adequate and optimum design, principles of optimization, formulation of objective function, design vector, design constraints, constraint surface, classification of optimization problems.

CLASSICAL OPTIMIZATION TECHNIQUES:

Single variable optimization - multivariable optimization without constraints

UNIT-II (12 Lectures)

MULTIVARIABLE OPTIMIZATION WITH EQUALITY CONSTRAINTS:

Direct substitution method and method of Lagrange multipliers unconstrained nonlinear single variable optimization: unimodal function, exhaustive search, interval halving method, golden Section method, quadratic search, Newton method.

UNIT-III (14 Lectures)

UNCONSTRAINED NONLINEAR MULTIVARIABLE OPTIMIZATION:

Univariate search, steepest descent (Cauchy's) method, Fletcher-Reeves method, Newton's method. constrained nonlinear optimization problems: Characteristics – interior penalty function method and exterior penalty function method.

UNIT-IV (12 Lectures)

GEOMETRIC PROGRAMMING:

Introduction , solution by differential calculus, solution by arithmetic, geometric inequality, degree of difficulty, optimization of zero degree of difficulty problems.

UNIT-V (10 Lectures)

CONCEPTS OF MULTI-OBJECTIVE OPTIMIZATION:

Introduction to genetic algorithms, simulated annealing and neural networks.

ENGINEERING APPLICATIONS:

Optimal design of beams and torsionally loaded shafts- optimal design of springs.

TEXT BOOK:

Singiresu S. Rao, *"Engineering Optimization -Theory and Practice"*, Wiley, 4th Edition, 2009.

REFERENCES:

1. Kalyanmoy Deb, *"Optimization for Engineering Design-Algorithms and Examples"*, PHI, 8th Reprint, 2005
2. Ashok D. Belegundu and Tirupathi R. Chandrupatla, *"Optimization concepts and applications in engineering"*, PHI, 2nd Edition, 2011

3. Johnson, Ray C., *“Optimum Design of Mechanical Elements”*, Johnson Wiley & Sons, Ic., NY, 1980.

4. Goldberg D. E., *“Genetic Algorithms in Research, Optimization and Machine”*, Addison-Wesley, NY

REFRIGERATION AND AIR CONDITIONING
(Elective – IV)

Course Code:13ME1151

L	T	P	C
4	0`	0	3

Pre requisites: Thermodynamics and Heat Transfer

Course Educational Objectives:

To enable the student

- ✤ Understand the principles of refrigeration and air conditioning.
- ✤ Calculate the cooling load for different applications.
- ✤ Select the suitable equipment for a particular application.
- ✤ Design and implement refrigeration and air conditioning systems using standards.

Course Outcomes:

The student will be able to

- ✤ Differentiate between various refrigeration systems
- ✤ Apply refrigeration and air conditioning principles
- ✤ Design refrigeration and air conditioning systems

UNIT-I **(10 Lectures)**

REVIEW ON REFRIGERATION:

Methods of refrigeration-refrigeration by expansion of air-refrigeration by throttling of gas-vapor refrigeration system-steam jet refrigeration system-unit of refrigeration and cop –mechanical refrigeration – types of ideal cycles of refrigeration.

AIR REFRIGERATION:

Bell-Coleman cycle and Brayton Cycle, open and dense air systems – actual air refrigeration system problems – air craft refrigeration -simple, bootstrap, regenerative and reduced ambient systems – problems based on different systems.

UNIT-II (16 Lectures)

REFRIGERANTS: TYPES, PROPERTIES AND SELECTION

REFRIGERATION SYSTEM COMPONENTS:

Compressors – general classification – comparison – advantages and disadvantages. Condensers and Cooling towers – classification – working principles evaporators – classification – working principles expansion devices – types – working principles.

VAPOR COMPRESSION REFRIGERATION:

Working principle and essential components of the plant – simple Vapor compression refrigeration cycle – COP – representation of cycle on T-S and p-h charts – effect of sub cooling and super heating – cycle analysis – methods to improve the COP – Use of p-h charts – numerical Problems.

UNIT-III (10 Lectures)

VAPOR ABSORPTION SYSTEM:

Calculation of max COP – description and working of NH3 – water system and Li Br –water (Two shell & Four shell) System. Principle of operation, three Fluid absorption systems (Domestic Electrolux Refrigerator).

STEAM JET REFRIGERATION SYSTEM:

Working principle and basic components, advantages and disadvantages.

Non conventional refrigeration systems: Thermoelectric refrigerator – Vortex tube or Hilsch tube.

UNIT-IV (12 Lectures)

AIR CONDITIONING:

Psychrometric properties -air conditioning processes- need for ventilation, consideration of infiltration – load concepts of RSHF, GSHF- Problems, concept of ESHF and ADP. Requirements of human comfort and concept of effective temperature- comfort chart –comfort air conditioning – requirements of industrial air conditioning, air conditioning load calculations.

UNIT-V **(12 Lectures)**

Air conditioning systems: Classification of equipment, cooling, heating humidification and dehumidification, filters, grills and registers fans and blowers.

Heat pump – heat sources – different heat pump circuits.

Design of air conditioning systems: Cooling load calculations-Bypass Factor (BF)-Effective Sensible Heat Factor (ESHF)-cooling coils & Dehumidifying Air Washers.

TEXT BOOK:

Arora, S.C. and Domkundwar, *"A Course in Refrigeration and Air conditioning"*, Dhanpatrai, 8th Edition, 2012.

REFERENCES :

1. Arora, C.P., *"Refrigeration and Air Conditioning"*, TMH, 3rd Edition, 2011.
2. Manohar Prasad., *"Refrigeration and Air Conditioning"*, New Age International Ltd., 2nd Edition. 2006.
3. Ananthanarayanan, *"Basic Refrigeration and Air-Conditioning"*, TMH, 3rd Edition, 2012.

INTRODUCTION TO AIRCRAFT STRUCTURES

(Elective –IV)

Course Code:13ME1152	**L**	**T**	**P**	**C**
	4	**0**	**0**	**3**

Pre requisites: Mechanics of solids and Machine Design.

Course Educational Objectives:

The present course is to provide the basic methodologies to design and analysis of aircraft structures.

Course Outcomes:

✤ After completing the course, the student will have understood the fundamentals of flight and the systems of aircraft

✤ The student will be in a position to appreciate the difficulties in the actual design and manufacture of an aircraft

✤ The student will be able to understand the operating and control systems of an aircraft including maneuverability

UNIT-I (12 Lectures)

AIRCRAFT DESIGN PROCESS:

Introduction, phases of aircraft design, aircraft conceptual design process, conceptual stage, preliminary design, detailed design, design methodologies

Introduction to aircraft structures: Types of structural members of fuselage and wing section ribs, spars, frames, stringers, Longeron, splices, sectional properties of structural members and their loads, types of structural joints, type of loads on structural joints.

UNIT-II (12 Lectures)

AIRCRAFT MATERIALS AND MANUFACTURING PROCESSES:

Material selection criteria, aluminum alloys, titanium alloys, steel alloys, magnesium alloys, copper alloys, nimonic alloys, non- metallic materials, composite materials.

UNIT-III (12 Lectures)

STRUCTURAL ANALYSIS OF AIRCRAFT STRUCTURES:

Plate deflection under different end conditions, strain energy due to bending of circular, rectangular plates

PLATE BUCKLING:

Compression buckling, shear buckling, buckling due to in plane bending moments, rectangular plate buckling, sample exercises.

UNIT-IV (12 Lectures)

THEORY OF BEAMS:

Symmetric beams in pure bending, deflection of beams, unsymmetrical beams in bending, bending of open section beams, bending of closed section beams, sample exercises.

THEORY OF TORSION:

Shafts of non-circular sections, torsion in closed section beams, torsion in open section beams, sample exercises.

UNIT-V (12 Lectures)

AIRWORTHINESS AND AIRCRAFT CERTIFICATION:

Definition, airworthiness regulations, regulatory bodies, type certification, general requirements, requirements related to aircraft design covers, performance and flight requirements.

TEXT BOOKS:

1. Shevell, Richard S., *"Fundamentals of Flight"*, Pearson Education Inc, Fourth Impression, 2011.
2. Anderson, Dave, Jr., *"Introduction to Flight"*, Tata McGraw-Hill Education Private Ltd., New Delhi, Second Reprint, 2011.
3. Beer, P.F. and Johnston, E.R., *"Mechanics of Materials"*, 2nd edition, McGraw-Hill Inc., 1992.

REFERENCES:

1. Kermode, A.C., *"Mechanics of Flight"*, Pearson Education Inc, third impression, 2009.
2. Kermode, A.C., *"Flight without Formulae"*, Pearson Education Inc, seventh impression, 2012.

WEB RESOURCES:

1. http://www.aero.org/
2. http://www.rl.af.mil/rrs/resources/griffiss_aeroclub/aircraft.html
3. http://en.wikipedia.org/wiki/Tesla_turbine
4. http://ameslib.arc.nasa.gov/randt/1999/aero/aero.html
5. http://www.aeromech.usyd.edu.au/structures/as/acs1-p4.htm
6. http://www.av8n.com/how/htm/xref.html
7. http://www.aviation-history.com/video.html

PROJECT MANAGEMENT

Course Code:13ME1153

L	T	P	C
4	0	0	3

Course Educational Objectives:

To make the student to

- ✤ Understand the subject which is a specialized area in Management. In the changing scenario every job, big or small, has to be considered as a separate entity or project for better control and timely completion of the total work.
- ✤ Understand all aspects of project management like definition and characteristics of a project, project manager's role, project selection, stages in a project, work breakdown structure, planning, procurement, execution, project closure, project finance and other important topics like environment which bear on projects.

Course Outcomes:

The student will be able to

- ✤ Identify the completion of project in a better control way.
- ✤ Understand the topics like planning, procurement and execution.

UNIT-I (12 Lectures)

INTRODUCTION:

Characteristics of a project, types of projects, Project Management Body of Knowledge (PMBOK), role of project manager and his qualities, project organization and benefits, idea generation, needs of society, import substitution, project lifecycle, project charter, project sponsor.

PROJECT PLANNING:

Customer needs, stake holder concept, Project scope, feasibility study and report, baseline plan, SWOT analysis, project organization structure and hierarchy, project teams, formation, attitude and aptitude

UNIT-II (12 Lectures)

Structure, project selection methods, breakeven analysis, DCF methods, project implementation, estimation, cost, price, value, scheduling, barcharts, network diagrams, PERT and CPM, schedule crashing, simple introduction to risk management, probability in project management, decision trees.

UNIT-III (12 Lectures)

Procurement:

Vendor selection methods, JIT, supply chains, quality ,quality circles, quality control and quality assurance, cause and effect analysis, ISO and concepts of total quality management and six sigma, resource planning and allocation, availability and constraints of resources, resource leveling and crashing.

UNIT-IV (12 Lectures)

PROJECT CONTROL :

Projectscope, projectchangerequest, and control of schedule, resources, costandquality, project communications, channels, means, meetings, projectreports, projectaudits Projectevaluation, projectclose-outreports, guidelines, auditreports, maintenance andshutdownprojects, plantturn-aroundandbriefintroductiontoreplacementanalysis

UNIT-V (12 Lectures)

Engineering projects:

Contour maps, sitemaps, plant layout, suitability of project site, preparation of site, selection and leasing of construction equipment special considerations in selection and location of projects, safety, health, human and environment al factors, project finance, international projects, joint ventures, collaborations, impact of culture, implementation, and handing over of projects

TEXT BOOK:

Kamaraju Ramakrishna, *"Essentials of Project Management"*, PHI Learning, New Delhi, 2010.

REFERENCES:

1. Prasanna Chandra, *"Projects – Planning, analysis, selection, implementation and review"*, Tata McGraw-Hill, New Delhi, 2010.
2. Chitkara, *"Construction Project Management"*, Tata McGraw- Hill, New Delhi.
3. Harold Kerzner, *"Project Management"*, Wiley, New York.

NOTES