ACADEMIC REGULATIONS
COURSE STRUCTURE AND SYLLABI

MASTER OF COMPUTER APPLICATIONS
(Department of Computer Applications)

2015 – 2016
(under Choice based Credit System)

COLLEGE OF ENGINEERING
(AUTONOMOUS)

GAYATRI VIDYA PARISHAD
COLLEGE OF ENGINEERING
(AUTONOMOUS)

Accredited by NAAC with A Grade with a CGPA of 3.47/4.00

Affiliated to JNTUK-Kakinada

MADHURAWADA, VISAKHAPATNAM – 530 048

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 endeavor.

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 GVP college of Engineering (Autonomous) has entered into a new phase as it completed one cycle of autonomy. Recently the Autonomy has been extended for six more years(2014-2020) by UGC, the affiliating University JNTU-K. The experiences with the experiments and innovations brought into the curriculum with the help of autonomy are proving successful and encouraging.

The paradigm shift in the curriculum design has been brought into the system in 2013 in the form of Out Come Based Education (OBE) and the systems and processes are stabilized in this regard.

Recently, the Choice Based Credit System (CBCS) has been introduced along with the grading system as per the guidelines of UGC, to offer more choice, facilitate the cross mobility and uniformity across the country.

The concepts of Skill Based Lab Electives (SBLE), to facilitate the students to select from the breadth and depth of the technical concepts ranging over concerned discipline as well as allied areas.

I thank all the expert members, Industry representatives, University representatives and all other members on Boards of Studies, Academic Council who helped us in brining a good shape to the curriculum.

I also thank the members of the Governing Body for their constant support and guidance in all our academic endeavors.

I hope together with these changes, the curriculum will be more beneficial to the students to make them ready to face the society and the challenges ahead.

PRINCIPAL

DEPARTMENT OF COMPUTER APPLICATIONS

VISION

To emerge as a center of excellence and research in the field of computer education and applications and to serve the society and ever changing industry

MISSION

To provide high quality post graduate program in the field of Computer Applications and to prepare students for professional career or higher studies.

MEMBERS ON THE BOARD OF STUDIES
IN
CSE, IT, MASTER OF COMPUTER APPLICATIONS

Mr. Lawrence Mohanraj
Academic Initiative, Manager - India / South Asia, IBM India Pvt. Ltd, Chennai

Mr. Suryanarayana Putrevu
Senior Vice President, Engineering Technology Kony Labs, Hyderabad

Mr. HariKishanBurle
Vice President, Global Enterprise Architecture at Wipro Technologies, Bengaluru.

Mr. Satya Thopalli
AGM, Information Technology and Services, Tech Mahindra, RMG Campus, Hyderabad

Mr. B. S. Ananth
Technical Manager, CISCO Systems, Bangalore

Mr. M. Anuroop Sobhan
Senior Software Engineer, Intel Mobile Communications India Pvt. Ltd., Bangalore

Dr. P. Krishna Subba Rao
Professor and Head of Department of Computer Science Engineering, GVPCE(A)

Sri G. S. Mallikarjuna Rao
Associate Professor and Head of Department of Computer Applications, GVPCE(A)

All Faculty members of the Department

MASTER OF COMPUTER APPLICATIONS

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO	Programme Educational Objectives (PEOs)
PEO1	Excel in professional career and/or higher education by acquiring knowledge in mathematics & computing principles.
PEO2	Exhibit technical, analytical, communication, project management skills and appropriate research methodologies to solve computing problems relevant to the society.
PEO3	Engage in life long learning to expand the knowledge of contemporary professional issues to undertake inter - disciplinary problems upholding ethical practice.

PROGRAMME OUTCOMES

1. Ability to acquire in-depth knowledge of Computer Applications with analytical and synthesizing skills.
2. Ability to analyze complex computing problems critically and provide viable solutions.
3. Ability to solve computing problems, evaluate potential solutions to those problem and arrive at feasible, optimal solutions.
4. Ability to apply appropriate research methodologies to develop innovative techniques for solving computing problems.
5. Ability to apply modern IT tools to solve complex problems.
6. Ability to work as an effective team member in a collaborative and multidisciplinary projects to achieve common goals.
7. Ability to apply management principles as a member and leader in a team and to maintain financial records as per standards.
8. Ability to effectively communicate with clients, peers and society at large and through social media
9. Ability to engage in life-long learning to be in tune with the fast-changing software related technologies.
10. Ability to follow ethical practices in the IT industry and accept social responsibility.
11. Ability to learn from mistakes, make corrective measures and surge forward with positive attitude and enthusiasm.

ACADEMIC REGULATIONS
(UNDER CHOICE BASED CREDIT SYSTEM EFFECTIVE FROM 2015-16 ADMITTED BATCH)

The MCA Degree of Jawaharlal Nehru Technological University Kakinada shall be recommended to be conferred on candidates who are admitted to the program and fulfill all the following requirements for the award of the Degree.

1.0 ELGIBILITY FOR ADMISSION:

Admission to the above program shall be made subject to the eligibility, qualifications and specialization as per the guidelines prescribed by the AICTE from time to time.

Admission shall be made on the basis of merit rank obtained by the qualifying candidate at ICET examination or an Entrance Test conducted by the university subject to reservations prescribed by the University from time to time.

2.0 AWARD OF MCA DEGREE:

a. A student shall be declared eligible for the award of the MCA degree, if he pursues a course of study and completes it successfully for not less than three academic years and not more than six academic years.

b. A student, who fails to fulfill all the academic requirements for the award of the Degree within six academic years from the year of his admission, shall forfeit his seat in MCA Programme.

3.0 STRUCTURE OF THE PROGRAMME:

Semester	No. of courses		Credits
I	5 THEORY + 2 LAB	2*4+3*3 + 2*2	21
II	5 THEORY + 2 LAB	2*4+3*3 + 2*2	21
III	5 THEORY + 2 LAB + SBLE-I	2*4+3*3 + 2*2+1	22
IV	3 THEORY + PE-I+PE-II + 2 LAB + SBLE-II	2*4+1*3+3+3+2*2+1	22
V	3 THEORY + PE-I+PE-II + 2 LAB + SBLE-III	2*4+1*3+3+3+2*2+1	22
VI	SEMINAR PROJECT WORK	2 20	22
		TOTAL	**130**

PE-Professional Elective, **SBLE**-Skill Based Lab Elective

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

3 credits for 3 lecture periods per week and one credit for one tutorial period per week.

2 credits for 3 laboratory periods per week.

20 credits for project work.

4.0 Registration: A student shall register for courses in each semester according to the choice provided and subjects offered by the concerned department.

5.0 Attendance Requirements: It is desirable for a candidate to put up 100% attendance in the class in all the courses(except free electives). However, a candidate shall be permitted to appear for the end semester examination provided he records a minimum of 75% attendance for each course in any semester. However, condonation for shortage of attendance may be given on Medical grounds, if a certificate to that 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 shall be paid by the student whose attendance is between 65 and 74 % for permission to appear for the end semester 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) 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.

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

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

6.0 METHOD OF EVALUATION: The performance of a student in each semester shall be evaluated subject-wise with a maximum of 100 marks for each theory, practical and Project work.

6.1 Theory (3 or 4 Credits): The assessment shall be for 40 marks through Continuous Internal evaluation and 60 marks through end-semester examination of three hours duration.

6.2 Continuous Internal evaluation: One part of the internal evaluation shall be made based on the average of the marks secured in the two internal examinations of 30 marks each conducted one in the middle of the Semester and the other at the end of the semester. Each mid-term

examination shall be conducted for duration of 90 minutes with 3 questions to be answered out of 5 questions. The remaining 10 marks are awarded through an average of continuous evaluation of assignments / seminars / any other method, as notified by the teacher at the beginning of the semester.

6.3 End-semester examination: An end semester examination shall be conducted for 60 marks.

For 80% of the theory courses, the question paper shall be set externally and valued both internally and externally. A chief examiner appointed for each course shall monitor the valuation process. If the difference between the first and second valuations is less than or equal to 9 marks, the better of the two valuations shall be awarded. If the difference between the first and second valuation is more than 9 marks, the chief examiner shall value the script. The marks given by the chief examiner shall be final. For the remaining 20% of the theory courses (as notified by the Principal), the end semester evaluation shall be totally internal.

6.4 Lab (1 Credit): For all Skill Based Lab Electives, the evaluation shall be totally internal and carried out for 100 marks at the end of the course. Skill Based Lab Electives shall be conducted from III semester on thrust areas each for a period of 24 hours. Students shall register and put up a minimum of 75% attendance. Based on the performance in examination to be conducted for 100 marks after all lab sessions, grade shall be awarded.

6.5 Practical: Practical 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. 10 out of 12 to 16 experiments/exercises shall be completed in a semester.

6.6 Seminar: There shall be a seminar presentation in VI semester. For seminar, there will be only internal evaluation of 50 marks. The assessment will be made by a Board consisting of Head of the Department and two other internal staff members of the department.

6.7 Supplementary examinations: Supplementary examinations for the odd semester shall be conducted with the regular examinations of even semester and vice versa.

7.0 EVALUATION OF PROJECT WORK:

a. A Departmental   Project Review Committee (DPRC) shall be constituted with the Head of the Department as the Chairman and two senior faculty as Members to oversee the proceedings of the project work from allotment of project topic to submission of the thesis.
b. A Project Review Committee (PRC) shall be constituted with a Professor as Chair Person, Heads of the Departments that are offering the M.Tech. / MCA programs and two other senior faculty members.
c. Registration of Project Work: A candidate is permitted to register for the project work in the beginning of the VI Semester, only after satisfying the attendance requirement of all the courses up to V semester. The duration of the project is for one semester.
d. After satisfying 7.0 c, a candidate has to submit, in consultation with his project supervisor, the title, objective and plan of action of his project work to the DPRC for its approval. Only after obtaining the approval of DPRC the student can initiate the Project work.
e. If a candidate wishes to change his supervisor or topic of the project he can do so with the approval of the DPRC. If so, his date of registration for the project work shall start from the date of change of Supervisor or topic as the case may be whichever is earlier.

f. Candidate shall submit and present the status report during two DPRC reviews after satisfying 7.0 d. The two reviews/evaluation shall carry 20 and 30 marks, respectively. During each review, the DPRC has to approve the status report, for the candidate to proceed with the next stage of work.

g. A candidate shall be permitted to submit his dissertation only after successful completion of all theory and practical course with the approval of PRC but not earlier than 16 weeks from the date of registration of the project work. For the approval by PRC, the candidate shall submit a draft copy of the dissertation to the Principal through the concerned Head of the Department and shall make an oral presentation before the PRC.

h. Three copies of the dissertation certified by the Supervisor shall be submitted to the College after approval by the PRC.

i. For the purpose of adjudication of the dissertation, an external examiner shall be selected by the Principal from a panel of 5 examiners who are experienced in that field proposed by the Head of the Department in consultation with the supervisor.

j. The final evaluation, i.e., viva-voce examination, for 50 marks, shall be conducted by a board consisting of the supervisor, Head of the Department and the external examiner.

k. A student is deemed to be failed, if he secures less than 25 marks in the final evaluation or less than 50 marks from both internal and final evaluation put together. In such a case, the candidate shall revise and resubmit the dissertation, in a time frame prescribed by the PRC. If the student fails once again, the dissertation shall be summarily rejected and the candidate shall change the topic and go through the entire process afresh.

8. ACADEMIC REQUIREMENTS:

* In case of theory courses having both internal and end semester examination, a student is deemed to be failed if he secures less than 24 marks in the end semester examination or less than 50 marks from both internal and end semester examination put

together. For all courses having examination at the end, a student is deemed to be failed if he secures less than 50 marks.

\# In case of Practical / Project having both internal and end semester examination / evaluation, a student is deemed to be failed if he secures less than 25 marks in the end semester examination / evaluation or less than 50 marks from both internal and end semester examination / evaluation put together. For Seminar / SBLEs having examination/evaluation at the end, a student is deemed to be failed if he secures less than 50 marks.

9.0 Promotion Criteria:

A student shall be promoted from IV to V semester, if he/she registered atleast **86** credits and secure a **pass grade in atleast 60 credits** at the end of IV semester, from I, II, III semester regular and supplementary examinations and regular examinations of IV semester.

10.0 Make-up classes:

For students detained due to shortage of attendance in a course, Make-up programme shall be announced at the beginning of every semester. The announcement of courses 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. 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.

It is desirable for a candidate to put up 100% attendance in all the courses 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. 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.

The method of internal evaluation in the case of make-up programme is same as for the regular MCA programme. 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. The grades for the courses registered during the make-up programme shall be earned from the end semester examinations following the corresponding regular semester.

No student can register for more than two courses. Withdrawal from a make-up program after registration will not entitle for any refund of fees.

11.0 Grading System: Absolute grading system shall be followed for the award of grades.

Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.
Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F.
Based on the marks secured, a Grade Point is awarded for each theory course / lab course / project work / Seminar / SBLE along with a corresponding Letter Grade as per the following:

Grades and Grade Points

Letter Grade	Grade Point
O (Outstanding)	10
A+ (Excellent)	9
A (very good)	8
B+ (Good)	7
B (Above average)	6
C (Average)	5
P (Pass)	4
F (Fail)	0
Ab (Absent)	0

Credit Point: It is the product of grade point and number of credits for a course.

11.1 Computation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student in a semester, i.e

$$\textbf{SGPA } (Sj) = \ (C_i \times G_i) / \ C_i$$

where C_i is the number of credits of the ith course and G_i is the grade point scored by the student in the ith course.

The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

$$\textbf{CGPA} = \ (C_i \times S_i) / \ C_i$$

where S_i is the SGPA of the ith semester and C_i is the total number of credits in that semester. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

Transcript for each semester shall be issued containing letter grades and grade points along with attendance grade, for each of the courses registered, SGPA of that semester and CGPA up to that semester. Marks will not be displayed on the transcript.

A consolidated transcript indicating the performance in all semesters shall also be issued.

Note: The ranges of marks to award the grade point, CGPA ranges for the award of class or division shall be as decided by the affiliating University.

11.2 Minimum Academic Requirements: A student shall secure a minimum of **P** grade in all courses corresponding to 130 credits to be eligible for the award of the MCA degree.

11.3 Provision for improvement of CGPA: PROVISION FOR IMPROVEMENT OF CGPA: A student shall be permitted to improve his class or division from PASS CLASS to SECOND CLASS or SECOND CLASS to FIRST CLASS after successful completion (passing all the courses) of the programme. He / She may be allowed to appear for supplementary examinations and earn grade points for improvement from at the most two courses of his / her choice. The improvement provision shall be limited to one attempt.

12.0 WITHHOLDING OF RESULTS:

If the candidate has not paid any dues to the college or if any case of indiscipline is pending against him, the result of the candidate shall be withheld and he will not be allowed into the next higher semester. The recommendation for the issue of the degree shall be liable to be withheld in all such cases.

13.0 TRANSITORY REGULATIONS:

a. A candidate who has discontinued or has been detained for want of attendance or who has failed after having studied the subject is eligible for admission to the same or equivalent subject(s) as and when subject(s) is/are offered, subject to 2.0 and 5.0.

b. Credit equivalences shall be drawn for the students re-admitted into 2015 regulations from the earlier regulations. A Student has to register for the substitute / compulsory / pre-requisite subjects identified by the respective Boards of Studies.

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

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

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

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.

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 th college.

MASTER OF COMPUTER APPLICATIONS
COURSE STRUCTURE

I SEMESTER

Course Code	Theory / Lab	L	T	P	C
15CA3101	Computer Programming through C	3	1	0	4
15CA3102	Computer Organization	3	1	0	4
15HE3101	English Language Communication Skills	3	0	0	3
15BM3101	Mathematical Foundations of Computer Applications	3	0	0	3
15HM3101	Accounting and Financial Management	3	0	0	3
15CA3103	Computer programming through C Lab	0	0	4	2
15CA3104	PC Software Lab	0	0	4	2
	Total	**15**	**2**	**8**	**21**

II SEMESTER

Course Code	Theory / Lab	L	T	P	C
15CA3105	Operating Systems	3	1	0	4
15BM3102	Operations Research	3	0	0	3
15BM3103	Numerical Methods, Probability & Statistics	3	0	0	3
15CA3106	Object Oriented Programming through Java	3	0	0	3
15CA3107	Data Structures	3	1	0	4
15CA3108	Object Oriented Programming through Java Lab	0	0	4	2
15CA3109	Data Structures Lab	0	0	4	2
	Total	**15**	**2**	**8**	**21**

III SEMESTER

Course Code	Theory / Lab	L	T	P	C
15CA3110	UNIX & Shell Programming	3	0	0	3
15CA3111	Design and Analysis of Algorithms	3	1	0	4
15CA3112	Data Base Management Systems	3	1	0	4
15HM3102	Organizational Structure and Human Resource Management	3	0	0	3
15CA3113	Computer Networks	3	0	0	3
15CA3114	Unix & Operating Systems Lab	0	0	4	2
15CA3115	Data Base Management Systems Lab	0	0	4	2
	Skill Based Lab (Elective) – I	0	0	2	1
	Total	**15**	**2**	**8**	**22**

IV SEMESTER

Course Code	Theory / Lab	L	T	P	C
15CA3116	Software Engineering	3	1	0	4
15HM3117	Management Information Systems	3	0	0	3
15CA3118	Data Warehousing and Data Mining	3	1	0	4
	Elective – I	3	0	0	3
15CA3119	Software Project Management				
15CA3120	Mobile Computing				
15CA3121	Image Processing and Pattern Recognition				
	Elective – II	3	0	0	3
15CA3122	Perl Programming				
15CA3123	Software Testing				
15CA3124	Information Storage Systems				
15CA3125	Software Engineering Lab	0	0	4	2
15HE3102	Technical Communication & Soft Skills Lab	0	0	4	2
	Skill Based Lab (Elective) – II	0	0	2	1
	Total	**15**	**2**	**8**	**22**

V SEMESTER

Course Code	Theory / Lab	L	T	P	C
15CA3126	Multimedia Application Development	3	1	0	4
15CA3127	Web Technologies & Web Services	3	1	0	4
15CA3128	Information Security	3	0	0	3
	Elective – III	3	0	0	3
15CA3129	Cloud Computing				
15CA3130	Middle Ware Technologies				
15CA3131	E-Commerce				
	Elective – IV	3	0	0	3
15CA3132	Big Data and Hadoop				
15CA3133	Information Storage Security and Management				
15CA3134	Information Retrieval Systems				
15CA3135	Multimedia Application Development Lab	0	0	4	2
15CA3136	Web Technologies & Web Services Lab	0	0	4	2
	Skill Based Lab (Elective) - III	0	0	2	1
	Total	**15**	**2**	**8**	**22**

Skill Based Lab Electives

Course code	Title of the subject
15CA31S1	Linux Lab
15CA31S2	Computer Organization and Architecture Lab
15CA31S3	Data Mining Lab
15CA31S4	Computer Graphics Lab
15CA31S5	Digital Image Processing Lab
15CA31S6	Network Security and Cryptography Lab

VI SEMESTER

Course Code	Seminar / Project Work	Credits
15CA31SM	Seminar	2
15CA31PW	Project Work	20

Syllabi for I-Semester

COMPUTER PROGRAMMING THROUGH C

Course Code: 15CA3101 **L T P C**
3 1 0 4

Course Outcomes:
At the end of the course student will be able to
CO1: Create Algorithms and draw Flowcharts and develop programs using Sequential, Selection and Iterative control statements.
CO2: Design Programs using functions for user defined functions and recursion and storage classes.
CO3: Implement Programs using Arrays and String Manipulations.
CO4: Generate Programs for Pointers, dynamic memory allocation, Structures, Unions and Bit fields and user defined types like typedef, enum.
CO5: Develop Procedures and Create Programs for File Handling and to Define Standard I/O streams.

UNIT-1
Introduction to Computers, Algorithm/Pseudo code, Flow chart, Program Development steps, Basic structure of C Program, Input and Output statements (printf() & scanf()), 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.

UNIT-II
FUNCTIONS: Definition, Advantages, types of functions- user defined and standard library functions, categories of functions, scope rules, recursion, storage classes.

UNIT-III
ARRAYS: Introduction to arrays, one Dimension Arrays: Definition, Declaration, Initialization, Accessing & storing the elements, two

Dimension Arrays: Definition, Declaration, Initialization, Accessing & storing the elements, C Pre processor

STRINGS: String- Declaration, Initialization, pointers and strings, standard library string functions, array of pointers to strings.

UNIT-IV
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.

UNIT-V
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.

TEXT BOOKS:
1. B.A Forouzan and R.F. Gilberg, *Computer science, A structured programming approach using C*, 3rd Edition, CENGAGE Learning, 2009.
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.

COMPUTER ORGANIZATION

Course Code: 15CA3102   **L T P C**
                                                 3 1 0 4

Course Outcomes:
At the end of the course student will be able to
CO1: The basic components of a computer, including CPU, memories, and input/output, and their organization representation of data, addressing modes, instructions sets.
CO2: Discriminate different register transfer micro operations, Principles of hardwired and micro programmed control.
CO3: Demonstrate various fixed and floating point arithmetic operations, performing the Arithmetic operations of binary number systems and formulating the arithmetic functions and solve scientific problems by means of a numerical analysis method.
CO4: Extrapolate memory organization and input, output organizations.
CO5: Generalize pipe line and vector processing, multi processors and its applications.

UNIT-I
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
REGISTER TRANSFER AND MICRO OPERATIONS: Register transfer language, Register transfer, Bus and Memory transfers,

Arithmetic Microoperations, Logic Microoperations, Shift Microoperations, Arithmetic Logic Shift Unit.
MICRO PROGRAMMED CONTROL: Control Memory, Address Sequencing, Micro Program examples, Design of control unit, Hardwired control.

UNIT-III
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
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
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, SafeaZaky, "*Computer Organization*", 5th Edition, TMH, 2011.

WEB REFERENCES:
http://nptel.iitm.ac.in/video.php?subjectId=106106092

ENGLISH LANGUAGE COMMUNICATION SKILLS

Course Code : 15HE3101   **L T P C**
                                                              3 0 0 3

Course Outcomes:
At the end of the course student will be able to
CO1: Use English language fluently, accurately and appropriately
CO2: Discuss and discover barriers to effective communication.
CO3: Demonstrate skills in listening comprehension, GDs and Interview.
CO4: Read and answer questions (orally and in writing) based on passages.
CO5: Show effective writing skills in academic and professional contexts.

UNIT-I
Correction of sentences - Common errors, articles, prepositions, tenses, concord, phrasal verbs, modal verbs, conditionals, transformation of sentences, punctuation and spelling, Vocabulary- synonyms, antonyms, prefixes, suffixes, confusables ,one- word substitutes, Idioms and phrases

UNIT-II
Communication- definition, functions, process, types of communication, differences between oral and written communication, barriers to effective communication-Non-verbal communication

UNIT- III
Listening skills – types of listening- barriers to effective listening- the role of listening in leadership styles Oral skills - Public speech, Team presentation-Group Discussion –Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, interview through Tele-conference and Video-conferencing

UNIT- IV

Reading and comprehension **–** kinds of reading- reading at various speeds (slow, fast, very fast); reading for different purposes (for relaxation, for information, for understanding, for discussion at a later stage etc.); skimming, scanning, intensive and extensive reading.

UNIT-V

Written communication -   features of effective writing such "as clarity, brevity, appropriate tone, balance etc.-- Paragraph writing and essay writing, Letter-writing - business letters – format – kinds of business letters- style of writing –effectiveness, promptness – Writing E-Mail, Memos and Minutes, Technical Report Writing – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.- Progress and Project Reports.

REFERENCE BOOKS:

1. Meenakshi Raman & Sangeeta Sharma, *"Technical Communication Principles & Practice",* New Delhi: OUP, 2011.
2. Rajendra Pal, J S Korlahalli,   *Essentials of Business Communication*, New Delhi: Sultan Chand & Sons, 2008.
3. Meenakshi Raman & Prakash Singh, *"Technical Communication Principles & Practice",* New Delhi: OUP, 2007.
4. Simon Sweeny, *"English for Business Communication"*, CUP, First South Asian Edition, 2010
5. RK Madhukar, *"Business Communication"*, Vikas Publishing House Pvt Ltd, 2006.
6. M. Ashraf Rizvi, *"Effective Technical Communication"*, Tata McGraw-Hill Publishing Company Ltd. Latest edition.
7. Dr. ShaliniVerma, *"Body Language- Your Success Mantra",* S. Chand, 2006.
8. Sunita Mishra & C. Muralikrishna, *"Communication Skills for Engineers",* Pearson Education, 2007.
9. Books on TOEFL/GRE/GMAT by Barron's/ CUP(latest edition)

MATHEMATICAL FOUNDATIONS OF COMPUTER APPLICATIONS

Course Code : 15BM3101   **L T P C**
                                                    3 0 0 3

Course Outcomes:

At the end of the course student will be able to

CO1: Rewrite mathematical arguments using logical connectives and quantifiers and verify the validity of flow of argument using propositional, predicate logic and truth tables.

CO2: Identify and give examples of various types of relations and describe various properties of the relations.

CO3: Discuss certain properties of Lattices and Boolean algebra.

CO4: Solve problems involving recurrence relations and generating functions.

CO5: Determine isomorphism of graphs and spanning tree of a given graph using DFS / BFS. Also determine minimal spanning tree of a given graph.

UNIT-I

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.

UNIT- II

Relations: Relations, properties of binary relations in a set, Relation matrix and Graph of a relation, partition and covering of a set, equivalence relations, compatibility relation, composition of binary relations, partial ordering, partially ordered set.

UNIT- III
Lattices, Boolean Algebra: Lattices, Definition and examples, properties of lattices, some special lattices, Boolean algebra-Definitions and Examples, Boolean forms and free Boolean algebra, Values Boolean Expressions and Boolean functions, representation of Boolean functions.

UNIT-IV
Generating Functions and Recurrence relations: Generating Functions of sequences, Calculating coefficients of generating functions, Recurrence relations, Solving Recurrence relations by substitution, generating functions and the method of characteristic roots.

UNIT-V
Graph Theory
Basic concepts: Graph, Directed Graph, Multi Graph, Degree of vertex and their properties, Adjacency Matrix, Cycle Graph, Bipartite graphs, Isomorphism and Subgraphs, Trees and their properties, Spanning trees: DFS, BFS, Kruskal's Algorithm for finding minimal Spanning tree.

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*, Prentice Hall of India Pvt Limited, New Delhi Second Edition,2009.

REFERENCES:
Kenneth Bogart, Clifford Stein, Robert L.Drysdale, "*Discrete Mathematics for Computer Science*", Springer International Edition, 2006.

ACCOUNTING AND FINANCIAL MANAGEMENT

Course Code: 15HM3101   **L T P C**
                                                      3 0 0 3

Course Educational Objectives:
To explain the basic principles of accounting practices and financial management techniques for effective business decision making.

Course Outcomes
At the end of the course student will be able to
CO1: To relate the principles of accounting at the time of maintaining the books of accounts and able to record, classify and summarize various transactions in books of accounts.
CO2: To illustrate a trading account, Profit and Loss account and Balance sheet of a trading concern and explain the concept of Financial Management to design a Comparative and Common size Statement analysis.
CO3: To narrate various capital budgeting techniques for making capital investment decisions.
CO4: To list out various costs associated with production and compute breakeven point and to illustrate the various uses of breakeven analysis.
CO5: To be competent and utilize computers and accounting software to record, store and analyze financial data.

UNIT-I: Introduction to Financial Accounting   (10 Lectures)
Meaning, Definition, difference between financial, cost and management accounting.
Accounting: Principles, concepts, conventions, double entry book keeping, Journal, Ledger Trial Balance.

UNIT-II: Preparation of Final Accounts and Analysis of Financial Statements   (12   Lectures)
Trading account, Profit and Loss account and Balance sheet with and

without simple adjustments. Financial Statement Analysis: Comparative, Common size and Ratio Analysis (Simple numerical problems).

UNIT-III: Introduction to Financial Management and Capital budgeting   (12 Lectures)
Introduction to financial management, nature, scope, and objectives
Capital Budgeting: Definition, nature and scope of capital budgeting, features of capital budgeting proposals, methods of capital budgeting: traditional and modern methods (simple numerical problems)

UNIT-IV: Cost Analysis and Behavior   (10 Lectures)
Costing- nature, importance and basic principles. Marginal costing and Break-even Analysis: Nature, scope and importance - practical applications of marginal costing, limitations and importance of cost - volume, profit analysis, Short run decisions (simple numerical problems)

UNIT-V: Computerized Accounting System   (10 Lectures)
Introduction to computerized accounting system: coding logic and codes, master files, transaction files, introduction documents used for data collection, processing of different files and outputs obtained.

Text Books:
1. S N Maheswari & S K Maheswari, *"Financial Accounting",* 4th Edition, Vikas Publishers – 2005.
2. M Y Khan & P K Jain, *"Financial Management",* 4th Edition, TMH – 2005.
3. A Mukherje & M Hanif, *"Financial Accounting",* 1st edition, TMH – 2008.
4. M Y Khan & P K Jain, "Management Accounting*",* 5th Edition, TMH – 2010.

References:
1. S P Jain & K L Narang, *"Cost Accounting-Principles & Practice",* 1st Edition, Kalyani Publishers – 2005.

2. Shashi K Gupta & R K Sharma, *"Financial Management",* 6th Edition, Kalyani Publishers – 2008.
3. Ambrish Gupta, *"Financial accounting for Management",* 1st Edition, Pearson Education - 2005.
4. Charles T. Horngren, "Introduction to Management Accounting", 16th Edition, Pearson Education – 2014.

COMPUTER PROGRAMMING THROUGH C LAB

Course Code: 15CA3103   **L T P C**
                                                             0 0 4 2

Course Outcomes:

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

CO1: Gets exposure on RAPTOR tool.

CO2: Learn how to program basic mathematical operation using various control statements like if, if-else, switch, for, while and do-while

CO3: Develop Programs for Arrays and String manipulations

CO4: Exercise Programs for functions, pointers, structures and unions.

CO5: Implement Programs for File I/O operations and Gets an idea on maximizing the usage of various C programming features.

Exercise 1.

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.

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

d) Write a program which checks a given integer is Fibonacci number or not.

Exercise 2.

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 find the roots of a quadratic equation.

Exercise 3

a) Write C programs that use both recursive and non-recursive functions
   i) To find the factorial of a given integer.

ii) To find the GCD (Greatest Common Divisor) of two given integers.
iii) To solve Towers of Hanoi problem.
iv) Write program to calculate probability of head/tail by generating random numbers using random() function.

Exercise 4

a) The total distance travelled by vehicle in 't' seconds is given by distance $= ut + \frac{1}{2}at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write 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, which takes two integer operands and one operator form the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Exercise 5

a) Write a C program to find both the larges and smallest numbers in a list of integers.

b) Write a C program that uses functions to perform the following:
  i) Addition of Two Matrices ii) Multiplication of Two Matrices
  iii) Checking symmetry of a square matrix.
  iv) Calculating transpose of a matrix in-place manner.

Exercise 6

a) Write a C program that uses functions to perform the following operations:
  i) To insert a sub-string in to given main string from a given position.
  ii) To delete n Characters from a given position in a given string.

b) Write a C program to determine if the given string is a palindrome or not.

Exercise 7

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 count the lines, words and characters in a given text.

Exercise 8

a) Write a C program to generate Pascal's triangle.

b) Write a C program to construct a pyramid of numbers.

Exercise 9

Write a C program to read in two numbers, x and n, and then compute the sum of the terms of the following geometric progression:
$1+x+x^2+x^3+\ldots\ldots\ldots+x^n$
For example: if n is 3 and x is 5, then the program computes 1+5+25+125. Print x, n, the sum Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers without computing the sum. Are any values of x also illegal? If so, test for them too.

Exercise 10

a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.

b) Write a C program to convert a Roman numeral to its decimal equivalent.

Exercise 11

Write a C program that uses functions to perform the following operations using Structure:
i) Reading a complex number
ii) Writing a complex number

iii) Addition of two complex numbers iv) Multiplication of two complex
   numbers

Exercise 12
a) Write a C program which copies one file to another.
b) Write a C program to reverse the first n characters in a file.
(Note: The file name and n are specified on the command line.)

PC SOFTWARE LAB

Course Code : 15CA3104   **L T P C**
                                                                     0 0 4 2

Course Outcomes:
At the end of the course the student will be able to
CO1: Illustration of computer components, maintenance of software
CO2: Demonstration of installing OS, hardware and software troubleshooting.
CO3: Explain Internet concepts
CO4: Use Microsoft Office programs to create personal and/or business documents following current professional and/or industry standards
CO5: Use of basic Unix/Linux commands

COMPULSORY EXERCIES:
Identification of the peripherals of a computer, components in a CPU and its functions - 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.

Installation of Linux on the computer wherein the windows was installed. The system should be configured as dual boot with both windows and Linux.

Hardware Trouble shooting : Identification of the problem of a PC which does not boot (due to improper assembly or defective peripherals) and fixing it to get the computer back to working condition.

Software Trouble shooting: Identification of the problem of a malfunctioning CPU (due to some system software problems) and fixing it to get the computer back to working condition.

Connectivity Boot Camp : Connectivity to the Local Area Network and accessibility to the Internet. TCP / IP setting.

Web Browsers, Surfing the Web: Customization the web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Using MS Word:

Creation of project certificate: Exposure to features like: - Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word.

Creating project abstract: Features to be covered are: Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Creating a Newsletter: Features to be covered are: Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs

Creating a Feedback form - Features to be covered are: Forms, Text Fields, Inserting objects, Mail Merge in Word.

Excel Orientation : Introduction of Excel as a Spreadsheet tool, Using Excel –Accessing, overview of toolbars, saving excel files, Using help and resources.

Creating a Scheduler - Features to be covered are: Gridlines, Format Cells, Summation, auto fill, Formatting Text.

Calculating GPA - Features to be covered:- Cell Referencing, Formulae in excel – average, standard deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP.

Performance Analysis - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting.

Power point presentation
Exposure to basic power point utilities and tools (PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in Power point, Hyperlinks, inserting Images, Clip Art, Audio, Video, Objects, Tables, Charts) to create basic power point presentation.

MS-Access: Create database for student information, library information and inventory. Generation of queries, reports and transaction processing

Be able to use the following list of commands in Linux:

alias	clear	ftp	man	talk
banner	chfn	gv	mkdir	telnet
bc	chown	gunzip	more	unzip
bg	cp	head	mv	vi
cal	date	history	passwd	vim
cat	diff	id	pine	vimtutor
cc	dir	indent	ps	wall
cd	display	dill	pwd	wait
chgrp	df	last	reboot	whereis
chmod	du	login	rm	who
cmp	echo	logname	rmdir	whoami
	exit	ln	shutdown	write
	fg	logout	tail	zip
	file	ls	mail	tar ands
	finger			
	find			
	gzip			

NOTES

Syllabi for II-Semester

OPERATING SYSTEMS

Course Code : 15CA3105   **L T P C**
                                                3 1 0 4

Course Outcomes:
At the end of the course the student will be able to
CO1: Classify different types of systems like distributed system, special purpose system and the working principle of system calls.
CO2: Compute the waiting time and turnaround time of different CPU scheduling algorithms and comparison among all the CPU scheduling algorithms.
CO3: Examine the page faults for different Page Replacement algorithms and comparison among all the Page Replacement algorithms, and methods to handle deadlocks.
CO4: Differentiate among different File System implementation and directory implementation.
CO5: Assess different types of disk scheduling algorithms, distinguish different protection and security mechanisms

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   (10 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   (10 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   (10 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

OPERATIONS RESEARCH

Course Code: 15BM3102   **L T P C**
                                                      3 0 0 3

Course Outcomes:
At the end of the course student will be able to
  CO1: Formulate a real system into a Linear Programming problem and solve it using graphical or simplex method.
  CO2: Formulate and solve transportation and assignment problems and interpret solutions.
  CO3: Determine optimal sequence of n-jobs to be processed on k-machines that minimize the total elapsed time. Recognize the basic types of queuing models, and calculate the performance characteristics.
  CO4: Calculate Economic order quantity, optimum number of orders for deterministic inventory models without shortages.
  CO5: Solve two person zero sum games with and without saddle point.

Unit-I   (10 Lectures)
Introduction to OR and LPP: Introduction, Origin and Development of O.R. Linear Programming Problem, Mathematical Formulation of the problem, Graphical Solution.
Simplex method: General LPP, Canonical and standard form of LPP, Simplex Method: Introduction, Computational Procedure, Use of artificial variables, Degeneracy in LPP.

Unit-II   (10 Lectures)
Transportation   Problem: Introduction,   LP   formulation   of Transportation Problem, The
Transportation Table, Solution of Transportation problem, Finding IBFS, Test for Optimality, Degeneracy in Transportation problem, Transportation Algorithm, Some Exceptional cases.
Assignment Problem: Introduction, Mathematical Formulation of the Problem, Hungarian Assignment Method, Special Cases in Assignment Problems.

Unit-III   (10 Lectures)
Sequencing Problem and Queuing Theory: Sequencing Problem: Introduction, Problem of Sequencing, Processing n jobs through two machines. Processing n jobs through k- machines.
Queuing Theory: Introduction, Queuing system, elements of Queuing system Operating characteristics of a Queuing system, Classification of queuing models: Model-I

Unit-IV   (10 Lectures)
Inventory control: Introduction, Types of Inventories, Costs associated with inventories, the concept of EOQ, Deterministic inventory problems with no shortages.

Unit-V   (10 Lectures)
Game Theory: Introduction, Two-person zero-sum game, Some Basic terms, The Maxi-Min-Mini-Max Principle, Games without saddle points, mixed strategies, Dominance property.
CPM: Introduction, Basic Components, Logical sequencing, Rules of Network Construction, Critical Path Analysis.

Prescribed Text Book:
1. Kanthi Swarup, P.K.Gupta and Man Mohan, *"Operations Research",* Fifteenth Edition, Sultan Chand & Sons, New Delhi, 2010.

 Reference Book:
1. Hamdy. A. Taha, *"Operations Research"*, Seventh Edition, An Introduction, Pearson Education, 2002.

NUMERICAL METHODS, PROBABILITY AND STATISTICS

Course Code: 15BM3103   **L T P C**
                                                  3 0 0 3

Course Outcomes:

At the end of the course student will be able to

CO1: Determine solution of algebraic and transcendental equations and numerically solve system of linear equations.

CO2: Compute interpolating polynomial for the given data.

CO3: Examine, analyze, and compare various Probability distributions for both discrete and continuous random variables.

CO4: Construct confidence intervals for population parameters.

CO5: Formulate null and alternative hypothesis and test its validity based on random sample.

Unit- I   (10 Lectures)

Solutions of algebraic and transcendental equations-Bisection Method-Regula Falsi-Newton Raphson method.

Solution of linear simultaneous equations – Gaussian Elimination, Gauss Jordan, Factorization Method, Gauss Seidel Iterative Method.

Unit- II   (10 Lectures)

Finite differences, differences of polynomial, other difference operators. Interpolation-Newton's forward interpolation- Newton's backward interpolation-interpolation with unequal intervals-Lagrange's interpolation-Newton's divided interpolation, Inverse interpolation.

Unit-III   (10 Lectures)

Discrete Random variables: Random variables, mean and variance, Chebyshev's theorem, Binomial distribution, Poisson distribution. Continuous Random variables: Continuous random variable, normal distribution, normal approximation to binomial distribution, uniform distribution.

Unit-IV   (10 Lectures)
Sampling distribution of Means,: Population and sample, sampling distribution of the mean, Point estimation, interval estimation, Null hypotheses and tests of hypotheses, inferences concerning one mean.

Unit-V   (10 Lectures)
Inferences concerning two mean. Inferences concerning Proportions: Estimation of Proportions, Hypotheses concerning one Proportion, several Proportions.

Prescribed Text Books:

1. Introductory Methods of Numerical Analysis by S. S. Sastry, Fourth Edition, Prentice Hall India Pvt., Limited, 2005. (For Unit-I and II).

2. Richard A.Johnson, " Miller.& Freund's Probability and Statistics for Engineers", eighth edition, PHI Learning India Private Limited, 2011. (For Unit-III, IV and V).

REFERENCE BOOKS:
1.   Samuel Daniel Conte, Carl W. De Boor, "Elementary Numerical Analysis: An Algorithmic Approach", McGraw- Hill, 3rd edition, 2008.

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

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Course Code: 15CA3106   **L T P C**
                                                              3 0 0 3

Course Outcomes:
At the end of the course student will be able to

CO1: Define secure classes, objects & message passing to implement program.

CO2: Compare and contrast Inheritance and implement Packages for grouping classes.

CO3: Create Built-in-Exceptions to handle any type of Exception.

CO4: Write well structured & documented OO applications with event-driven Graphical User Interface (GUI).

CO5: Illustrate Swing components to develop GUIs for applications and applets.

UNIT-I   (10 Lectures)
Object oriented thinking :- Need for oop paradigm, A way of viewing world – Agents, responsibility, messages, methods, classes and instances, class hierarchies (Inheritance), method binding, overriding and exceptions, summary of oop concepts, coping with complexity, abstraction mechanisms.

Java Basics History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, classes and objects – concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling functions.

UNIT-II   (10 Lectures)
Inheritance – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits

of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes.

Packages and Interfaces : Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces, Exploring packages, java.io(Character streams, Byte streams), Files, (Directories, random access files), java.util (collections(vectors, hashmap, treemap, lists, sets,), calendar, regex(pattern matching), date, scanner).

UNIT- III   (10 Lectures)
Exception handling and multithreading - Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

UNIT-IV   (10 Lectures)
Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menu bar, graphics, layout manager – layout manager types – boarder, grid, flow, card and grib bag.

UNIT-V   (10 Lectures)
Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

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"*, Java 7 edition, 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.

Web references:
1. http://www.onjava.com
2. http://developers.sun.com/rss/java.xml

DATA STRUCTURES

Course Code: 15CA3107   **L T P C**
                                                             3 1 0 4

Course Outcomes:
At the end of the course student will be able to
CO1: Get knowledge on how to develop algorithms. Operations on queues and stacks.
CO2: Extrapolate the concepts of linked lists and apply the linked lists for implementing stacks and queues.
CO3: Apply knowledge on different searching methods and sorting techniques.
CO4: Extrapolate their knowledge on trees, binary trees and AVL trees.
CO5: Develop concepts of graphs

UNIT-I   (10 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   (10 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   (10 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   (10 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   (10 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

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Course Code: 15CA3108   **L T P C**
                                                          0 0 4 2

Course Outcomes:
At the end of the course student will be able to
CO1: Develop simple Java programs
CO2: Implement Packages to combine classes together.
CO3: Write a multithread program to control multiple threads
        simultaneously.
CO4: Develop an Applet to support Graphical User Interface (GUI).
CO5: Create a Client/Server programs

1. (Using java. math class)
a) Write a Java program that prints all real solutions to the quadratic
equation $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula.
If the discriminant b^2-4ac is negative, display a message stating that
there are no real roots.
b) The Fibonacci sequence is defined by the following rule:
The first two values in the sequence are 0 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 nth value in the
Fibonacci sequence.
2.a)Write a Java program that prompts the user for an integer and then
prints out all prime numbers up to that integer.
b) Write a Java program to multiply two given matrices.
c) Write a Java 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)
3. (Using java.lang.FileInputStream and FileOutputStream)
a) Write a Java program that reads a file name from the user, then
displays information about whether the file exists, whether the file is
readable, whether the file is writable, the type of file and the length of
the file in bytes.

b) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.

c) Write a Java program that displays the number of characters, lines and words in a text file.

4. Write a Java program that:

a. Implements stack ADT.

b. Converts infix expression into Postfix form

   c. Evaluates the postfix expression

5. (packages)

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. (Exception Handling and Multithreading)

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 Arithmetic Exception.

   b) Create a user defined exception.

   c) Write a Java program that correctly implements producer consumer problem   using the concept of multithreading.

7. (Using java.awt.*)

   a) Write a java 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.

   b) Write applet program that simulates a digital clock.

8. (Applets and Event Handling)

   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.

c) Write a Java 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.

9. (Swings and Event Handling)

    a) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Jtable component.

    b) Write a Java program for handling mouse events.

10. (Socket Programming)

    Write a Java 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. (Use java.net)

11.a) Write a java 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.

    b) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.

    c) Write a Java program for sorting a given list of names in ascending order.

DATA STRUCTURES LAB

Course Code: 15CA3109   **L T P C**
                                                              0 0 4 2

Course Outcomes:
At the end of the course student will be able to
CO1: Extend the knowledge in programming by implementing the algorithms, searching and sorting techniques.
CO2: Apply the various data structures like stacks and queues using arrays.
CO3: Apply the knowledge of linked lists and implements stacks, queues, trees and creates applications on stacks and queues.
CO4: Extend the knowledge to implement trees like AVL, Binary search tree.
CO5: Apply the concepts to find shortest path using algorithms and use the concepts to find the minimum cost spanning trees.

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 Evaluations of postfix and prefix expressions.

4. Write C program to implement the 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 programs to 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 sorting algorithms i) Merge Sort
    ii)Quick Sort.

10. Write a C program 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
    element from a binary search tree. iii) Search for a key element in a
    binary 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 for a
    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.

Syllabi for III-Semester

UNIX & SHELL PROGRAMMING

Course Code: **15CA3110**   **L T P C**
                                                       3 0 0 3

Course Outcomes:
At the end of the course student will be able to
CO1: Utilize Shell commands to develop Shell Script.
CO2: Apply System calls for handling Files & Directories.
CO3: Generate a Signal and control Signal activities.
CO4: Estimate the communication between the Processes for sharing Messages.
CO5: Distinguish Semaphores and Shared memory to support Inter Process Communication (IPC).

UNIT-I   (10 Lectures)
Unix Utilities-Introduction to Unix file system, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, cp, mv, ln, rm, unlink, mkdir, rmdir, du, df, mount, umount, find, unmask, ulimit, ps, who, finger, arp, ftp, telnet, rlogin, text processing utilities and backup utilities, detailed commands to be covered are cat, tail, head, sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, tar, cpio.

Problem solving approaches in Unix: Using single commands, using compound Commands, shell scripts, C programs, building own command library of programs. **Working with the Bourne shell:** what is a shell, shell responsibilities, pipes and input Redirection, output redirection, the shell as a programming language, shell meta characters, shell variables, shell commands, the environment, control structures, shell script examples.

UNIT-II   (10 Lectures)
Unix Files: Unix file structure, directories, files and devices, System calls, library functions, low level file access, usage of open, creat, read, write, close, lseek, stat, fstat, octl, umask, dup, dup2. The standard I/O

(fopen, fclose, fflush, fseek, fgetc, getc, getchar, fputc, putc, putchar, fgets, gets), formatted I/O, stream errors, streams and file descriptors, file and directory maintenance (chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir, getcwd), Directory handling system calls (opendir, readdir, closedir,rewinddir, seekdir, telldir).

UNIT-III   (10 Lectures)
Unix Process and Signals: What is process, process structure, starting new process, waiting for a process, zombie process, process control, process identifiers, **system call interface for process management**-fork, vfork, exit, wait, waitpid, exec, system, **Signals-** Signal functions, unreliable signals, interrupted system calls, kill and raise functions, alarm, pause functions, abort, sleep functions.

UNIT-IV   (10 Lectures)
Interprocess Communication Overview: Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, file and record locking, other unix locking techniques, pipes, FIFOs, streams and messages, namespaces, introduction to three types of IPC(system-V)-message queues, semaphores and shared memory.
Message Queues-Unix system-V messages, unix kernel support for messages, unix APIs for messages, client/server example.

UNIT-V   (10 Lectures)
Semaphores-Unix system-V semaphores, unix kernel support for semaphores, unix APIs for semaphores, file locking with semaphores.
Shared Memory-Unix system-V shared memory, unix kernel support for shared memory, unix APIs for shared memory, semaphore and shared memory example.

TEXT BOOKS:
1. W.R.Stevens, "*Unix Network Programming*", Pearson/PHI, 4th Edition-1990.

2. Sumitabha Das, *"Unix Concepts and Applications"*, 3rd Edition, TMH-2001.
3. M.J.Rochkind, *"Advanced Unix Programming"*, 2nd Edition, Pearson Education-1992.

REFERENCE BOOKS:

1. T.Chan, *"Unix system programming using C++"*, 3rd Edition, PHI-1997.
2. Graham Glass, King Ables, *"Unix for programmers and users*, 3rd Edition", Pearson   Education-2003.
3. Stephen A.Rago, *"Unix System-V Network Programming"*, 4th Edition,Pearson Education-2005.
4. Kernighan and Pike, *"Unix programming environment"*, 3rd Edition, PHI/Pearson Education 1984.

WEB REFERENCES:

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2. http://www.ee.surrey.ac.uk/Teaching/Unix/
3. http://www.tutorialspoint.com/unix/
4. http://heather.cs.ucdavis.edu/~matloff/UnixAndC/Unix/CShellII.pdf
5. http://www.dreamsyssoft.com/unix-shell-scripting/

DESIGN AND ANALYSIS OF ALGORITHMS

Course Code: 15CA3111   **L T P C**
                                                             3 1 0 4

Course Outcomes:

At the end of the course student will be able to

CO1: To identify the efficiency of Algorithms and to demonstrate algorithm for Divide and conquer.

CO2: Identify and create a generalized approach for Greedy techniques and Dynamic programming.

CO3: Design an Algorithmic approach for searching and traversing techniques.

CO4: Planning an Algorithm for Backtracking Method.

CO5: Design an algorithmic approach for Branch and Bound Technique.

UNIT-I   (10 Lectures)

Introduction: Algorithm, Psuedo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis.

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

UNIT-II   (10 Lectures)

Greedy method: General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees,0/1 knapsack problem, All pairs shortest path problem, Traveling sales person problem, Reliability design.

UNIT-III   (10 Lectures)
Searching and Traversal Techniques: Efficient non recursive binary traversal algorithms, Graph traversal- Breadth first search and Depth first search, AND/OR graphs, game tree, Bi-connected components.

UNIT-IV   (10 Lectures)
Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT-V   (10 Lectures)
Branch and Bound: General method, applications - Traveling sales person problem,0/1 knapsack problem-LC Branch and Bound solution, FIFO Branch and Bound solution.

Text Books:
1. Ellis Horowitz, Satraj Sahni and S.Rajasekharam, "*Fundamentals of Computer Algorithms*", 2nd Edition, Univesity Press, 2008.
2. T.H.Cormen,C.E.Leiserson, R.L.Rivest,and C.Stein, *Introduction to Algorithms*, 3rd Edition, PHI / Pearson Education, 2009.

Reference Books:
1. M.T.Goodrich and R.Tomassia, *Algorithm Design Foundations, Analysis and Internet examples*, 1st Edition, John wiley and sons, 2006.
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++*, Second 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/

DATA BASE MANAGEMENT SYSTEMS

Course Code: 15CA3112   **L T P C**
                                                                 3 1 0 4

Course Outcomes:

At the end of the course student will be able to

CO1: Explain the basic structure of Database System, compare Database approach with File Oriented approach and design E-R diagrams.

CO2: Analyze Integrity constraints of RDBMS and apply operations of procedural query languages and non-procedural query languages.

CO3: Identify problems with redundancy and discuss different types of Normal Forms.

CO4: Discuss the properties of Transaction and analyze various Concurrency Control Protocols and Illustrate various Database Recovery approaches and examine Database Indexing techniques.

CO5: Outline concepts of storing data on Disks and Files and Indexing (Tree based and Hash based).

UNIT – I   (10 Lectures)

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 – History of Data base Systems. 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.

Relational Model: Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical database Design – Introduction to Views – Destroying /altering Tables and Views.

UNIT – II   (10 Lectures)
Relational Algebra and Calculus: 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.

Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivities – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT – III   (10 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 Database Design – Multi valued Dependencies – forth Normal Form.

UNIT – IV   (10 Lectures)
Overview of Transaction Management: ACID Properties – Transactions and Schedules – Concurrent Execution of transaction – Lock Based Concurrency Control – Performance Locking – Transaction Support in SQL – Introduction to Crash recovery.

Concurrency Control: Serializability, and recoverability – Introduction to Lock Management – Lock Conversions – Dealing with Dead Locks – Specialized Locking Techniques – Concurrency without Locking.

Crash recovery: Introduction to ARIES – the Log – Other Recovery related Structures – the Write-Ahead Log Protocol – Check pointing –

recovering from a System Crash – Media recovery – Other approaches and Interaction with Concurrency control.

UNIT – V   (10 Lectures)
Overview of Storage and Indexing: Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning.

Storing data: Disks and Files: - The Memory Hierarchy – Redundant Arrays of Independent Disks – Disk Space Management – Buffer Manager – Files of records – Page Formats – record formats.

Tree Structured Indexing: Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure.
Hash Based Indexing: Static Hashing – Extendable hashing – Linear Hashing – Extendable vs. Linear hashing.

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*", 7th Edition, Pearson Education, 2000.
2. Elmasri Navrate, "*Fundamentals of Database Systems*", 5th Edition, Pearson Education, 2007.

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www.cs.wisc.edu/~dbbook/

http://www.cse.iitb.ac.in/~sudarsha/db-book/slide-dir/

http://www.db-book.com/

http://pawangkp.wordpress.com/2009/09/09/dbms-slides/

ORGANIZATIONAL STRUCTURE AND HUMAN RESOURCE MANAGEMENT

Course Code: 15HM3102   **L T P C**
                                                       3 0 0 3

Course Educational Objective

To provide an understanding of the basic principles of organization and management so as to acquaint the students of MCA with the required managerial skills, in terms of Organizational Communication, Transactional Analysis and Group Dynamics. Also, provide students the required inputs with reference to Human Resource Management as an important function of the Management Process.

Course Outcomes

CO-1: To define and explain the basic concepts and evolution of management.

CO-2: To explain the essential concepts of organization and the various types of organizational structures and also analyze the essentials of Organizational Communication.

CO-3: Helps to understand the concept of Motivation and adopt different theories for studying the human behavior in an organization and identify different leadership styles and application of styles for achievement of organization objectives.

CO-4: To familiarize the various aspects of HR, to deal effectively with people resourcing and talent management and to be able to handle HR functions in an organization in an effective manner.

CO-5: To understand the concepts of HRD, its role and competencies, challenges in HRD.

UNIT-I: Introduction to Management   (10 Lectures)

Definition meaning, nature, of Management, Functions of Management and Principles of Management; Evolution of management thought.

UNIT-II: Organizational Structures and Communication

(14 Lectures)

Basic concepts related to Organization – Departmentation, Delegation and Decentralization. Types of Organizational Structures – Flat, Hierarchal, Hybrid and Matrix; Authority, Responsibility and Accountability.
Organizational Communication: Definition, importance; Interpersonal and Intrapersonal Communication, Internal and External Communication, Downward and Upward Communication, Johari Window and Transactional Analysis.

UNIT-III: Motivation and Leadership   (10 Lectures)

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-IV: Introduction to Human Resource Management
        (10 Lectures)

Meaning, objectives, principles and policies of HRM. Duties & responsibilities of HR manager. Manpower planning; Job Evaluation, Recruitment and Selection.

UNIT-V: Human Resource Development   (10 Lectures)

Introduction to Human Resource Development: Concept; Relationship between human resource management and human resource development; HRD mechanisms, processes and outcomes; HRD matrix; HRD interventions; Roles and competencies of HRD professionals; Challenges in HRD.

TEXT BOOKS:

1. Harold Koontz and Heinz Weihrich, "Essentials of Management", 8th Edition, Tata McGrawHill, 2010.
2. Peter F Drucker, "The Practice of Management", 1st Reprint, Elsevier, 2007.
3. Richard L. Daft, "Organisation Theory and Design", 11th Edition, Cengage Learning, 2013.

REFERENCES:

1. Rustum S Davar, *Personnel Management & Industrial Relations*, 10th Edition, Vikas Publishers - 2009
2. Venkataratnam K, *Human Resource Management*, 1st Edition, Seven Hills Book Publication – 2011
3. C B Mamoria & C B Mamoria, *Personnel Management*, 20th Edition, Himalaya Publishers – 2012
4. K. Aswathappa, *Human Resource & Personal Management*, 6th Edition, TMH – 2007

COMPUTER NETWORKS

Course Code: 15CA3113   **L T P C**
                                                           3 0 0 3

Course Outcomes:
At the end of the course the student will be able to:
CO1: Explain the various Network Models and classify the different components of Physical Layer.
CO2: Solve error detection and correction techniques of data link layer and describe MAC layer techniques.
CO3: Analyze various routing algorithms used in Network Layer and differentiate various Congestion Control techniques.
CO4: Associate the TCP and UDP protocols used in the Transport Layer to various network systems.
CO5: Assess network security algorithms and demonstrate WWW and multimedia.

UNIT-I   (10 Lectures)
Introduction: Uses of computer Networks, Network H/w, Network S/W, Reference Models, Example Networks, Network Standardization.
Physical Layer: Guided transmission media – Magnetic media, Twisted Pair, coaxial cable, fiber optics.

UNIT-II   (10 Lectures)
Data Link Layer: Design Issues, Error detection and correction, Elementary Data Link Protocols, Sliding Window Protocols, Protocol Verification, Example Data Link protocols.
The Medium Access Sub Layer: The channel allocation problem, Multiple access Protocols, Ethernet, Wireless LANs, Broadband Wireless, Bluetooth, and Data Link Layer Switching.

UNIT-III   (10 Lectures)
The Network Layer: Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms, Quality of Service, Internet Working, Network Layer in Internet.

UNIT-IV   (10 Lectures)
The Transport Layer: The Transport Service, Elements of transport protocol, a simple Transport   Protocol, Internet Transport Protocols UDP, Internet Transport Protocols TCP, Performance   Issues.

UNIT-V   (10 Lectures)
The Application Layer: DNS-(Domain Name System), Electronic Mail, World Wide Web Multimedia.
Network Security: Cryptography, Symmetric _key Algorithms, Public–Key Algorithms, Digital Signatures, and Management of public keys.

TEXT BOOKS:
1. Andrew S Tanenbaum, *Computer Networks*, 4th Edition. Pearson Education/PHI, 2003

REFERENCE BOOKS:
1. Michael A. Gallo, William M .Hancock, *Computer Communications and Networking Technologies,* Thomson Publication, 2002.
2. Behrouz A. Forouzan, *Data Communications and Networking,* Third Edition TMH, 2005.

Web References:
http://nptel.iitm.ac.in/video.php?subjectId=106105081

UNIX AND OPERATING SYSTEMS LAB

Course Code: 15CA3114   **L T P C**
                                                   0 0 4 2

Course Outcomes:

At the end of the course student will be able to

CO1: Create simple Shell Scripts based on Shell commands.
CO2: Identify the File that is executable, readable & writable using Shell Script.
CO3: Develop programs that display directory path, date and terminal name.
CO4: Create C Programs for developing FCFS and FIFO algorithms.
CO5: Execute Priority and Resource Request algorithms at Shell prompt.

EXPERIMENTS:

1. Write a shell script to accept two numbers and perform all arithmetic operations on it.
2. Write a shell script to find largest of three numbers using conditional execution operators
3. Write a shell script to accept the name of the file from standard input and perform the following tests on it
   a) File executable
   b) File readable
   c) File writable
   d) Both readable & writable
4. Write a shell script which will display the username and terminal name who is login recently in to the Unix system.
5. Write a shell script to find number of files in a directory
6. Write a shell script to print the following format
      1
      1 2
      1 2 3
      1 2 3 4
      ……….

7. Write a shell script which will display the number of days in the given month and year
8. Write a shell script to check whether a given number is perfect number or not
9. Write a shell script for concatenation of two strings using arguments
10. Write a shell script to demonstrate break and continue statements
11. Write a shell script to satisfy the following menu options
    a. Display current directory path
    b. Display today's
    c. Display users who are connected to the Unix system
    d. Quit
12. Write a shell script to delete all files whose size is zero bytes from current directory
13. Write a shell script to display reverse numbers from given argument list
14. Write a shell script to display factorial value from given argument list
15. Write a shell script which will greet you "Good Morning", "Good Afternoon", "Good   Evening" and "Good Night" according to current time
16. To implement the FCFS Algorithm
17. To implement the Shortest Job First Algorithm
18. To implement Priority Algorithm
19. To implement the round robin Algorithm
20. To implement the FIFO page replacement Algorithm
21. To implement LRU page replacement Algorithm
22. To implement Resource Request Algorithm
23. To implement First-Fit, Best-Fit and Worst-Fit Algorithm
24. To implement Sequential File Organization
25. To implement Random File Organization

DATABASE MANAGEMENT SYSTEMS LAB

Course Code: 15CA3115   **L T P C**
                                                           0 0 4 2

Course Outcomes:
At the end of the course student will be able to
CO1: Analyze the basics of SQL and apply basic SQL commands to create Relational Database.
CO2: Manipulate Relational Database fields using SQL.
CO3: Operate more SQL queries on created Relational Database.
CO4: Extend the basics of PL/SQL to generate PL/SQL programs.
CO5: Create Triggers and Cursors using SQL.

1. Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.

1. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.

2. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

3. Queries using Conversion functions(tochar, tonumber and todate), string functions (concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions.

5. Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section

6. Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.

7. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT–IN Exceptions, USER defined Exceptions, RAISE APPLICATION ERROR.

8.   Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.

9.   Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.

10. Program development using creation of package specification, package bodies, private objects, package variables and cursors and calling stored packages.

11. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.

12. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers.

Syllabi for IV-Semester

SOFTWARE ENGINEERING

Course Code: 15CA3116   **L T P C**
                                                                    3 1 0 4

Course Outcomes:
At the end of the course student will be able to
CO1: Extrapolate sound Software Engineering Practices and prescriptive process Models for Process Assessment and Improvement.
CO2: Analyze the functional and non-functional requirements and able to do feasibility analysis.
CO3: Design different system models.
CO4: Outline concepts of UML and structural modeling.
CO5: Apply Behavioral modeling and Architectural modeling.

UNIT-I   (10 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. **PROCESS MODELS**: Prescriptive Process Models- The Waterfall Model, Incremental Process Models, Evolutionary Process Models, Concurrent Models. SpecializedProcess Models. The Unified Process, Personal and Team Process Models.

UNIT-II   (10 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.

UNIT-III   (10 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.

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.

UNIT-IV   (10 Lectures)
INTRODUCTION TO UML: Importance of modeling, Principles of modeling, Object oriented modeling, Conceptual model of UML

STRUCTURAL MODELING: Classes, relationships, advanced classes, advanced relationships, Interfaces, Types and roles, Packages, Class and object diagrams

UNIT-V   (10 Lectures)
BEHAVIORAL MODELING: Interactions, Interaction diagrams, Use cases, Use case diagrams, Activity diagrams, events and signals, Process and threads, state Machine state chart diagram.

ARCHITECTURAL MODELING: Component diagrams, Deployment diagrams

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.

3. Grady Booch, James Rumbaugh, Ivar Jacobson, *The unified modeling language user guide*, 1st Edition, Pearson Education, 2006.

<u>REFERENCES:</u>

1. K.K.Agarwal & Yogesh Singh, "*Software Engineering*", 3/e, New Age International Publishers, 2008.
2. Shely Cashman Rosenblatt, "*System Analysis and Design*", 2/e, Thomson Publications, 2011.
3. Pankaj Jalote, "*An Integrated Approach to Software Engineering*", 3/e, Narosa Publishing House, 2011.
4. Meilir Page-Jones, "*Fundamentals of object oriented Design in UML*", 1st Edition, Pearson Eduction, 2006.
5. Atul Kahate, "*Object Oriented Analysis and Design*", 1st Edition, McGraw Hill Companies, 2007.

MANAGEMENT INFORMATION SYSTEMS

Course Code: 15HM3117   **L T P C**
                                                                  3 0 0 3

Course Objective
To provide an understanding of the basic principles of Management Information System (MIS) and the utility of MIS in the various functional areas of business, for effective decision making.

Course Outcomes
CO1: To describe the evolution, concept, and scope of MIS and to outline the various approaches to information systems and to analyze and interpret the growth and importance of International Information Systems.

CO2: To identify and describe the various systems in organizations from a functional perspective and to discuss and analyze the Enterprise Systems

CO3: To analyze and appraise the application of operational information systems, tactical information systems and strategic information systems to business.

CO4: To analyze the process of systems analysis and development and outline the process of structured systems analysis and design and interpret the process of alternative application development.

CO5: To identify the pitfalls of using computers and information systems in business and identify the socio-ethical challenges and opportunities.

UNIT-I: Introduction to Information Systems and International Information Systems   (12 Lectures)
Meaning, Scope of Information Systems, Concepts of system and organization, strategic uses, Evolution of MIS. Contemporary approaches to Information Systems – Technical Approach, Behavioral Approach, Socio-Technical Approach. Introduction, growth and management of global information Systems

UNIT-II: Information System in the Enterprise   (12 Lectures)
Major types of Systems in the organization from a functional perspective; Enterprise application – Enterprise systems, Systems for supply chain management, Customer relationship management and Knowledge management. Business Process Management, Business Process Reengineering and Information Technology, Social Media /Digital Revolutions.

UNIT-III: Application of Information Systems to Functional Business Areas   (10 Lectures)
Significance of Information systems; Application of Operational Information System to Business; Application of Tactical and Strategic Information Systems to Business

UNIT-IV: Systems Analysis and Design   (10 Lectures)
System development process; Systems analysis; Structured systems analysis and design; Alternative application development and evaluation.

UNIT-V: Ethical and Security Issues of MIS   (10 Lectures)
Management Information systems: Pitfalls, Ethical, Societal Challenges and new opportunities. Computer crime, privacy issues, Ethical Hacking, Security Management of Information Technology; IT Act 2000

TEXT BOOKS:
1. Kenneth C Laudon & Jane P Laudon, "*Management Information Systems*", 8th Edition, PHI – 2003.
2. Robert Schultheis & Mary Sumner, "*Management Information Systems – The Managers View*", 20th reprint, TMH – 2010.
3. James A. O' Brein, "*Management Information Systems*", 6th reprint, TMH – 2003

REFERENCES:

1. V.M.Prasad, "*Management Information Systems*", 9th Edition, Pearson Education – 2005.
2. Robert G Murdick, Joel E Ross & James R Claggett, "*Information Systems for Modern Management*", 3rd Edition, PHI - 2007

DATA WAREHOUSING AND DATA MINING

Course Code: 15CA3118   **L T P C**
                                                                  3 1 0 4

Course Outcomes:
At the end of the course student will be able to
CO1: Interpret the problem in real time applications, and apply the appropriate data mining technique for effective results.
CO2: Analyze the different conceptions of data mining and compute OLAP operations.
CO3: Infer associations and correlations in the given Information domain.
CO4: Apply basic techniques of classification for various applications like banks, health organizations etc.
CO5: Analyze the real time data using various clustering techniques

UNIT-I   (10 Lectures)
Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining, Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining,

UNIT-II   (10 Lectures)
Data Preprocessing: Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discrimination and Concept Hierarchy Generation, Online Data Storage.

Data Mining Primitives, Languages, and System Architectures: Data Mining Primitives, Data Mining Query Languages, Designing Graphical User Interfaces Based on a Data Mining Query Language Architectures of Data Mining Systems,

UNIT-III   (10 Lectures)

Concepts Description: Characterization and Comparison: Data Generalization and Summarization-Based Characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between Different Classes, Mining Descriptive Statistical Measures in Large Databases.

Mining Association Rules in Large Databases: Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

UNIT-IV   (10 Lectures)

Classification and Prediction-1: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation.

Classification and Prediction-2: Support Vector Machines, Association Classification, Other Classification Methods, Prediction, Accuracy and Error Measures, Evaluating the Accuracy of a Classifier or Predictor.

UNIT- V   (10 Lectures)

Cluster Analysis Introduction: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

TEXT BOOKS:

1. Jiawei Han & Micheline Kamber, *Data Mining – Concepts and Techniques*, 3rd Edition, Morgan Kaufmann Publishers, 2008.

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 Edition, 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.
Web references:
www.cs.uiuc.edu/homes/hanj/bk2/toc.pdf

SOFTWARE PROJECT MANAGEMENT
(ELECTIVE-I)

Course Code: 15CA3119   **L T P C**
                                                       3 0 0 3

Course Outcomes:
At the end of the course student will be able to
CO1: Outline the process of project management and its application in delivering successful IT projects.
CO2: Outline life cycle phases for the projects with different Artifacts of the process.
CO3: Identify concepts of a project scope of work, provide accurate cost estimates and to plan the various activities
CO4: Identify and analyze software project activities using contemporary work breakdown techniques.
CO5: Plan evolution of Organizations and Responsibilities, Process Automation and apply metrics for quality and automation of projects and process.

UNIT-I   (10 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 environments. Achieving required quality, peer inspections.
The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT-II   (10 Lectures)
Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

UNIT-III   (10 Lectures)
Model based software architectures: A Management perspective and technical perspective.
Work Flows of the process: Software process workflows, Iteration workflows,

UNIT-IV   (10 Lectures)
Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments.
Iterative Process Planning: work breakdown structures, planning guidelines, cost and schedule estimating process, Iteration planning process, Pragmatic planning.

UNIT-V   (10 Lectures)
Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.
Process Automation: Automation Building blocks, The Project Environment.
Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.
Tailoring the Process: Process discriminants.

TEXT BOOKS:
1.Walker Royce, *Software Project Management*, Pearson Education, 2005.

REFERENCE BOOKS:
1. Bob Hughes and Mike Cotterell, *Software Project Management*, TMH, 2009.
2. Joel Henry, *Software Project Management*, Pearson Education, 2004.

3. Pankaj Jalote, *Software Project Management in practice*, Pearson Education.2005.

Web references:

https://www.comp.glam.ac.uk/staff/dwfarthi/projman.html

MOBILE COMPUTING
(ELECTIVE-I)

Course Code: 15CA3120   **L T P C**
                                                 3 0 0 3

Course Outcomes:
At the end of the course student will be able to
CO1: Explain the system architecture of GSM and describe the basic concepts and principles in mobile computing
CO2: Analyze the motivation for specialized MAC
CO3: Demonstrate the structure and components for Mobile IP and Mobility Management.
CO4: Define the goals and assumptions of mobile IP and also extrapolate the transmission techniques in mobile transport layer
CO5: Identify and differentiate the various routing algorithms used in MANET's and design the Wireless Application Protocol architecture

UNIT – I   (10 Lectures)
Introduction to Network Technologies and Cellular Communications:
HIPERLAN: Protocol architecture, physical layer, Channel access control sub-layer, MAC sub-layer, Information bases and networking.
WLAN: Infrared v/s radio transmission, Infrastructure and ad hoc networks, IEEE 802.11. Bluetooth.: User scenarios, Physical layer, MAC layer, Networking, Security, Link management
GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.
Mobile Computing (MC): Introduction to MC, novel applications, limitations, and architecture

UNIT –II   (10 Lectures)
(Wireless) Medium Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, DMA.

UNIT –III   (10 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).

UNIT – IV   (10 Lectures)
 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 – V   (10 Lectures)
Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs. Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers),

TEXT BOOKS:
1). **Jochen Schiller**, *Mobile Communications*, *Addison-Wesley, 2nd Edition*, 2004.
2) **Stojmenovic and Cacute,** *Handbook of Wireless Networks and Mobile Computing*, *Wiley*, 2002, **ISBN** 0471419028.

REFERENCE BOOKS:
1) Reza Behravanfar, *Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML*, ISBN: 0521817331, Cambridge University Press, October, 2004,

WEB REFERENCES:
http://nptel.iitm.ac.in/syllabus/syllabus.php?subjectId=10610402

IMAGE PROCESSING AND PATTERN RECOGNITION
(ELECTIVE-I)

Course Code: 15CA3121   **L T P C**
                                                            3 0 0 3

Course Outcomes:
At the end of the course student will be able to

CO1: Describe Digital image fundamentals and outline different image enhancement techniques

CO2: Apply segmentation techniques on Digital Images

CO3: Apply Morphological operations on Digital Images

CO4: Analyze Restoration techniques and compression techniques.

CO5: Outline Feature detection approaches

UNIT-I   (10 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   (10 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   (10 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 (10 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. Image textures-statistical texture description, methods based on spatial frequencies, co-occurrence matrices, edge frequency, and texture recognition method applications.

UNIT- V (10 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.
3. Julus T. Tou , Rafel C. Gonzalez, Addision, *Pattern Recognition Principles*, 1st edition, Wesley publishing company, 1974.
4. 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

PERL PROGRAMMING
(ELECTIVE-II)

Course Code: **15CA3122**   **L T P C**
                                                            3 0 0 3

Course Outcomes:

At the end of the course student will be able to

CO1: To identify basic perl constructs and to outline perl debugging commands.

CO2: To create and design simple perl programs with the available perl pre-defined functions.

CO3: To demonstrate perl subroutines and perl references

CO4: To Apply Data Structures on perl programs and perl formats.

CO5: To install HTTP server and to design and execute perl programs through CGI.

UNIT-I   (10 Lectures)

Introduction to perl # ! , Basic I/O, Variables variables & Backslash Interpolation, Scalar/list control operators, operator procedure, if unless, loops, loop control.
Debugging perl scripts Debugging commands, Debugger customization, Unattended execution, Debugging support, the perl profiler.

UNIT-II   (10 Lectures)

Built in Function Perl functions by category, Perl functions in alphabetical order. Regular expressions Pattern Matching, operators, Meta character and meta symbols. Character classes, quantifiers, Pointers, capturing & clustering, Alternation, staying in control.

UNIT-III   (10 Lectures)

Subroutines Syntax, Semantics, parsing references, prototypes, subroutine attributes. Formats Format variables, footers. References Creating References, using hard references, symbolic references, Braces, Brackets and quotes.

UNIT-IV   (10 Lectures)

Data Structure Arrays of Arrays, Hashes of arrays, Arrays of Hashes, Hashes of Hashes, Hashing as function , Elaborate records, Hashes of functions. CGI Programming CGI Basic, Forms, Methods.

UNIT-V   (10 Lectures)

Here Docs, More CGI Emailing, Cookies, File uploading, E-mail.

TEXT BOOKS

1. Tom Christiansen, Brian D Foy, Larry Wall, Jon Orwant, *Programming Perl*, O'Reily, 3rd Edition, 2010.
2. Scott Guelich, *CGI Programming with Perl*, O'Reily, et al., SPD publication, 2nd Edition, 2008.

SOFTWARE TESTING
(ELECTIVE-II)

Course Code: **15CA3123**   **L T P C**
                                                             3 0 0 3

Course Outcomes:
At the end of the course student will be able to
CO1: Infer that that the process of Testing should be economic, strategic and efficient to withstand the consequences of Bugs.
CO2: Apply sound testing principles like Path Testing and Dataflow Testing
CO3: Demonstrate reduction procedure and differentiate between Nice & ugly domains.
CO4: Draw KV charts & state graphs.
CO5: Test software projects by using Testing tools.

UNIT-I   (10 Lectures)
Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs
Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT-II   (10 Lectures)
Transaction Flow Testing: transaction flows, transaction flow testing techniques. Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.
Domain Testing: domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT-III   (10 Lectures)
Paths, Path products and Regular expressions: path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

Logic Based Testing: overview, decision tables, path expressions, kv charts, specifications.

UNIT-IV   (10 Lectures)
State, State Graphs and Transition testing: state graphs, good & bad state graphs, state testing, Testability tips.

UNIT-V   (10 Lectures)
Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter or Winrunner).

TEXT BOOKS:
1. Baris Beizer, *Software Testing techniques*, second edition, Dreamtech -2003.
2. Dr.K.V.K.K.Prasad, *Software Testing Tools*, 2nd Edition –Dreamtech-2005.

REFERENCE BOOKS:
1. Brian Marick, *The craft of software testing*, 3rd Edition, Pearson Education-2009.
2. *Software Testing Techniques* – SPD(Oreille)
3. Edward Kit, *Software Testing in the Real World*, 2nd Edition, Pearson-1995.
4. Perry, *Effective methods of Software Testing*, 2nd Edition,John Wiley - 2006.
5. Meyers, *Art of Software Testing*, 4th Edition,John Wiley-2004.

WEB REFERENCE:
http://www.qaiquest.org/2012/classes/testing-practices/

INFORMATION STORAGE SYSTEMS
(ELECTIVE-II)

Course Code: 15CA3124   **L T P C**
                                                           3 0 0 3

Course Outcomes:

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

CO1: Summarize storage architecture, storage evolution, virtualization and cloud computing.

CO2: Compute disk performance by varying different application requirements.

CO3: Classify storage solutions based on consistency, reliability and availability to meet the needs of organization i.e. RAID and discover different intelligent storage systems suitable for different storage needs of the organizations.

CO4: Distinguish different storage connectivity technologies and use them in data centre design.

CO5: Select network attached storages or object-based storages which meet needs of data centre.

UNIT I   (10 Lectures)
INTRODUCTION TO INFORMATION STORAGE: Information Storage, Evolution of Storage Architecture, Data Center Infrastructure, Virtualization and Cloud Computing.

UNIT-II   (10 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   (10 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 Symmetrix and VNX.

UNIT-IV   (10 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   (10 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.

SOFTWARE ENGINEERING LAB

Course Code: 15CA3125   **L T P C**
                                                   0 0 4 2

Course Outcomes:

At the end of the course student will be able to

CO1: Draw all the UML diagrams using Rational Rose.

CO2: Apply Reverse Engineering and Forward Engineering

CO3: To design Software Requirement Specification.

CO4: To design plan and schedule setting milestones, resource usage and estimated costs.

CO5: To design plan quality plan with quality assurance procedures.

MINI PROJECT- I:

A mini project is which a student takes from initial specification to implementation to develop a Application.

The project deliverables include:

Documentation including

       Problem statement

       Requirements document

       Requirements Analysis Document.

       System Requirements Specification.

       Software Requirements Specification.

       Design document

       Software Design Description and a System Design Document.

       Test specification.

Manuals/guides for

     Users and associated help frames

     Programmers

     Administrators (installation instructions)

A project plan and schedule setting out milestones, resource usage and estimated costs.

A quality plan setting out quality assurance procedures

An implementation.

MINI PROJECT- II:

Student has to take up another case study of his/her own interest and Design and document all the above specifications and diagrams for that application.

TECHNICAL COMMUNICATION & SOFT SKILLS LAB

Course Code: 15HE3102   **L T P C**
                                                             0 0 4 2

Course Outcomes

The Students will be able to …

CO1: Use language fluently, accurately and appropriately in debates and group discussions

CO2: Use their skills of listening comprehension to communicate effectively in cross-cultural contexts.

CO3: Distinguish and use new vocabulary.

CO4: Write resumes, project reports and reviews.

CO5: Apply interview skills and soft skills.

1. **Group Discussion** – dynamics of group discussion, Lateral thinking, Brainstorming (CO 1)

2. **Listening comprehension** – Achieving ability to comprehend material delivered at relatively fast speed; comprehending spoken material in Standard Indian English, British English, and American English (CO2)

3. **Cross-Cultural Communication** / Non-Verbal Communication, Problems of Language, Lack of Language equivalency/difficulties in using English. (CO2)

4. **Vocabulary building**, Creativity in using Advertisements, Case Studies etc. (CO3)

5. **Personality Development:** Decision-Making, Problem Solving, Goal Setting, Time Management & Positive Thinking(CO5)

6. **Resume writing** – structure and presentation, planning, defining the career objective(CO4)

7. **Writing Skills – Letter writing,** Essays for competitive examinations, Analyzing newspaper articles(CO4)

8. **Technical Report Writing/ Project Proposals** – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.- Progress and Project Reports. (CO4)

9. **Meetings- making meeting effective, chairing a meeting, decision-making, seeking opinions,   interrupting and handling interruptions, clarifications, closure, Negotiation skills.** (CO2 &5)

10. **Interview Skills** – concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing (CO5)

Recommended Books:.

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:
4. A Reader cum Lab Manual, Anuradha Publications, Chennai, 2006
5. Dr. ShaliniVerma, Body Language- Your Success Mantra S. Chand, 2006.
6. Andrea J. Rutherford, Basic Communication Skills for Technology, 2nd Edition, PearsonEducation, 2007.
7. Sunita Mishra & C. Muralikrishna, Communication Skills for Engineers, Pearson Education,2007.
8. Jolene Gear & Robert Gear, Cambridge Preparation for the TOEFL Test by, 2010.
9. Meenakshi Raman & Sangeeta Sharma, Technical Communication Oxford University Press, 2011.
10. Nick Ceremilla & Elizabeth Lee-Cambridge English for the Media CUP, 2010.
11. R.C. Sharma, Krishna Mohan, Business correspondence and Report writing, 4th edition, Tata Mcgraw-Hill Publishing Co.Ltd, 2010.
12. DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice, New AgeInternational (P) Ltd., Publishers, New Delhi, 2010.

13.   Books on TOEFL/GRE/GMAT/CAT by Barron's/ CUP, Latest Edition. 13. IELTS series with CDs by Cambridge University Press, 2010.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

Advanced English Communication Skills Lab:
1.   The practical examinations for the English Language Laboratory practice shall be conducted as per the norms prescribed for the core engineering practical sessions.
2. Evaluation is for 100 marks, out of which 50 marks are for external examination and 50 marks for internal evaluation. The 50 internal marks are distributed as 25 marks for day-to-day work and 25 marks for two internal examinations. The internal end examination shall be conducted by the teacher concerned and another faculty member of the same department.

Syllabi for V-Semester

MULTIMEDIA APPLICATION DEVELOPMENT

Course Code: 15CA3126   **L T P C**
3 1 0 4

Course Outcomes:
At the end of the course student will be able to

CO1: To identify the basic multimedia content types and outline the formats for the multimedia types

CO2: To prepare and compile Flash Movie programs that uses the multimedia content types using Action Script.

CO3: To identify and apply different statement constructs such as data type checking, inheritance and event handling techniques for the Action Script.

CO4: To outline data compression techniques for the Multimedia content types.

CO5: To identify different multimedia networks for effective multimedia data transmission.

UNIT-I   (10 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, Popular File Formats.

COLOR IN IMAGE AND VIDEO: color science, color models in images, color models in video.

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.

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   (10 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.

ACTON SCRIPT 3.0 DATA TYPES AND TYPE CHECKING :
Data types and type annotations, untyped 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   (10 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   (10 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: The anatomy of an array, creating an array, using single dimensional and multi dimensional arrays.

UNIT-V   (10 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, 2004.
2. Colin Moock, *Essential Action Script 3.0*, 1st Edition, SPD O'Reilly, 2007.

REFERENCE BOOKS:
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.

WEB TECHNOLOGIES & WEB SERVICES

Course Code: 15CA3127   **L T P C**
                                                                    3 1 0 4

 Course Outcomes:
At the end of the course student will be able to
CO1: To Create static and dynamic web pages and able to design DTD
        for an XML.
CO2: To plan, prepare and compile Bean programs and servlet
        programs.
CO3: To install a Web Server and to design JSP pages.
CO4: To Apply MVC architecture.
CO5: To establish connections with database and able to access the
        data from database.

UNIT-I   (10 Lectures)
HTML Common tags- List, Tables, images, forms, Frames, Cascading
Style sheets, Introduction to Java Scripts, Objects in Java Script,
Dynamic HTML with Java Script.
XML: Document type definition, XML Schemas, Document Object
model, Presenting XML, Using XML Processors: DOM and SAX

UNIT-II   (10 Lectures)
Java Beans: Introduction to Java Beans, Advantages of Java Beans,
BDK Introspection, Using Bound properties, Bean Info Interface,
Constrained properties Persistence, Customizes, Java Beans API,
Introduction to EJB's.
Web Servers and Servlets: Tomcat web server, Introduction to
Servelets: Lifecycle of a Serverlet, JSDK, The Servelet API, The javax.
servelet Package, Reading Servelet parameters, Reading Initialization
parameters. The javax.servelet HTTP package, Handling Http Request &
Responses, Using Cookies-Session Tracking, Security Issues.

UNIT-III   (10 Lectures)

Introduction to JSP: The Problem with Servelet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat

UNIT-IV   (10 Lectures)

JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data between JSP pages, Requests and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations

UNIT V   (10 Lectures)

Database Access: Database Programming using JDBC, Studying Javax.sql.* package, Accessing a Database from a JSP Page, Application – Specific Database Actions, Deploying JAVA Beans in a JSP Page, Introduction to struts framework.

TEXT BOOKS:

1. Chris Bates , "*Web Programming, building internet applications*", 2nd edition, WILEY Dreamtech, 2006.
2. Patrick Naughton and Herbert Schildt, "*The complete Reference Java*", 2   Fifth Edition. TMH, 2006.
3. Hans Bergsten, "*Java Server Pages*", SPD O'Reilly, 2004

REFERENCE BOOKS:

1. Sebesta, "*Programming world wide web*", Pearson
2. Marty Hall and Larry Brown, *Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES*, Pearson-2011.
3. Dietel and Nieto, *Internet and World Wide Web – How to program*, PHI/Pearson Education.
 4. Bill Siggelkow, *Asia. Jakarta Struts Cookbook*, S P D O'Reilly for

chap 8-2003.

5. Murach, *Murach's beginning JAVA JDK 5*, SPD-2012.

6. Wang-Thomson, *An Introduction to web Design and Programming*, 4th Edition, Pearson–2011.

7. Knuckles, *Web Applications Technologies Concepts*, 5th Edition, John Wiley-2003.

8. Sebesta, *Programming world wide web*, 4th Edition, Pearson-2001.

9. Thomas, *Web Warrior Guide to Web Programmming,* 4th Edition, Bai/Ekedaw-2012

WEB REFERENCES:

1. www.**w3schools**.com/**html**
2. [www.**w3schools**.com/**xml**](http://www.w3schools.com/xml)

INFORMATION SECURITY

Course Code: **15CA3128**   **L T P C**
                                                            3 0 0 3

Course Outcomes:
At the end of the course student will be able to
CO1: Discuss the Security Architecture, Attacks, Services, mechanisms and differentiate Encryption Techniques and describe the access control mechanism used for user authentication and authorization.
CO2: Examine different Public-Key Cryptography Algorithms and Hash Function, Illustrate Key Management and Distribution and Authentication Techniques.
CO3: Determine IP Security and network security designs using available secure solutions such as   PGP, SSL, IPSec.
CO4: Describe Secure Sockets Layer (SSL) as a common solution enabling security of many applications, including all Internet-based commerce, explain the use of such security tools as firewalls and intrusion prevention systems.
CO5: Describe the basic concepts and general techniques in security auditing and intrusion detection.

UNIT-I   (10 Lectures)
Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.
Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC,

UNIT-II   (10 Lectures)
Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service

UNIT-III   (10 Lectures)
Email privacy: Pretty Good Privacy (PGP) and S/MIME.
IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management

UNIT-IV   (10 Lectures)
Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET)
Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3, Intruders, Viruses and related threats

UNIT-V   (10 Lectures)
Firewall Design principles, Trusted Systems, Intrusion Detection Systems

TEXT BOOKS:
1. William Stallings, "*Network Security Essentials: Applications and Standards*", 4th   Edition, Pearson Education, 2011.

REFERENCES:
1. Eric Maiwald, *Fundamentals of Network Security*, 1 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/syllabus/syllabus.php?subjectId=106105031

CLOUD COMPUTING
(ELECTIVE-III)

Course Code: **15CA3129**   **L T P C**
                                                           3 0 0 3

Course Outcomes:
At the end of the course the student will be able to
CO1: Extrapolate the concepts of Virtualization and its implementation in practical.
CO2: Summarize the fundamentals of cloud computing and its importance in real world.
CO3: Relate cloud computing to Corporation.
CO4: Compare cloud computing collaboration with different applications.
CO5: Interpolate Cloud computing applications.

UNIT-I   (10 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.

UNIT-II   (10 Lectures)
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   (10 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   (10 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. 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.

MIDDLEWARE TECHNOLOGIES
(ELECTIVE-III)

Course Code: **15CA3130**   **L T P C**
                                                             3 0 0 3

Course Outcomes:
At the end of the course student will be able to
CO1: Define Object Middleware and can use web services.
CO2: Describe technical issues in Middleware.
CO3: Discover the use of Middleware in building Distributed Technologies.
CO4: Associate security issues with Distributed Applications and identify the problems in existing application design approaches.
CO5: Classify different business processes.

UNIT-I   (10 Lectures)
Introduction to client server computing: Evolution of corporate computing models from centralized to distributed computing, client server models. Benefits of client server computing, pitfalls of client server programming.

UNIT-II   (10 Lectures)
Introducing C# and the .NET Platform; Understanding .NET Assemblies; Object –Oriented Programming with C#; Callback Interfaces, Delegates, and Events.
Building c# applications: Type Reflection, Late Binding, and Attribute-Based Programming; Object Serialization and the .NET Remoting Layer; Data Access with ADO.NET; XML Web Services.

UNIT-III   (10 Lectures)
CORBA with Java: Review of Java concept like RMI, RMI API, JDBC.
Client/Server CORBA-style, The object web: CORBA with Java.
Core CORBA / Java: Two types of Client/ Server invocations-static, dynamic. The static CORBA, first CORBA program, ORBlets with

Applets, Dynamic CORBA-The portable count, the dynamic count multi count.

UNIT-IV   (10 Lectures)
Existential CORBA: CORBA initialization protocol, CORBA activation services, CORBAIDL mapping CORBA java- to- IDL mapping, The introspective CORBA/Java object.
Java Bean Component Model: Events, properties, persistency, Intrespection of beans, CORBA Beans

UNIT-V   (10 Lectures)
EJBs and CORBA: Object transaction monitors CORBA OTM's, EJB and CORBA OTM's, EJB container frame work, Session and Entity Beans, The EJB client/server development Process The EJB container protocol, support for transaction EJB packaging EJB design Guidelines.

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 InternetInfrastructure*, 1st edition, Kluwer Academic Publishers, 2000.

Web Reference:
http://en.wikipedia.org/wiki/Common_Object_Request_Broker_Architecture

E- COMMERCE
(ELECTIVE-III)

Course Code: **15CA3131**   **L T P C**
                                                            3 0 0 3

Course Outcomes:
At the end of the course student will be able to
CO1: Analyze the types of E-Commerce Applications.
CO2: Identify the ways of Payment for E-Commerce Transactions.
CO3: Describe Inter Commerce and Intra Commerce for Organizational transactions.
CO4: Identify Marketing Strategies for On-line Marketing.
CO5: Support E-Commerce with Digital Video to promote Consumer Devices.

UNIT-I   (10 Lectures)
Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

UNIT-II   (10 Lectures)
Consumer Oriented Electronic commerce - Mercantile Process models Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

UNIT-III   (10 Lectures)
Inter Organizational Commerce - EDI, EDI Implementation, Value added networks.
Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

UNIT-IV   (10 Lectures)
Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process,

market research.

Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering.

UNIT-V   (10 Lectures)

Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processings, Desktop video conferencing.

TEXT BOOKS:
1. Kalakata, Whinston, *Frontiers of electronic commerce*, 2nd Edition, Pearson-2004.

REFERENCE BOOKS:
1. Hendry Chan, Raymond Lee,Tharam Dillon, Ellizabeth Chang, John Wiley, *E-Commerce fundamentals and applications*, 2nd Edition,Pearson-2006.
2. S.Jaiswal – Galgotia, *E-Commerce*, 1999.
3. Efrain Turbon, Jae Lee, David King, H.Michael Chang. Gary P.Schneider, *E-Commerce*, 3rd Edition, Thomson-2006.
4. Kenneth C.Taudon, Carol,Guyerico Traver, *E-Commerce–Business*, Technology, 4th Society-2004.

WEB REFERENCES:

1. http//ecommercetechnology.org/
2. http://www.engr.sjsu.edu/gaojerry/course/cmpe296u/296z/introduction.pdf
3. http://www.kau.edu.sa/Files/830/Files/61164_Ecommerce%20and%20E%20Business.pdf
4. http://www.bvp.com/sites/default/files/bessemer_top_10_laws_ecommerce_oct2010.pdf

BIG DATA AND HADOOP
(ELECTIVE- IV)

Course Code: **15CA3132**   **L T P C**
                                                   3 0 0 3

Course Outcomes:
At the end of the course the student will be able to
CO1: Explain Big data and Apache Hadoop Eco system; and Install Hadoop software.
CO2: List out and explain the Design concepts of HDFS(Hadoop Distributed File system); and describe the anatomy of reading a file and writing a file in HDFS and Coherency Model
CO3: Distinguish between analyzing data using Unix tools and using Java MapReduce API in Hadoop framework
CO4: Apply the Concepts of Hadoop, create programs and execute them in Hadoop environment and analyze the results
CO5: Use different tools in Hadoop Framework and Compare between services provided in traditional databases and database services provided in Hadoop.

UNIT-I   (10 Lectures)
Introduction to Big Data. What is Big Data. Why Big Data is Important. Meet Hadoop. 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   (10 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   (10 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   (10 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   (10 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*,

WEB REFERENCES:
http://www.cloudera.com/content/cloudera-content/clouderadocs/HadoopTutorial/CDH4/Hadoop-Tutorial.html

https://www.ibm.com/developerworks/community/blogs/SusanVisserEditionntry/flashbook_understanding_big_data_analytics_for_enterprise_class_hadoop_and_streaming_data?lang=en

INFORMATION STORAGE SECURITYAND MANAGEMENT (ELECTIVE-IV)

Course Code: **15CA3133**

L T P C
3 0 0 3

Course Outcomes:
At the end of the course the student will be able to
CO1: Analyze the effect of information unavailability due to failure of storage system and design business continuity plan.
CO2: Select a local replication technology to provide data backup.
CO3: Distinguish different remote replication technologies, cloud solutions and selecting appropriate one depending on a particular requirement.
CO4: Assess different security issues and mitigate them.
CO5: Select appropriate storage management software to perform storage management activities

UNIT-I (10 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 Deduplication for Backup, Backup in Virtualized Environments, Data Archive, Archiving Solution Architecture, Concepts in Practice: EMC NetWorker, EMC Avamar, and EMC Data Domain.

UNIT-II (10 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   (10 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 Mirror View, 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   (10 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   (10 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.

INFORMATION RETRIEVAL SYSTEMS
(ELECTIVE-IV)

Course Code: **15CA3134**   **L T P C**
                                                        3 0 0 3

Course Outcomes:

At the end of the course student will be able to

CO1: Explain the concepts of indexing, vocabulary, normalization and dictionary in Information Retrieval

CO2: Outline different search structures for dictionaries, spelling corrections and indexes.

CO3: Explain different index compressions, and use scoring and term weighting.

CO4: Apply vector space model for document and query weighting schemes

CO5: Evaluate unranked and ranked retrieval results, assessing relevance and asses system quality and user utility.

UNIT-I   (10 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   (10 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   (10 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   (10 Lectures)
THE VECTOR SPACE MODEL: The vector space model for scoring, Dot products, Queries as vectors, Computing vector scores, Variant tf-idf function, Sublinear tf scaling, Maximum tf normalization, Document and query weighting schemes, Pivoted normalized document length

UNIT-V   (10 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

MULTIMEDIA APPLICATION DEVELMENT LAB

Course Code: **15CA3135**   **L T P C**
                                                       0 0 4 2

Course Outcomes:

At the end of the course student will be able to

CO1: To identify the basic multimedia content types and outline the formats for the multimedia types.

CO2: To prepare and compile Flash Movie programs that uses the multimedia content types using Action Script.

CO3: To identify and apply different statement constructs such as data type checking, inheritance and event handling techniques for the Action Script.

LIST OF EXPERIMENTS:

1. Draw a circle, fill it with color and divide it into four equal halves. (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.

REFERENCE BOOKS:

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, 29-05-2010.

3. Joey, Lott, *Action Script Cookbook*, 1st Edition, SPD-Oreilly, 2003.

WEB TECHNOLOGIES & WEB SERVICES LAB

Course Code: **15CA3136**   **L T P C**
                                                              0 0 4 2

Course Outcomes:

At the end of the course student will be able to

CO1: To Create static and dynamic web pages and able to design DTD for an XML.

CO2: To plan, prepare and compile Bean programs and servlet programs.

CO3: To install a Web Server and to design JSP pages.

CO4: To Apply MVC architecture.

CO5: To establish connections with database and able to access the data from database.

Hardware and Software required :

1. A working computer system with either Windows or Linux
2. A web browser either IE or firefox
3. Tomcat web server and Apache web server
4. XML editor like Altova Xml-spy [www.Altova.com/**XML**Spy – free] etc.
5. A database either Mysql or Oracle
6. JVM(Java virtual machine) must be installed on your system
7. BDK(Bean development kit) must be also be installed

Week-1:

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 contains description of the web site.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Description of the Web Site			

Fig 1.1

2) LOGIN PAGE:

This page looks like below:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Login : [ ] Password: [ ] Submit Reset			

3) CATOLOGUE 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.

Logo	Web Site Name				
Home	Login	Registration	Catalogue	Cart	
CSE ECE		Book : XML Bible Author : Winston Publication : Wiely	$ 40.5		
EEE CIVIL		Book : AI Author : S.Russel Publication : Princeton hall	$ 63		
		Book : Java 2 Author : Watson Publication : BPB publications	$ 35.5		
		Book : HTML in 24 hours Author : Sam Peter Publication : Sam publication	$ 50		

Note: Week 2 contains the remaining pages and their description.

Week-2:
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

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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.

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```
<HTML>
<HEAD>
<style                                      type="text/css">
B.headline   {color:red;   font-size:22px;   font-
family:arial;              text-decoration: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>
```

For example:

```
</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;">LAYER </div>
<div style="position:relative; top:-50; left:5; color:red; font-size:80px; z- index: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:

VISUAL BEANS:

Create a simple visual bean with a area filled with a color.

The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle, if it is false.

The color of the area should be changed dynamically for every mouse click. The color should also be changed if we change the color in the "property window ".

Week-7:
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.

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-8:
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-9:

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. Experiment with various SQL queries.

Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).

Week-10:

 Write a JSP which does the following job:

 Insert the details of the 3 or 4 users who register with the web site (week9) 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-11:

Create tables in the database which contain the details of items (books in our case like Book name, Price, Quantity, Amount) of each category. Modify your catalogue page (week 2)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.

Week-12:

HTTP is a stateless protocol. Session is required to maintain the state.

The user may add some items to cart from the catalog page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time(i.e., from different systems in the LAN using the ip-address instead of localhost). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website.

When the user logs out his session should get invalidated (by using the method session.invalidate()).

Modify your catalogue and cart JSP pages to achieve the above mentioned functionality

LINUX LAB

Course Code: 15CA31S1

L T P C
0 0 2 1

Course Outcomes:

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

CO 1: Creation and maintenance of file folders

CO 2: Working with VI Editor.

CO 3: Changing file permissions

CO4: Acquiring the knowledge of archival, searching and compression

CO 5: Work with different Basic Networking Techniques

List of Experiments
1. File Management
2. Text Editor
3. File Content
4. File Permissions
5. Archival and Compression
6. Obtaining System Information
7. Pipes and Redirection
8. Searching
9. Basic Networking

COMPUTER ORGANIZATION AND ARCHITECTURE LAB

Course Code: 15CA31S2   **L T P C**
                                            0 0 2 1

Course Outcomes:
At the end of the course, a student will be able to

CO 1 Discuss basic structure and organization of computers.
CO 2 Explain register transfer and micro operations.

CO 3 Apply fixed and floating point arithmetic algorithms.
CO 4 Discuss memory and input/output organizations.

CO 5 Explain pipeline and vector processing.

LIST OF EXPERIMENTS
1. Ripple Carry Adder
2. Carry-look-ahead adder
3. Registers and Counters
4. Wallace Tree Adder
5. Combinational Multipliers
6. Booth's Multiplier
7. Arithmetic Logic Unit
8. Memory Design
9. Associative cache Design
10.   Direct Mapped cache Design
11.   CPU Design

DATA MINING LAB

Course Code: 15CA31S3   **L T P C**
                                                 0 0 2 1

Course Outcomes:
At the end of the course the student will be able to
   1. Understand the application of data mining techniques in real time applications
   2. Understand the Comparing and contrast different conceptions of data mining
   3. Understand the finding associations in commercial market basket data
   4. Understand the identifying and characterizing the noise, redundancy and outliers in presented data
   5. Understand about the clusters

List of experiments
   1. Apriori (An association rule mining algorithm)
   2. Sampling (An association rule mining algorithm)
   3. Partition (An association rule mining algorithm)
   4. Comparison of Association Rule Mining Algorithms
   5. k-Means (A partitioning clustering algorithm)
   6. Agglomerative Clustering (A hierarchical clustering algorithm)
   7. DBSCAN (A density-based clustering algorithm)
   8. KNN (A nearest neighbor based classification algorithm)
   9. Decision Tree (Classification algorithm)
   10.   Comparison of Classification algorithms

COMPUTER GRAPHICS

Course Code: 15CA31S4   **L T P C**

0 0 2 1

Course Outcomes:
At the end of the course student will be able to
CO1: Acquire the knowledge about working principles of different Output devices.
CO2: Different types of 2D and 3D graphics along with transformation techniques.
CO3: Get the idea about projections of different views of objects along with elimination of invisible components (points, lines and surfaces).
CO4: Motion oriented graphics will give the idea about implementing different animation sequences.
CO5: Get knowledge on visible surface detection methods .

List of experiments
1. Points and Co-ordinate Systems
2. Transformations: Translation
3. Transformations: Rotation
4. Transformations: Scaling
5. Hierarchical Transformations: 2D Demo
6. Hierarchical Transformations: 3D Articulated Arm
7. Projections and Cameras
8. Clipping: Line
9. Clipping: Polygon
10.   Rasterization: Line
11.   Rasterization: Polygon

DIGITAL IMAGE PROCESSING

Course Code: 15CA31S5   **L T P C**
                                                   0 0 2 1

Course Outcomes:
At the end of the course the student will be able to
CO1 Comprehend fundamentals of Image Processing.
CO2 Describe various transforms used in image processing.
CO3 Describe various techniques of image enhancement in the spatial
    and frequency domain.
CO4 Comprehend the color image processing and restoration techniques.
 CO5 Analyze the various compression and segmentation techniques

List of experiments
1. Distance and Connectivity
2. Image Arithmetic
3. Affine Transformation
4. Point Operations
5. Neighborhood Operations
6. Image Histogram
7. Fourier Transform
8. Color Image Processing
9. Morphological Operations
10. Image Segmentation
11. Image Processing Test Bench

NETWORK SECURITY AND CRYPTOGRAPHY LAB

Course Code: 15CA31S6   **L T P C**
                                                         0 0 2 1

Course Outcomes:

At the end of the course the student will be able to
1. Understand various attacks, services, mechanisms and various conventional and modern encryption techniques.
2. Analyze conventional encryption system and various algorithms in it.
3. Understand number theory and various algorithms and theorems involved in it.
4. Understand Hash and Mac algorithms and authentication applications.
5. Analyze IP Security Overview and Intruders, Viruses and Worms.

List of Experiments
1. Breaking the Shift Cipher
2. Breaking the Mono-alphabetic Substitution Cipher
3. One-Time Pad and Perfect Secrecy
4. Message Authentication Codes
5. Cryptographic Hash Functions and Applications
6. Symmetric Key Encryption Standards (DES)
7. Symmetric Key Encryption Standards (AES)
8. Diffie-Hellman Key Establishment
9. Public-Key Cryptosystems (PKCSv1.5)
10. Digital Signatures