CIVIL ENGINEERING

I SEMESTER :

COURSE CODE	THEORY/LAB	L	T	P	C
ABM1101	Mathematics-I	4	1	0	4
ACT1102	Computer Programming through C	4	1	0	4
ACE1101	Surveying	4	1	0	4
ACE1102	Introduction to Civil Engineering	4	1	0	4
ABE1101	Environmental Studies	4	0	0	4
ACE1103	*Surveying Lab*	*0*	*0*	*3*	*2*
ACT1103	*Computer Programming Lab*	*0*	*0*	*3*	*2*
AME1102	*Engineering Drawing*	*0*	*0*	*3*	*2*
	Total	**20**	**4**	**9**	**26**

II SEMESTER :

COURSE CODE	THEORY/LAB	L	T	P	C
AHE1101	English	4	0	0	4
ABM1102	Mathematics-II	4	1	0	4
AME1103	Engineering Mechanics	4	1	0	4
ABP1101	Physics	4	1	0	4
ABC1101	Chemistry	4	1	0	4
AHE1102	*English Language Lab*	0	0	3	2
AMT1101	*Engineering Workshop*	0	0	3	2
ABP1102	*Physics and Chemistry Lab*	0	0	3	2
	Total	**20**	**4**	**9**	**26**

III SEMESTER :

COURSE CODE	THEORY/LAB	L	T	P	C
ABM1103	Probability, Statistics and Numerical Methods	4	1	0	4
ACE1104	Strength of Materials – I	4	1	0	4
ACE1105	Mechanics of Fluid s	4	1	0	4
ACE1106	Building Materials & Construction	4	1	0	4
ACE1107	Engineering Geology	4	0	0	4
ACE1108	Elements of EE and ME	4	0	0	4
ACE1109	*Structural Engineering Lab*	*0*	*0*	*3*	*2*
ACE1110	*Engineering Geology Lab*	*0*	*0*	*3*	*2*
	Total	**24**	**4**	**6**	**28**

IV SEMESTER :

COURSE CODE	THEORY/LAB	L	T	P	C
ACE1111	Strength of Materials – II	4	1	0	4
ACE1112	Hydraulics and Hydraulic Machinery	4	1	0	4
ACE1113	Concrete Technology	4	0	0	4
ACE1114	Building Planning Services & Drawing	3	0	2	4
AHM1101	Managerial Economics and Financial Analysis	4	0	0	4
ACE1115	Structural Analysis-I	4	0	0	4
ACE1116	*Fluid Mechanics Lab*	*0*	*0*	*3*	*2*
ACE1117	*Concrete Technology Lab*	*0*	*0*	*3*	*2*
	Total	**23**	**2**	**8**	**28**

V SEMESTER :

COURSE CODE	THEORY/LAB	L	T	P	C
ACE1118	Water Resources Engineering-I	4	1	0	4
ACE1119	Reinforced Concrete Structures-I	4	1	0	4
ACE1120	Geotechnical Engineering-I	4	1	0	4
ACE1121	Structural Analysis-II	4	1	0	4
ACE1122	Transportation Engineering-I	4	0	0	4
ACE1123	Estimation & Quantity Surveying	4	0	0	4
ACE1124	Transportation Engineering Lab	0	0	3	2
ACE1125	Geotechnical Engineering Lab	0	0	3	2
	Total	**24**	**4**	**6**	**28**

VI SEMESTER :

COURSE CODE	THEORY/LAB	L	T	P	C
ACE1126	Water Resource Engineering-II	4	1	0	4
ACE1127	Design of Steel Structures	4	1	0	4
ACE1128	Environmental Engineering-I	4	1	0	4
ACE1129	Remote Sensing & GIS	4	0	0	4
ACE1130	Transportation Engineering – II	4	0	0	4
ACE1131	Geotechnical Engineering-II	4	1	0	4
ACE1132	Geomatics Lab	0	0	3	2
AHE1103	Advanced Communication Skills Lab	0	0	3	2
	Total	**24**	**4**	**6**	**28**

VII SEMESTER :

COURSE CODE	THEORY/LAB	L	T	P	C
ACE1133	Environmental Engineering-II	4	0	0	4
ACE1134	Prestressed Concrete	4	1	0	4
ACE1135	Construction Management	4	0	0	4
ACE1136	Reinforced Concrete Structures-II	4	1	0	4
	Elective- I				
ACE1137	Earthquake Resistant Design	4	0	0	4
ACE1138	Industrial Waste and	4	0	0	4
	Waste Water Management				
ACE1139	Traffic Engineering	4	0	0	4
AEE1124	Renewable Energy Sources	4	0	0	4
AEC1132	Satellite Communication	4	1	0	4
	Elective- II				
ACE1140	Air Pollution and Control	4	0	0	4
ACE1141	Ground Improvement Techniques	4	0	0	4
ACE1142	Advanced Structural Design	4	0	0	4
ACS1114	Software Development Engineering	4	1	0	4
AIT 1114	Data Structures For				

	Engineering Applications	4	1	0	4
ACE1143	Computer Applications in Civil Engg.	0	0	3	2
ACE1144	Environmental Engg. Lab	0	0	3	2
ACE11MP	Industry Oriented Mini-Project*	-		-	2
	Total	**24**	**2+**	**6**	**30**

VIII SEMESTER :

COURSE CODE	THEORY/LAB	L	T	P	C
ACE1145	Bridge Engineering	4	0	0	4
	Elective-III				
ACE1146	Finite Element Methods	4	0	0	4
ACE1147	Transportation Planning and Design	4	0	0	4
ACE1148	Soil Dynamics & Machine Foundations	4	0	0	4
AEE1140	Electrical Safety Management	4	1	0	4
AEE1141	Engineering Ethics	4	1	0	4
AME1150	Fluid Power Systems	4	0	0	4
ACH1148	Optimization Techniques	4	0	0	4
	Elective-IV				
ACE1149	Advanced Structural Analysis	4	0	0	4
ACE1150	Environmental Impact Assessment & Management	4	0	0	4
ACE1151	Advanced Foundation Engineering	4	0	0	4
ACE1153	Green Buildings and Infrastructure	4	0	0	4
ACE1154	Introduction to Aircraft Structures	4	0	0	4
AEE1142	Design Concepts for Engineers	4	1	0	4
ACE11SM	Seminar	0	0	3	2
ACE11CV	Comprehensive Viva	0	0	0	4
ACE11PW	Project work	0	0	9	12
	Total	**12**	**0+**	**12**	**30**

SYLLABI FOR I SEMESTER

MATHEMATICS – I

(Common to all Branches)

Course Code : ABM1101

L	T	P	C
4	1	0	4

AIM :

To impart the necessary fundamental principles that are essential to study the core courses of Engineering.

OBJECTIVE :

To motivate and inculcate the logical thinking and methodical approach to solve mathematical problems

UNIT - I

Sequences – Series – Convergence and divergence – Comparison test – Ratio test –Integral test –Alternating series, Leibniz's test
(9.1 to 9.9, 9.12).

Rolle 's theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem –Taylor's theorem and Maclaurin's series (all theorems without proof)
(4.3, 4.4).

UNIT - II

Differential equations of first order (linear, Bernoulli), Linear differential equations with constant coefficients, Method of Variation of parameters .
(11.9, 11.10, 13.1, 13.3-13.8(i), 13.9)

UNIT - III

Applications of Linear differential equations: orthogonal trajectories, Newton's law of cooling, Simple harmonic motion, Oscillatory electrical circuits (LC and LCR circuits).
(12.3, 12.6, 14.2, 14.5)

UNIT - IV

Laplace transform of elementary functions, properties, Transforms of derivatives and integrals – Unit step function – second shifting theorem, Periodic function.

(21.1-21.5, 21.7-21.11)

UNIT - V

Inverse transform –- Inverse transform of Derivatives and Integrals - Convolution theorem – Application of Laplace transforms to ordinary differential equations, Unit step function, Unit impulse function.

(21.12-21.15, 21.17, 21.18)

UNIT - VI

Partial differentiation: Total derivative, change of variables, Jacobians, Taylor's theorem for functions of two variables, maxima and minima of functions of two variables.

(5.5 – 5.9, 5.11)

UNIT - VII

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

(17.1 to 17.3, 17.5, 17.6)

UNIT - VIII

Method of separation of variables – Classification of second order linear Partial Differential Equations, solutions of one dimensional heat equation, wave equation and two-dimensional Laplace's equation under initial and boundary conditions.

(18.1 to 18.7)

TEXT BOOK :

Dr.B.S.Grewal, "Higher Engineering Mathematics", 40th Edition, Khanna Publishers

REFERENCES :

1. Kreyszig E, "Advanced Engineering Mathematics", 8th Edn. John Wiley, Singapore (2001)

2. Greenberg M D, "Advanced Engineering Mathematics", 2nd Edn, Pearson Education, Singapore, Indian Print (2003).

COMPUTER PROGRAMMING THROUGH C

Course Code : ACT1102

L	T	P	C
4	1	0	4

AIM :

To give the basic idea about programming.

OBJECTIVE :

To make the students capable of programming in high level computer languages as well as applications.

UNIT - I

Algorithm, Flow chart, Program development steps, Basic structures of C Language, C tokens, Data types and sizes, Declaration of variables, Assigning values, Arithmetic, Relational and Logical operators, Increment and decrement operators, Conditional operator, Bitwise operators, Type conversions, Expressions, evaluation, Input output statements, blocks.

UNIT - II

If and switch statements, while, do while and for statements. C programs covering all the above aspects.

UNIT - III

One dimensional and two dimensional arrays, Initialization, String variables declaration, reading, writing, basics of functions, parameter passing, String handling functions.

UNIT - IV

User defined functions, recursive functions, variables and storage classes, scope rules, block structure, header files, C preprocessor, Example C Programs.

UNIT - V

Pointers and arrays: Pointers and addresses, Pointers and arrays, Pointers and function arguments, address arithmetic, character pointers and functions

UNIT - VI

Pointers to pointers, multi-dimensional arrays, initialization of pointer arrays, command line arguments, pointers to functions, function pointers.

UNIT - VII

Structure definition, initializing, assigning values, passing of structures as arguments, arrays of structures, pointers to structures, self reference to structures, unions, type-defs, bit fields, C program examples.

UNIT - VIII

Console and file-I/O: Standard I/O, Formatted I/O, Opening and closing of files, I/O operations on files, command line arguments.

TEXT BOOKS :

1. Herbert Schild, "Complete Reference Using C", 4th Edition, Tata McGraw Hill, 2009.
2. Yashawanth Kanethkar, "Let us C", 9th Edition, BPB Publishers, 2009.

REFERENCES :

1. B.A.Fouruzan and R.F.Gilberg, "Computer Science, A structured Programming Approach using C", 3rd Edition, Thomson Publishers, 2008.
2. B.W.Kerninghan and Dennis M. Ritche, "C Programming Language", 2nd Edition, Pearson Education, 2009.
3. Stephen G.Kochan, "Programming in C" 3rd Edition, Pearson Education, 2005.
4. N. B. Venkateswarlu, E. V. Prasad, "C & Data structures", 1st Edition, S. Chand Publications, 2002.

SURVEYING

Course Code : ACE1101

L	T	P	C
4	1	0	4

AIM :

To introduce the basic concepts of survey.

OBJECTIVES :

Overview of plane survey and Geodetic survey. Studying various instruments for taking linear and angular measurements. Computing areas and volumes. Designing and setting out simple curves.

UNIT - I

INTRODUCTION : Overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications. Introduction to Total Station and Global positioning system,

UNIT - II

DISTANCES AND DIRECTION : Distance measurement conventions and methods; use of chain and tape, Electronic Distance Measurements, Meridians, Azimuths and Bearings, declination, computation of angle.

UNIT - III

LEVELLING AND CONTOURING : Concept and Terminology, Temporary and permanent adjustments- methods of leveling and characteristics. Contours-Uses of contours- methods of conducting contour surveys and their plotting.

UNIT - IV

COMPUTATION OF AREAS AND VOLUMES : Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes. Determination of the capacity of reservoir. Volume of barrow pits.

UNIT - V

THEODOLITE : Description, Uses – temporary adjustments and permanent adjustments, measurement of horizontal and vertical angles. Trigonometrical levelling, Traversing.

UNIT - VI

TACHEOMETRIC SURVEYING : Stadia and tangential methods of Tacheometry. Distance and Elevation formulae for Staff vertical position.

UNIT - VII

CURVES : Types of curves, design and setting out – simple and compound curves.

UNIT - VIII

Errors and Approximations

TEXT BOOKS :

1. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, "Surveying (Vol – 1, 2 & 3)", Laxmi Publications (P) ltd., New Delhi, 17th Edition, 2009.
2. Duggal S K, "Surveying (Vol – 1 & 2), Tata Mc.Graw Hill Publishing Co. Ltd. New Delhi, 10th Edition, 2004.
3. "Surveying and Levelling", Oxford university press, New Delhi, 2008.

REFERENCES :

1. Arthur R Benton and Philip J Taety, "Elements of Plane Surying", McGraw Hill – 2000
2. Arora K R, "Surveying Vol 1, 2 & 3", Standard Book House, Delhi, 9th Edition, 2008.
3. Chandra A M, "Plane Surveying", New age International Pvt. Ltd., Publishers, New Delhi, 2002.
4. Chandra A M, "Higher Surveying", New age International Pvt. Ltd., Publishers, New Delhi, 2002.

INTRODUCTION TO CIVIL ENGINEERING

Course Code : ACE1102

L	T	P	C
4	1	0	4

AIM :

To introduce the basic concepts of civil engineering.

OBJECTIVES :

To attain knowledge on civil engineering by introducing the new developments, various disciplines, challenges, responsibilities and achievements in Civil engineering.

UNIT - I

Historical background

UNIT - II

Role of Civil Engineers in Society;

UNIT - III

Outstanding accomplishments of the profession;

UNIT - IV

Explanation of applications of various disciplines of Civil Engineering
Transportation
Environmental
Geotechnical
Structural
Water Resources
Surveying, Estimation
Quality Control
Project Management

UNIT - V

Present status and future challenges of civil engineering profession.

UNIT - VI

Professional responsibility.

UNIT - VII

Concepts of analysis & design, interpretation of results and decision making, computational approaches, experiments.

UNIT - VIII

Technical Report writing

Invited lectures

Case Studies

Site visits.

Professional Societies in Civil Engineering and their activities

REFERENCES :

1. Engineers and Engineering, Oxford Univ. Press, 1970
2. Engineering Cases, ASEE, 1982
3. Laithwaite, E., "Invitation to Civil Engineering", Basil Blackwell Inc., Oxford, UK., 1984
4. Thing, M.W., Routledge & Kegan Paul, "Engineering- An Outline for the Intending Student", London 1972.

ENVIRONMENTAL STUDIES

Course Code : ABE1101

L	T	P	C
4	0	0	4

AIM :

To create awareness on environmental hazards.

OBJECTIVE :

The student shall acquire knowledge regarding utilization of natural resources, and the imbalance in ecosystems, environmental pollution caused by various practices and safe guards to be taken.

UNIT - I

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES : Definition, Scope and Importance – Need for Public Awareness.

UNIT - II

NATURAL RESOURCES : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems -Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Case studies. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT - III

ECOSYSTEMS : Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems
(ponds, streams, lakes, rivers, oceans, estuaries)

UNIT - IV

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

UNIT - V

ENVIRONMENTAL POLLUTION : Definition, Cause, effects and control measures of :

a. Air pollution
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

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

UNIT - VI

SOCIAL ISSUES AND THE ENVIRONMENT : From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, watershed management -Resettlement and rehabilitation of people; its problems and concerns. Case Studies - Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. -Wasteland reclamation. -Consumerism and waste products. –Environment Protection Act. -Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution)

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

UNIT - VII

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

UNIT - VIII

FIELD WORK : Visit to a local area to document environmental assets River /forest grassland/hill/mountain -Visit to a local polluted site-Urban/ Rural/industrial/ Agricultural Study of common plants, insects, birds. - Study of simple ecosystems-pond, river, hill slopes, etc.

TEXT BOOKS :

1 Erach Bharucha, "Textbook of Environmental Studies for Undergraduate Courses", University Press, Reprint 2005.

2 R. Rajagopalan, "Environmental Studies", Oxford University Press, 2nd Edn, 2011.

REFERENCE :

1. M. Anji Reddy B, "Textbook of Environmental Sciences and Technology"

SURVEYING LAB

Course Code : ACE1103

L	T	P	C
0	0	3	2

AIM :

To introduce the concepts of plane surveying equipments

OBJECTIVES :

The main objective is to attain the knowledge of equipments used for taking linear and angular measurements and setting contours. Transferring points on ground and Locating ground stations on map.

LIST OF EXERCISES

1. Survey of an area by chain survey (closed traverse) and Plotting
2. Determination of Distance between two in-accessible points with compass
3. Surveying of a given area by prismatic compass (closed traverse) and plotting after adjustment.
4. Radiation method & Intersection methods by plane table survey
5. An exercise of Longitudinal Section & Cross Section and plotting with dumpy level(Two exercises)
6. An exercise on contouring using dumpy level
7. Measurement of horizontal angles by method of repetition and reiteration with theodolite
8. Trigonometric leveling – Heights & Distance problem (Two exercises)
9. Height & distance using principles of tachometric surveying.
10. Curve setting – Different methods (Two exercises)

COMPUTER PROGRAMMING LAB

Course Code : ACT1103

L	T	P	C
0	0	3	2

AIM :

To give basic knowledge with practical orientation of programming language.

OBJECTIVE :

To train the students to write programmes in C language for different applications.

LIST OF PROGRAMMES :

1. To write C programs for the following
   a) 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 to generate the first n terms of the Fibonacci sequence.

2
   a) To write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user
   b) To write a C program to calculate the following sum:
   Sum=$1+x^2/2!+x^4/4!$ ———————— upto given 'n' terms.
   c) To write a c program to find the roots of a quadratic equation.

3. To write C programs that uses both recursive and non-recursive functions
   i) To find the factorial of a given number.
   ii) To find the GCD(greatest common divisor) of two given integers.
   iii) To solve Towers of Hanoi problem.

4. The total distance traveled by vehicle in 't' seconds is given by distance=ut+1/2at^2 where 'u' and 'a' are the initial velocity (m/sec) and acceleration (m/sec^2). Write a C program to find the distance traveled at regular intervals of time given 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'.

5. Using switch-case statement, write a C program that takes two operands and one operator from the user, performs the operation and then prints the answer. (consider operators +, -, *, and %).

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

7. Write a C program that uses functions to perform the following
   a. Addition of Two Matrices
   b. Multiplication of Two Matrices

8. Write a C program that uses functions to perform the following operations
   a. To insert a sub-string in to given main string from a given position
   b. To delete n characters from a given position in given string.

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

10.
   a) Write a C program that displays the position or index in the string S where the string T begins, or -1 if S does not contain T.
   b) Write a C program to count the lines, words and characters in a given text.

11. To write a C program
   a) to generate Pascal's triangle
   b) to construct a pyramid of numbers

12. To write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression $1+x+x^2+x^3+\ldots x^n$
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 nest pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too..

13. To write a C program
    a) to find the 2's compliments of a binary number.
    b) to convert a Roman numeral to its decimal equivalent

14. To write a C program that uses functions to perform the following operations
    a. Reading a complex number
    b. Writing a complex number
    c. Addition of 2 complex numbers
    d. Multiplication of 2 complex numbers
    (Note: represent complex number using a structure)

15. To write a C program
    a) to copy the contents from one file to another.
    b) to reverse the first n characters in a file.
    (Note: the file name and n are specified on the command line)
    c) to fine the no. of characters, no. of words, no. of lines in a given file.

16. To implement the algorithms for the below given iterative methods using C to find one root of the equation f(x)=x sinx + cosx=0
    a) Bisection b) False Position c) Newton-Raphson
    d) Successive approximation

17. To write C programs to implement the Lagrange interpolation
18. To implement the Newton- Gregory forward interpolation using C language.
19. To implement in C the linear regression algorithm.
20. To implement in C the polynomial regression algorithm.

TEXT BOOKS :

1. P. Dey & M. Ghosh, "Programming in C", Oxford Univ. Press
2. E. Balaguruswamy, "C and Data Structures", TMH publications
3. P. Padmanabham, "C Programming and Data Structures", 3rd Edition, BS publications.
4. M.K. Jain, S.R.K. Iyengar & R.K. Jain, "Numerical Methods for Scientific and Engineering Computation", New Age International Publishers.
5. Aitkinson & Han, "Elementary Numerical Analysis", Wiely India, 3rd Edition 2006.

ENGINEERING DRAWING

Course Code : AME1102

L	T	P	C
0	0	3	2

AIM & OBJECTIVES :

1. To make the student familiar to the drawing practices and convention
2. To familiarize the student about various engineering curves used in industry
3. To enable the student draft simple engineering components.

LIST OF EXERCISES

1 Introduction to Engineering drawing & basics of Geometrical construction

2 Construction of parabola, ellipse, hyperbola

3 Construction of Involutes and Cycloidal curves

4 Projections of points and lines inclined to one plane

5 Projections of lines inclined to both the planes

6 Projections of planes in simple positions, planes inclined to one plane

7 Projections of planes inclined to both the planes

8 Demonstration & Practice: Computer aided drafting of lines, planes and dimensioning

9 Projections of solids in simple positions

10 Projections of solids inclined to both the planes

11 Isometric projections

12 Demonstration & Practice: Computer aided drafting of solids and dimensioning.

TEXT BOOKS :

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

2. R.B. Choudary "Engineering graphics with Auto CAD", Anuradha Publishes

3. Trymbaka Murthy, "Computer Aided Engineering Drawing", I.K. International, 3rd Edn. I.K. International, 2007

SYLLABI FOR II SEMESTER

ENGLISH

Course Code : AHE1101

L	T	P	C
4	0	0	4

Reading and Writing skills

OBJECTIVES :

The primary objective of the course is to help students of engineering to achieve a sound foundation in communicational skills, basic grammar and vocabulary. It also enables them to become successful communicators in academic, professional and social areas of life.

The course aims to enable the students to use English effectively for the purpose of

- Understanding class room lectures in different subjects
- Reading technical and general materials
- Effective written communication in professional contexts

OUTCOMES :

- The learners develop adequate skills in skimming, scanning, intensive and extensive reading
- The learners also develop enough vocabulary to be clearly expressive in any group - Professional or Managerial or Social
- The learners can correspond and communicate in descriptive, analytical modes with ease.

COURSE WORK :

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

Contents :

Reading :

- Reading with a purpose; Reading for understanding; skimming, scanning etc;
- Reading and interpreting charts and diagrams
- Vocabulary, synonyms, antonyms, prefixes, suffixes, confusables, one-word substitutes etc.

Writing :

- common errors, articles, prepositions, tenses, concord, phrasal verbs, modals, conditionals etc. (Remedial Grammar)
- Practice of writing- definition, description
- Paragraph writing with coherence, cohesiveness and clarity
- Essay, report and précis writing

Reference skills **:** Use of dictionary, thesaurus, library and internet materials.

UNIT - I

1. Around the House *(Language in Use)*
2. Education on Education *(English for Engineers)*

UNIT - II

1. On Holiday *(Language in Use)*
2. Vocabulary- synonyms, antonyms, prefixes, suffixes, confusables, one-word substitutes etc.

UNIT - III

1. Imagining *(Language in Use)*
2. Tenses & Concord, Articles & Prepositions

UNIT - IV

1. New Information Technology and Poverty Eradication (English for Engineers)
2. The media (Language in Use)

UNIT - V

1. What we must Learn from the West *(English for Engineers)*
2. Paragraph writing, Note-making and Minute writing

UNIT - VI

1. Essay writing
2. Value added Life *(English for Engineers)*

UNIT - VII

1. Breaking the Law *(Language in Use)*
2. Key item *(English for Engineers)*

UNIT - VIII

1. Letter and Précis writing
2. Dialogue writing

TEXT BOOKS :

1. "Language in Use(Intermediate)", Cambridge University Press India Pvt. Ltd.- Reprint-2008.
2. "English for Engineers", Regional Institute of English, Bangalore, Foundation Books Pvt. Ltd, 2006.

REFERENCES :

1. Eric H. Glendinning & Beverly Holmstorm,"Study reading- A course in reading skills for academic purposes"-CUP , 2004.
2. Liz Hamp Lyons, Ben Heasley, "Study writing", CUP, 2004.
3. Norman Lewis, "Word Power Made Easy", Lotus Press, 2006.
4. Michael Swan, "Practical English Usage", Oxford University Press, 3rd Edition, 2005.
5. Murphy "Murphy's English Grammar", CUP, 3rd Edition, 2004.

SUGGESTED READING : Stories of humour, adventure, mystery and autobiographies of eminent scientists.

MATHEMATICS – II

(Common to all Branches)

Course Code : ABM1102

L	T	P	C
4	1	0	4

AIM :

To impart the necessary fundamental principles that are essential to study the core courses of Engineering

OBJECTIVE :

To motivate and inculcate the logical thinking and methodical approach to solve mathematical problems

UNIT - I

Matrices: Rank – Normal form - Echelon form – Consistency – Solution of system of simultaneous linear homogeneous and non-homogeneous equations.(Gauss Jordan)

(2.8, 2.11)

UNIT - II

Eigen values, Eigen vectors – properties – Cayley-Hamilton Theorem (only statement) - Inverse and powers of a matrix by Cayley-Hamilton theorem – Diagonalisation of matrix. (2.14-2.17)

UNIT - III

Quadratic forms - Linear Transformation - Orthogonal Transformation. Reduction of quadratic form to canonical form, Nature of the quadratic form.

(2.12, 2.18 , 2.19).

UNIT - IV

Double and triple integrals, Change of order, change of variables

(7.1 – 7.3 , 7.5, 7.7).

UNIT - V

Vector Differentiation**:** Differentiation of vectors, Scalar and Vector point functions. Gradient of a scalar field and directional derivatives- Divergence and curl of a Vector field and it's physical interpretation.

(8.1, 8.4 – 8.8)

UNIT - VI

Vector Integration - Line integral – -Circulation-work done - surface and volume integrals Vector integral theorems: Green's theorem- Stoke's and Gauss's Divergence Theorem (Without proof). Verification of Green's - Stoke's and Gauss's Theorems. (8.10 – 8.17)

UNIT - VII

Fourier series: Euler's formulae, Conditions for Fourier expansion, Change of interval, even and odd functions, half range series.

(10.1 – 10.7)

UNIT - VIII

Fourier integral theorem – Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms – properties – Finite Fourier transforms.

(22.1 – 22.4)

TEXT BOOK :

1. Dr.B.S.Grewal "Higher Engineering Mathematics", 40th Edition, Khanna Publishers

REFERENCES :

1. Kreyszig E, "Advanced Engineering Mathematics", 8th Ed. John Wiley, Singapore (2001)
2. Greenberg M D, "Advanced Engineering Mathematics", 2nd Ed, Pearson Education, Singapore, Indian Print (2003).

ENGINEERING MECHANICS

Course Code : AME1103

L	T	P	C
4	1	0	4

AIM & OBJECTIVES :

1. To develop logical thinking approach to engineering problems.
2. Calculation and estimation of fourses developed in various engineering structures.

UNIT - I

SYSTEMS OF FORCES : Introduction – parallelogram law – Forces and components - Resultant of coplanar concurrent forces - component forces in space - vector notation – moment of force – principle of moments – couples. Resultant of planar force systems and spatial concurrent force system.

UNIT - II

EQUILIBRIUM OF FORCE SYSTEMS : Equilibrium – free body diagrams – Equations of equilibrium – equilibrium of planar systems – graphical methods and analytical methods for equilibrium of planar systems – equilibrium of spatial concurrent force systems.

UNIT - III

FRICTION: Introduction – Theory of friction – Angle of friction – Laws of friction - static friction – Kinetic friction-friction in bodies moving up or down on an inclined plane-screw friction and screw jack.

UNIT - IV

CENTROIDS AND CENTERS OF GRAVITY : Centre of gravity – centroids of area and lines – determination of centroids by integration – centroids of composite figures – theorems of Pappus.

UNIT - V

AREA MOMENT OF INERTIA : Moment of inertia – polar moment of Inertia – Radius of gyration - Transfer theorem for moment of Inertia – Moment of inertia of composite areas – product of inertia – Transfer formula for product of Inertia.

MASS MOMENT OF INERTIA : Moment of inertia of masses – Radius of gyration – Transfer formula for mass moment of inertia – Mass moment of Inertia by Integration.

UNIT - VI

KINEMATICS : Rectilinear motion-curvilinear motion - Rectangular components of curvilinear motion - Normal and Tangential components of acceleration, Radial and transverse components - Kinematics of rigid bodies - angular motion – fixed axis rotation – Definition and analysis of plane motion.

UNIT - VII

KINETICS: Kinetics of rigid bodies – equation of planes motion – fixed axis rotation – rolling bodies (simple examples) - general plane motion (Simple examples).

UNIT - VIII

WORK ENERGY METHODS : Work energy equations for translation – applications to particle motion – connected systems – fixed axis rotation (Simple cases)

TEXT BOOKS :

1. I.B. Prasad, "Applied Mechanics", Khanna Publishers, 19th Edition, 2009.
2. Ferdinand L. Singer, "Engineering Mechanics", Harper Collins Publishers India, 3rd Edition, 2008.

REFERENCES :

1. Irving. H. Shames, "Engineering Mechanics", PHI Publishers, 4th Edition, 2008.
2. Timoshenko & Young , "Engineering Mechanics", MGH Publishers, 4th Edition, 2010.
3. A.K. Tayal, "Engineering Mechanics", Umesh Publishers, 13th Edition, 2008.
4. K.L. Kumar, "Engineering Mechanics", TMH Publishers, 3rd Edition, 2009.

PHYSICS

Course Code : ABP1101

L	T	P	C
4	1	0	4

AIM : To give prerequisites in understanding the advanced Physics leading to applications in engineering field.

OBJECTIVE : To impart the students the concept and principles in Engineering to enable them to comprehend and take up the experimental work independently.

UNIT - I

VIBRATIONS & ACOUSTICS OF BUILDINGS :

i) Overview of vibrations with emphasis on damped and forced oscillations- resonance, coupled oscillators - two coupled pendulums and normal mode solutions.

(Engineering Physics - Gaur & Gupta Chap - 33, and Unified Physics, Vol-1, S L Gupta & Sanjeev Gupta, Chap-11 (coupled oscillators)

ii) Reverberation and Reverberation time – Sabine's formula for reverberation time – measurement of absorption coefficient of material- Basic requirements of acoustically good hall -Factors affecting the architectural acoustics and their remedies.

(Engineering Physics - Gaur & Gupta Chap - 14)

UNIT – II

PHYSICAL OPTICS :

Interference: Superposition of waves, Young's double slit experiment, Interference in thin films by reflection, Newton's rings experiment with necessary theory.

Diffraction: Fresnel and Fraunhoffer diffraction, Diffraction at single slit and diffraction grating, determination of wavelengths of various spectral lines, resolving power of grating.

Polarization: Types of Polarizations, Brewster's law, Double refraction, Nicol Prism, Polaroid's.

(Engineering Physics - Gaur & Gupta Chap - 26, 27, 28 & 29)

UNIT – III

CRYSTAL PHYSICS & SUPERCONDUCTIVITY :

i) Crystal Physics : Space lattice, basis and crystal structure, Unit cell, primitive cell, Seven crystal systems, Bravais lattices- SC, BCC, FCC crystal structures- crystal planes and Directions- Miller indices, Derivation of inter planar spacing.

(Applied Physics for Engineers - P K Palanisamy Chap - 2)

ii) Superconductivity: superconducting phenomenon, Meissner effect, Type I & Type II Super conductors, BCS theory, DC and AC Josephson effects, SQUIDS, High Temperature Super conductors- Applications.

(Applied Physics for Engineers - P K Palanisamy Chap - 9)

UNIT – IV

QUANTUM MECHANICS :

Dual nature of matter, DeBroglie wave length, Time independent Schrödinger wave equation, Physical significance of wave function, particle in a potential well, rigid and non rigid walls, Tunneling effect

(Applied Physics for Engineers - P K Palanisamy Chap - 3)

UNIT – V

FREE ELECTRON THEORY :

Introduction, Quantum free electron theory, Fermi-Dirac distribution and its dependence on temperature, Fermi energy, Electron scattering and resistance, motion of an electron in periodic potential, Kronig-Penney model (qualitative treatment), effective mass; classification of solids.

(Applied Physics for Engineers - P K Palanisamy Chap - 4 & 5)

UNIT – VI

DIELECTRICS :

Basic definitions, relation between **P,D** and **E** vectors, Polarization mechanisms, expression for electronic polarizability, Internal fields in solids,

Claussius-Mosotti equation, frequency and temperature dependence of electronic polarization, Dielectric strength, Dielectric loss, Loss tangent and Dielectric breakdown, Applications.

(Applied Physics for Engineers - P K Palanisamy Chap - 6)

UNIT – VII

LASERS AND FIBER OPTICS :

i) Introduction, Characteristics of lasers, Induced absorption, spontaneous and stimulated emission of radiation, Population Inversion, Einstein's coefficients, Low and high power Lasers, Ruby laser, He-Ne laser, CO_2 and semiconductor laser, Applications of lasers.

(Applied Physics for Engineers - P K Palanisamy Chap - 10)

ii) Basic principle of propagation of light in optical fibers, Numerical aperture, acceptance angle, Derivation of Numerical aperture, Classification of optical fibers on the basis of refractive index profile, Fiber optic communication system, Applications.

(Applied Physics for Engineers - P K Palanisamy Chap - 2)

UNIT – VIII

FUNCTIONAL MATERIALS :

i) Bio materials, SMART materials, metallic glasses, metal matrix composites, Electrets – piezo and ferro electric matrerials.

(Engineering Physics by V Rajendran, Chap - 21, 24, 25, materials Science - M Armugam - Metal Matrix composites and Electrets, SMART Materials chap -11)

ii) Nanophase materials: Introduction to nano materials, types of nano materials, Fabrication Techniques: ball milling, nano lithography, CVD, carbon nano tubes (CNT's), Applications.

(Engineering Physics M R Sirnivasn, Chap - 15)

TEXT BOOKS :

1. R.K. Gaur and S.L.Gupta, "Engineering Physics", 8th Edition, Dhanpaat Rai, 2003.
2. P.K. Palanisamy, "Applied Physics", 2nd Edition, Scitech Publishers, 2010.
3. M.R. Srinivasan, "Engineering Physics", 1st Edition, New Age Publishers, 2009.
4. V. Rajendran, "Engineering Physics", TMH, 2009.

REFERENCES :

1. C.Kittel, "Introduction to Solid State Physics", 7th Edn, John Wiley, 2007.
2. M Ross, Lowrence, Shepard, J Wulff , "Structure and properties of Materials, (Volume-4, Electronic properties)", Wiley East Publishers, 2004.
3. Avadhanulu & Kshirasagar, "Engineering Physics", 9th Edition, S. Chand Publishers, 2008.
4. S.O. Pillai, "Solid State Physics", New Age Publishers, 2004.
5. Sulabh. K. Kulkarni, "Nano Technology - Principles and Practices", 2006.
6. V.Raghavan, "Material Science", 5th Edition, PHI, 2007.
7. R.L.Singhal, "Solid State Physics", 6th Edition, Kedarnadh, Ramnadh Publishers, 2003.
8. A. Beiser., "Perspectives in Modern Physics", 5th Edition, McGraw Hill Publishers, 2006.
9. A.J. Dekker, "Electrical Engineering Materials", 1st Edition, Mac Millan, 2007.
10. M. Armugam, "Material Science",3rd Edition, Anuradha Publishers, 2009.
11. S.L. Gupta, & Sanjeev Gupta, "Unified Physics, Vol - 1", 16th Edition, Jaiprakash Nath & Co., 2007.

CHEMISTRY

Course Code : ABC1101

L	T	P	C
4	1	0	4

AIM :

The aim of the course is to provide basic chemistry background required for under graduate students of engineering.

OBJECTIVE :

The Objective of the course is to provide an over view of chemical properties of materials which the engineers are likely to use during their professional careers.

UNIT - I

ELECTROMOTIVE FORCE

Electrode potential, Nernest equation, EMF of electro chemical cell, calculation of cell potential, concentration cell, determination of P^H of solution.

BATTERIES - primary cell-Dry or Lachanche cell, alkaline battery; secondary cells (storage batteries or accumulators) – Lead-acid Accumulator, Nickel-cadmium battery.and lithium ion battery.

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

UNIT - II

CORROSION AND ITS CONTROL

Introduction-Dry or chemical corrosion, Wet or Electrochemical corrosion-Hydrogen evolution type, oxygen absorption type, Galvanic corrosion and concentration cell corrosion, pitting ,waterline, and stress corrosion;

passivity; Galvanic series; factors influencing corrosion. Corrosion control-proper designing, cathodic protection, modifying the environment and using inhibitors. Protective coatings- anodic and cathodic coatings; Hot dipping-Galvanizing and Tinning, Metal cladding; Electroplating; Electro less plating; cementation or diffusion coatings.

UNIT - III

CHEMICAL KINETICS

Arrhenius theory-effect of temperature on reaction rates –concept of activated complex; collision theory of reaction rates; Lindeman's theory of unimolecular reactions, steady state approximation; Transition state theory.

UNIT - IV

BONDING IN COORDINATION COMPOUNDS

Valence bond theory- limitations, crystal field theory, ligand field theory-octahedral and tetrahedral complexes. Spectral properties of d^1 ions & magnetic properties of low spin and high spin complexes.Molecular orbital theory as applied to octahedral complexes not involving pi-bonding.

UNIT - V

PRINCIPLES AND MECHANISMS OF ORGANIC REACTIONS

Bond fission – homolysis and heterolysis-examples. Types of reagents-electrophilic and nucleophilic reagents -examples. Concept of aromaticity, Huckel's (4n+2) rule. Introduction to mechanistic aspect of electrophilic aromatic substitution- nitration, sulphonation. Friedel-Crafts alkylation and acylation.

UNIT - VI

POLYMER SCIENCE AND TECHNOLOGY

Nomenclature; Types of polymerization, Mechanism of addition and condensation polymerization, Effect of polymer structure on properties. Plastics- Thermo and thermosetting plastics, constituents of a plastic.

Preparation, properties and uses of polythene, PVC, Teflon, nylons-6,6, bakelite and silicones.

RUBBER - Natural rubber-structure-vulcanization, compounding of rubber; synthetic rubbers-Buna-Sand Buna-N.

UNIT - VII

SEMI CONDUCTING MATERIALS

Band theory of solids, Types-Intrinsic, extrinsic,(n-type, p-type,) non-elemental semi conducting materials- stoichiometric semi conducting compounds, defect semiconductors, controlled valency semiconductors. Preparation of semiconductors- Zone refining, Czochralski crystal pulling technique, Doping technique.

UNIT - VIII

CHEMISTRY OF ENGINEERING MATERIALS

Cement - classification; Portland cement- raw materials, manufacture of Portland cement, chemical constititution of Portland cement, setting and hardening of Portland cement.

REFRACTORIES - Classification and properties of refractories

FUELS - classification; calorific value and its determination using Bomb and Junker's gas calorimeter, theoretical calculation of calorific value-Proximate and ultimate analysis of coal; Refining of petroleum-, catalytic cracking; catalytic reforming, knocking, octane rating, improvement in anti knock characteristics, unleaded petrol; diesel engine fuels, cetane value

LUBRICANTS - Friction- mechanism of lubrication-Fluid film lubrication; thin or boundary lubrication and extreme pressure lubrication, classification-Lubricating oils, greases and solid lubricants.

TEXT BOOKS :

1. Jain& Jain, "A text book of Engineering Chemistry", Dhanapat Roy Publishing Company, 15th Edition, 2006.

2. Shiva Shankar, "Engineering chemistry" , Tata Mc Graw Hill, 2008.

REFERENCES :

1. Sashi Chawala, "Engineering Chemistry", Dhanpath Rai Publications, 3rd Edition, 2010.
2. C. Parameswara Murthy, C.V. Agarwal and Andhra Naidu, "A Text Book of Engineering Chemistry", B.S. Publications, 1st Edition, 2006.
3. J.D.Lee, "Concise inorganic Chemistry", Black Well Science Publications, 5th Edition, 2005.
4. Arun Bahl & B.S.Bahl, "Advanced Organic Chemistry", S.Chand Publications, 2010.
5. Gurudeep Raj, "Physical Chemistry", Goel Publications, 3rd Edition, 2007.
6. S.S. Dara, "Text book of Engineering Chemistry", S. Chand Publications, 11th Edition, 2006.

ENGLISH LANGUAGE LAB

Course Code: AHE1102

L	T	P	C
0	0	3	2

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

OBJECTIVES :

- To make students recognise the sounds of English through Audio-Visual aids and Computer Software.
- To help them overcome their inhibitions and self- consciousness while speaking in English and to build their confidence. *The focus shall be on fluency rather than accuracy.*
- To enable them to speak English correctly with focus on stress and intonation.

SYLLABUS :

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

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Situational Dialogues / Role Play.
4. Oral Presentations- Prepared and Extempore/Speaking personally
5. 'Just A Minute' Sessions (JAM).
6. Describing things / Narration
7. Information Transfer

8. Debate
9. Telephoning Skills.
10. Giving Directions.

SUGGESTED SOFTWARE :

- Cambridge Advanced Learners' English Dictionary with CD.
- The Rosetta Stone English Library
- Clarity Pronunciation Power
- Mastering English in Vocabulary, Grammar, Spellings, Composition
- Dorling Kindersley series of Grammar, Punctuation, Composition etc.
- Language in Use, Foundation Books Pvt Ltd with CD.
- Learning to Speak English - 4 CDs
- Microsoft Encarta with CD
- Murphy's English Grammar, Cambridge with CD

REFERENCES :

1. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.

2. English Pronouncing Dictionary Daniel Jones Current Edition with CD.

3. Spoken English- R. K. Bansal and J. B. Harrison, Orient Longman 2006.

4. J. Sethi, Kamlesh Sadanand & D.V. Jindal, "A Practical Course in English Pronunciation, (with Two Audio Cassettes)", Prentice-Hall of India Pvt. Ltd., New Delhi.

5. T. Balasubramanian (Macmillan), "A Text Book of English Phonetics for Indian Students", 18th Reprint, 2005.

6. "English Skills for Technical Students"**,** WBSCTE with British Council, OL

ENGINEERING WORKSHOP

Course Code : AMT1101

L	T	P	C
0	0	3	2

AIM :

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

OBJECTIVES :

* To train the student in the basics of computer components, maintenance, software(s) installation and office tools.
* To demonstrate and train the students in basic professional trades.

Compulsory Exercises :

- 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.
- One lamp controlled by a one-way switch and (b) Two-way switching for stair-case lamp

Any Nine Exercises From The Following :

- **Carpentry**: Making a Cross-half lap joint using wooden pieces
- **Carpentry**: Making a Mortise and Tenon joint using wooden pieces
- **Fitting**: Preparation of a V-fit between mild steel flat pieces
- **Fitting**: Preparation of a Square-fit between mild steel flat pieces

- **Foundry**: Preparation of a sand mould using a single piece pattern
- **Foundry**: Preparation of a sand mould using a split piece pattern
- **Tin-Smithy**: Preparation of a sheet metal pipe-joint using tin-smithy tools
- **Tin-Smithy**: Preparation of a sheet metal funnel using tin-smithy tools
- **Welding**: Making a Lap joint through arc welding
- **Lathe Machine**: Demonstration of turning related activities on Lathe machine
- **Black smithy**: Demonstration of Black smithy trade
- **Plumbing**: Demonstration of Plumbing trade
- **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 Troubleshooting :** 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 Troubleshooting :** 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 : C**onnectivity to the Local Area Network and accessibility to the Internet. TCP / IP setting.
- **Web Browsers, Surfing the Web : C**ustomization 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 LaTeX and / word : C**reation 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 both LaTeX and / 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 both LaTeX and Power point, Hyperlinks, inserting Images, Clip Art, Audio, Video, Objects, Tables, Charts) .to create basic power point presentation.

PHYSICS AND CHEMISTRY LAB

Course Code : ABP1102

L	T	P	C
0	0	3	2

AIM :

To give prerequisites to understand the advanced Physics & Chemistry leading to applications in engineering field.

OBJECTIVES :

Training the students to understand the principles and concepts helpful in performing experiments in laboratory classes individually. To mould them to solve any technical problem in general.

LIST OF PHYSICS EXPERIMENTS

Any **SIX** of the following experiments are to be performed during the semester

01. Determination of rigidity modulus of the material of a given wire– Torsional pendulum
02. Verification of laws of vibration of stretched string - Sonometer
03. Determination of radius of curvature of a given convex lens - Newton's rings
04. Determination of wavelength of spectral lines of a mercury spectrum - Diffraction grating
05. Study of frequency response of LCR series and parallel resonant circuits
06. Study of variation of magnetic field along a circular current carrying conductor – Stewart & Gee apparatus
07. Determination of Hall coefficient and carrier concentration - Hall effect

08. Study of I-V characteristics of a solar cell

09. Optical Fibers – Determination of numerical aperture and losses in fibers

10. Measurement of dielectric constant of material by Waveguide method

LIST OF CHEMISTRY EXPERIMENTS

Any **SIX** of the following experiments are to be performed during the semester.

1. Preparation of standard potassium dichromate and determination of ferrous iron.
2. Determination of hardness of water by EDTA method.
3. Determination of dissolved oxygen in water.
4. Determination of chlorides in water.
5. Determination of iron-II by potentiometric method.
6. Determination of viscosity of lubricant by viscometer.
7. Determination of flash and fire points of oils.
8. Determination of percentage residue of carbon in oils.
9. Determination of calorific value of solid fuels.
10. Colorometric determination of iron in cement.

REFERENCES :

1. J.Mendham Et.al., "Vogel's text book of Quantitative Chemical Analysis", 6th Edn. Pearson Education.
2. Dr. K. B. Chandrasekhar, "Chemistry practical lab manual".
3. K.Sudha Rani, "Laboratory Manual on Engineering Chemistry"

SYLLABI FOR III SEMESTER

PROBABILITY, STATISTICS AND NUMERICAL METHODS

Course Code : ABM1103

L	T	P	C
4	1	0	4

AIM :

To acquire basic knowledge in concepts of Probability Statistics and Numerical Computation.

OBJECTIVE :

The student shall be able to apply the methods of Probability distributions, perform Statistical analysis and draw inference in various Engineering problems and also shall be able to apply methods of Numerical Computation for real time problems.

Pre requisites : Basic concepts of Probability and calculus.

UNIT - I

RANDOM VARIABLES - Discrete distribution - continuous distribution - expectation-moment generating function – probability generating function.

(26.7, 26.8, 26.9, 26.10, 26.11, 26.12)

UNIT - II

DISTRIBUTIONS - Binomial distribution - Poisson distribution - normal distribution - probable error – Normal approximation to Binomial distribution

(26.13, 26.14, 26.15, 26.16, 26.17, 26.18)

UNIT - III

SAMPLING DISTRIBUTION – Test of Hypothesis – test of significance for large samples – sampling distribution of the mean – central limit theorem – confidence limits for unknown mean – Test of significance for to large samples

(27.1 to 27.12)

UNIT - IV

SAMPLING OF VARIABLES-SMALL SAMPLES – Students t-distribution – significance test of a sample mean - significance test of difference between sample means – Chi square test – Goodness of fit

(27.13, 27.14, 27.15, 27.16, 27.17, 27.18)

UNIT - V

SOLUTIONS OF ALGEBRAIC AND TRANSCENDENTAL EQUATION – Bisection method – Regula Falsi – Newton Raphson method, deductions from Newton Raphson method – finite differences – differences of polynomial - other difference operators.

(28.1, 28.2, 28.3, 29.1, 29.2, 29.4)

UNIT - VI

INTERPOLATION - Newton's forward interpolation – Newton's backward interpolation – Interpolation with unequal intervals : Lagrange's interpolation - Newton's divided difference interpolation

(29.5, 29.8)

UNIT - VII

NUMERICAL DIFFERENTIATION - derivatives using Newton's forward difference formula - derivatives using Newton's backward difference formula.

NUMERICAL INTEGRATION –Newton cotes formula - Trapezoidal rule – Simpson's 1/3 Rule –Simpson's 3/8 Rule – weddle's rule.

(29.10(1,2), 29.12)

UNIT - VIII

NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS - Picard's method - Solution by Taylor's series - Euler's Method – Modified Euler's method - Runge-Kutta Method.

(31.1, 31.2, 31.3, 31.4, 31.5, 31.7)

TEXT BOOK :

1. Dr.B.S.Grewal, "Higher Engineering Mathematics", 40th Edition, Khanna Publishers.

REFERENCES :

1. Erwin Miller and John E.Freund. "Probability and Statistics for Engineers", Prentice-Hall of India / Pearson, Sixth edition.
2. S.S .Sastry, "Introductory Methods of Numerical Analysis", PHI, 14th Edition.

STRENGTH OF MATERIALS – I

Course Code: ACE1104

L	T	P	C
4	1	0	4

Aim:

To study the member / beam behavior subjected various forces and analysis of cylinders.

Scope:

Understanding various concepts of behavior of materials, analysis of stresses, deflection criteria and stress behavior in cylinders.

UNIT–I

ANALYSIS OF PIN-JOINTED PLANE FRAMES: Determination of Forces in members of plane, pin-jointed, perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever and simply – supported trusses.- by method of joints, method of sections.

UNIT-II

SIMPLE STRESSES AND STRAINS: Elasticity and plasticity – Types of stresses and strains – Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic constants and the relationship between them – Bars of varying section – composite bars – Temperature stresses.

UNIT–III

STRAIN ENERGY: Resilience – Gradual, sudden, impact and shock loadings – simple applications.

UNIT–IV

SHEAR FORCE AND BENDING MOMENT: Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, U.D.L., uniformly varying loads and

combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT–V

FLEXURAL STRESSES: Theory of simple bending – Assumptions – Derivation of bending equations, Neutral axis – Determination of bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections – Design of simple beam sections.

UNIT–VI

SHEAR STRESSES: Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

UNIT–VII

DEFLECTION OF BEAMS: Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, - U.D.L. Uniformly varying load.- Mohr's theorems – Moment area method – application to simple cases.

UNIT–VIII

THIN CYLINDERS: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in dia, and volume of thin cylinders – Thin spherical shells.

TEXT BOOKS:

1. R.K.Bansal, "Introduction to Text Book of Strength of Materials", Laxmi Publications Pvt. Ltd., New Delhi, 4th Edn. 2008.
2. Sadhu Singh, "Strength of Material", Khanna Publications, 2nd Edn. 2001.
3. S. Ramamrutham and R.Narayanan, "Strength of Materials", Dhanpat Rai Publications, 11th Edn. 2009
4. Popov,"Mechanics of Materials", 2nd Edn. 2002

REFERENCES:

1. Ferdinandp Beer and Johnston, "Mechanics of Solid", Tata Mc.Grawhill Publications , 6th Edn. 2000.
2. Schaum's out line series, "Strength of Materials", Mc. Grawhill International Editions, 10th Edn. 2007.
3. R. Subramanian, "Strength of materials", Oxford University Press, New Delhi, 1st Edn. 2011.
4. Bhavi Katti, "Strength of Materials", 7th Edn. 2010.
5. Timoshenko & Gere, "Mechanics of Materials", Mc Graw Hill, 4th Edn. 2003.
6. Timoshenko & Young, "Strength of Materials", Mc Graw Hill, 4th Edn. 2003.

MECHANICS OF FLUIDS

Course Code: ACE1105

L	T	P	C
4	1	0	4

AIM:

To introduce the concepts of Fluid Mechanics (along with simple applications) and fluid flow measurements. It is a first level course and a prerequisite for many other courses.

SCOPE:

To attain basic knowledge of ideal and real fluid properties and their behaviour in static and dynamic conditions along with simple applications.

UNIT I

INTRODUCTION: Dimensions and units – Physical properties of fluids, specific gravity, viscosity, surface tension, vapor pressure and their influences on fluid motion- fluid continuum- pressure at a point, Pascal's law, Hydrostatic law - atmospheric, gauge and vacuum pressure- measurement of pressure, Pressure gauges, Manometers: differential and Micro Manometers.

UNIT – II

HYDROSTATIC FORCES: Hydrostatic forces on submerged plane (Horizontal, Vertical, inclined) and curved surfaces – Center of pressure. Derivations and problems.

UNIT – III

FLUID KINEMATICS: Description of fluid flow, velocity, acceleration – convective, local and total, Stream line, path line and streak lines and stream tube. Classification of flows : Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrrotational flows – Equation of continuity- one, two , three dimensional flows – stream and velocity potential functions, flownet analysis.

UNIT – IV

FLUID DYNAMICS: Surface and body forces, Lagrangean and Eularian approaches – Concepts of fluid system and control volume – control volume approach for fluid flow problems – Euler's and Bernoulli's equations for flow along a stream line for 2-D flow, Momentum equation and its application – forces on pipe bend.

UNIT – V

VISCOUS FLOW: Navier – stokes equations (Explanatory) ,Reynolds experiment – Classification of Laminar & Turbulent flows, Flow between parallel plates, Flow through long pipes.

UNIT – VI

BOUNDARY LAYER (BL) THEORY: Concepts, Prandtl's contribution, Characteristics of boundary layer along a thin flat plate, Vonkarmen momentum integral equation, laminar and turbulent Boundary layers (no derivations) BL in transition, separation of BL, control of BL, flow around submerged objects-Drag and Lift- Magnus effect.

UNIT – VII

CLOSED CONDUIT FLOW: Laws of Fluid friction – Darcy's equation, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic gradient line, Pipe network problems, variation of friction factor with Reynolds number – Moody's Chart.

UNIT – VIII

MEASUREMENT OF FLOW: Pitot tube, Venturi meter and orifice meter – classification of orifices, flow over rectangular, triangular and trapezoidal and Stepped notches - –Broad crested weirs.

TEXT BOOKS:

1. Fluid Mechanics (9th Edn) by V.L.Streeter, Benjamin Wiley and Bedford, Mc Graw Hill Book company, Asian Students Edition, 2010
2. Fluid mechanics and hydraulic machinery by Modi P.N and S.M. Seth., Khanna Publishers 10th Edn. 2001
3. Fluid Mechanics by K.L. Kumar, Mc Graw Hill, 3rd Edn. 2002.

REFERENCES:

1. Frank.M. White, "Fluid Mechanics", Tata Mc.Grawhill Pvt. Ltd., 2nd Edn. 2000.
2. A.K. Mohanty, "Fluid Mehanics", Prentice Hall of India Pvt. Ltd., New Delhi, 1st Edn. 2011.
3. J.F. Douglas, J.M. Gasirock and J.A. Swaffield, "Fluid Mechanics (LPE)", Pearson Education Publishers, 2nd Edn. 2009.
4. A.K.Jain, "Fluid Mechanics", Khanna Publishers, 3rd Edn. 2007

BUILDING MATERIALS AND CONSTRUCTION

Course Code: ACE1106

L	T	P	C
4	1	0	4

AIM:

To acquire basic knowledge in different materials used in construction.

SCOPE:

The student shall have basic understanding of various materials like bricks, stones, tiles. The student shall also basic knowledge in various types of foundations, damp proofing materials.

UNIT – I

BRICKS & STONES: Properties of building stones – relation to their structural requirements. Classification of stones – Stone quarrying – precautions in blasting, Dressing of stone, Composition of good brick earth, Qualities of a good brick , various methods of manufacture of bricks. Comparison between clamp burning and kiln burning.

Other types of bricks

UNIT-II

FERROUS AND NON-FERROUS METALS: Ferrous metals, Desirable characteristics of reinforcing steel. Principles of cold working. Detailed Discussion on reinforcing steel, mechanical and physical properties chemical composition.

Aluminum- Brief description on properties and uses.

UNIT – III

TIMBER: Timber Structure – properties – Seasoning of timber, Classification of various types of timbers used in buildings – Defects in timber. Preservation of timber, fire resistance of timber and testing of timber

UNIT-IV

OTHER BUILDING MATERIALS: Characteristics of good tile – manufacturing methods, Types of tiles. Uses and testing of tiles. Gypsum- Properties , building products of gypsum and uses. Glass–ingredients, properties, types and uses.Insulating materials – thermal and sound insulating materials, desirable properties and types.Fiber-reinforced plastics and its uses

UNIT - V

MASONRY: Brick masonry – bonding of bricks, method of laying of bricks, inspection of brick work, construction of half brick masonry wall, height of walls in brick masonry and brick piers.

Stone masonry – classification of stone masonry – Random Rubble, coursed rubble and ashlar masonry.

UNIT – VI

FOUNDATIONS: Width & depth of the foundation- Foundation for a load bearing wall. Foundations of framed buildings- Shallow foundations – Spread, combined- strap and mat foundations.

UNIT –VII

BUILDING COMPONENTS: Lintels, Arches, Vaults-Staircases – Types. Different types of flooring-Concrete, Mosaic, Terrazo floors; Different types of roofs-Pitched, flat and curved Roofs. Lean-to-Roof, Coupled Roofs, Trussed roofs- King and Queen Post Trusses. Doors & Windows – Types, sizes and rate.

UNIT – VIII

OTHER CONSTRUCTION TECHNIQUES: Damp Proofing and water proofing- materials used- specifications of DPC in walls, Basic principles of water proofing of basements, Plastering, pointing, white washing, distempering and painting. Form work and scaffolding.

TEXT BOOKS:

1. S K Duggal, "Building Material", New Age International Publishers; 2nd Edition, 2010.
2. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, "Building Construction", Laxmi Publications (P) ltd., New Delhi, 3rd Edn. 2010.
3. P.C. Varghese, "Building Construction", Prentice-Hall of India Private Ltd, New Delhi, 2nd Edn. 2009,

REFERENCES:

1. R.Chudly, "Construction Technology-Volumes I and II" 2nd Edn., Longman, UK, 1987.
2. P.C. Varghese, "Building materials", Prentice-Hall of India Private Ltd, New Delhi, 1st Edn. 2008.

ENGINEERING GEOLOGY

Course Code: ACE1107

L	T	P	C
4	0	0	4

AIM:

To impart basic concepts of engineering geology that are required by Civil Engineer.

SCOPE:

The student shall have basic understanding of petrology, mineralogy, structural geology, geology of dams, tunnels and reservoirs.

UNIT - I

INTRODUCTION: Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some Civil Engineering constructions due to geological draw backs. Importance of Physical geology, Petrology and Structural geology.

WEATHERING OF ROCKS: Its effect over the properties of rocks importance of weathering with reference to dams, reservoirs and tunnel locations. Weathering profiles of products of granite.

UNIT - II

MINERALOGY: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Physical properties of Minerals. Study of physical properties of following common rock forming minerals: Feldspar, Quartz , Flint , Jasper, Olivine , Augite , Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economic minerals such as Pyrite, Hematite , Magnetite, Chromite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite.

UNIT - III

PETROLOGY:

DEFINITION OF ROCK : Geological classification of Igneous, Sedimentary and Metamorphic rocks. Dykes and sills, common structures

and textures of Igneous, Sedimentary and Metamorphic rocks. Their distinguishing features, Megascopic study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

UNIT - IV

STRUCTURAL GEOLOGY: Out crop, strike and dip Study of common geological structures associating with the rocks such as folds, faults, unconformities and joints - their important types. Insitu and drift soils, common types of soils, their origin and occurrence in India, Stabilisation of soils.

UNIT - V

Earthquakes, their causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Land slides, their causes and effect; measures to be taken to prevent their occurrence. Ground water, Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration.

UNIT – VI

GEOPHYSICAL INVESTIGATION: Importance of Geophysical studies, Principles of geophysical study by Gravity methods. Magnetic methods, Electrical methods. Seismic methods, Radio metric methods. Importance of Electrical resistivity methods, and seismic refraction methods. Improvement of competence of sites by grouting etc.

UNIT – VII

GEOLOGY OF DAMS AND RESERVOIRS: Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Analysis of dam failures of the past. Factor's contributing to the success of a reservoir. Geological factors influencing water, Lightness and life of reservoirs.

UNIT - VIII

Tunnels: Purposes of tunneling, Effects of Tunneling on the ground, Role of Geological Considerations (ie. Lithological, structural and ground water) in tunneling over break and lining in tunnels. Engineering classification

of Rock Masses. Strength modulus ; Rock quality designation, Rock structure rating, Rock mass rating system, Rock quality index system.

TEXT BOOKS:

1) K.V.G.K. Gokhale, "Principles of Engineering Geology", B.S Publications, 2009.

2) N.Chennkesavulu, "Engineering Geology", Mc-Millan, India Ltd. 2005.

3) Parbin Singh, "Engineering and General Geology", SK Katria & Sons, 2009.

REFERENCES:

1. F.G. Bell, "Fundamentals of Engineering Geology", Butterworths, Publications, New Delhi, 1992.

2. Krynine & Judd, "Principles of Engineering Geology & Geotechnics", CBS Publishers & Distribution,

ELEMENTS OF ELECTRICAL ENGINEERING AND MECHANICAL ENGINEERING

Course Code: ACE1108

L	T	P	C
4	0	0	4

AIM:

The aim of the course is to reach the basic fundamental concepts of Electrical and Mechanical Engineering.

SCOPE:

Basic Electrical and Mechanical Engineering is a basic fundamental course for discipline of Civil Engineering, so that students will have to understand its significance.

Electrical:

UNIT-I

FUNDAMENTALS OF ELECTRICAL ENGINEERING: Basic circuit elements – Resistance, Inductance and capacitance –Ohm's law Kirchoff's laws-Faraday's law of Electromagnetic Induction.

FUNDAMENTALS OF AC: Average and effective value-series RL and RC circuits – Active power, Reactive power, Apparent power, Power Factor – Simple Problems.

UNIT II

TRANSFORMERS: Single phase and Three phase transformers-Operation and Construction, EMF equation, losses and efficiency-Simple Poblems.

UNIT III

MEASURMENTS OF ELECTRICAL QUANTIITES: Types of instruments (indicating , intergrating,Recording), Basi Principles of indicating Instruments-Moving Coil and Moving iron Instruments (Ammeters and Voltmeters) Watt meters and Energy meters. Measurement of Insulation Resistance.

UNIT IV

INDUCTION MOTORS: Construction and Principle of operation of three phase induction motor-Torque slip characteristics-applications.

ALTERNATORS: Principle of operation of alternators –Types of alternators, Mechanical:

UNIT –V

MACHINE TOOLS: Lathe, Drilling, milling, shaper and planer description – function of various parts – applications.

UNIT- VI

THERMAL ENGINEERING: IC Engines – Classification and working principles diesel and petrol engines – two stroke and four stroke engines comparison Refrigeration : Block diagram – working principle – refrigeration and properties – Basic principles of air conditioning

UNIT - VII

WELDING: Introduction – classification – arc welding – gas welding – Equipment and materials required for arc and gas cutting

UNIT – VIII

BELTS ROPE AND CHAIN DRIVES: BELT : Introduction , open and crossed belt drives, length of belt, slip, centrifugal tension, limiting ratio of tensions for flat and V- belts, power transmitted

ROPES : Introduction, ratio of driving tensions

CHAINS : Length of chain, power transmitting chains, conveyor chains

FINAL EXAMINATION PATTERN: The end examination paper should consist of Part A and Part B. Part A consist of five questions in Electrical Engineering portion out of which Question No. 1 is compulsory and two questions out of the rest are to be answered. Part B consist of five questions in Mechanical Engineering portion out of which Question No. 1 is compulsory and two questions out of the rest are to be answered. Weight age for Part – A is50% and Part- B is 50%.

TEXT BOOKS:

1. V.K.Mehta and Rohit Mehta, "Principles of Electrical Engineering", S Chand Publications.
2. M.S.Naidu and S Kamakshaiah, " Electrical Technology", TMH Publishers.
3. C P Kondandaraman, "Mechanical Technology"
4. Mathur & Domkundwar, "Mechanical Technology"
5. Khurmi & Gupta (for unit VIII), "Theory of Machines", S. Chand & Co

REFERENCES:

1. I.J.Nagrath and D.P. Kothari, "Theory and Problems and Basic Electrical Engineering", PHI Publications.
2. David V.Kerns, JR J. David Irwin, "Essentials of Electrical and Computer Engineering".
3. Vincent Del Toro, "Electrical Engineering Fundamentals", PHI Publishers 2nd Edition.

STRUCTURAL ENGINEERING LAB

Course Code: ACE1109

L	T	P	C
0	0	3	2

AIM:

To enhance the knowledge gained in theory and have demonstration of various stresses.

SCOPE :

To have basic knowledge of stresses under various loading conditions. To find material properties of wood, steel and bricks.

EXPERIMENTS:

1. Tension test.
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simply supported beam.
4. Torsion test.
5. Hardness test.
6. Spring test.
7. Compression test on wood.
8. Impact test.
9. Shear test.
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of electrical resistance strain gauges.
12. Compression test on Bricks.

ENGINEERING GEOLOGY LAB

Course Code: ACE1110

L	T	P	C
0	0	3	2

Aim:

To enhance the knowledge gained in theory through study and interpretation.

Scope:

The student shall be able to identify rocks and minerals, draw and interpret sections of geological maps and solve simple structural geology problem.

1. Study of physical properties and identification of Rock forming minerals.
2. Study of physical properties and identification of Economic minerals.
3. Megascopic description and identification of Igneous rocks.
4. Megascopic description and identification of Sedimentary rocks.
5. Megascopic description and identification of Metamorphic rocks.
6. Interpretation and drawing of sections for geological maps showing tilted beds.
7. Interpretation and drawing of sections for geological maps showing tilted faults beds.
8. Interpretation and drawing of sections for geological maps showing tilted uniformities.
9. Structural Geology problems – Simple strike problems.
10. Structural Geology problem – Dip problems.

SYLLABI FOR IV SEMESTER

STRENGTH OF MATERIALS – II

Course Code: ACE1111

L	T	P	C
4	1	0	4

AIM:

To study the principal stresses and analysis of compression members.

Scope : Understanding the behaviors of the member subjected to various stresses, analysis of columns and combined direct and bending stresses.

UNIT-I

PRINCIPAL STRESSES AND STRAINS: Introduction – Stresses on an inclined section of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses – Principal stresses and strains – Analytical and graphical solutions.

UNIT – II

THEORIES OF FAILURES: Introduction – Various Theories of failures like Maximum Principal stress theory – Maximum Principal strain theory – Maximum shear stress theory – Maximum strain energy theory – Maximum shear strain energy theory.

UNIT – III

TORSION OF CIRCULAR SHAFTS: Theory of pure torsion – Derivation of Torsional Rigidity equation – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending and torsion and end thrust – Design of shafts according to theories of failure.

UNIT – IV

SPRINGS: Introduction – Types of springs – deflection of close and open coiled helical springs under axial pull and axial couple – springs in series and parallel – Carriage or leaf springs.

UNIT – V

COLUMNS AND STRUTS: Introduction – Types of columns – Short, medium and long columns – Axially loaded compression members – Crushing load – Euler's theorem for long columns- assumptions- derivation of Euler's critical load formulae for various end conditions – Equivalent length of a column – slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – Long columns subjected to eccentric loading – Secant formula – Empirical formulae – Straight line formula – Prof. Perry's formula.

UNIT – VI

DIRECT AND BENDING STRESSES: Stresses under the combined action of direct loading and B.M,. core of a section – determination of stresses in the case of chimneys, retaining walls and dams – conditions for stability – stresses due to direct loading and B.M. about both axis.

UNIT – VII

UNSYMETRICAL BENDING: Introduction – Centroidal principal axes of section – Graphical method for locating principal axes – Moments of inertia referred to any set of rectangular axes – Stresses in beams subjected to unsymmetrical bending – Principal axes – Resolution of bending moment into two rectangular axes through the centroid – Location of neutral axis Deflection of beams under unsymmetrical bending.

UNIT – VIII

THICK CYLINDERS: Introduction Lame's theory for thick cylinders – Derivation of Lame's formulae – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders – Necessary difference of radii for shrinkage – Thick spherical shells.

TEXT BOOKS:

1. R.K.Bansal, "A Text book of Strength of Materials", Laxmi Publications (P) ltd., New Delhi, 4th Edn. 2008.
2. Sadhu Singh, "Strength of Material", Khanna Publications, 2nd Edn. 2001.
3. S. Ramamrutham and R.Narayanan, "Strength of Materials", Dhanpat Rai Publications, 11th Edn. 2009.

REFERENCES:

1. Ferdinandp Beer and Johnston, "Mechanics of Solid", Tata Mc.Grawhill Publications, 6th Edn. 2000.
2. Schaum's out line series, "Strength of Materials", Mc. Graw Hill International Editions, 10th Edn. 2007.
3. R.K.Rajput, "Strength of materials", S.Chand & Co, New Delhi, 4th Edn. 2010.
4. A.R.Basu, "Strength of Materials, Dhanpat Rai & Co, Nai Sarah, New Delhi, 2nd Edn. 2008.
5. L.S.Srinath et al., "Strength of Materials", Macmillan India Ltd., Delhi, 1st Edn. 2001.
6. S.B. Junnarkar, "Mechanics of Structures", Charotar Publishing House, Anand, Gujrat, 10th Edn. 2000.

HYDRAULICS AND HYDRAULIC MACHINERY

Course Code: ACE1112

L	T	P	C
4	1	0	4

AIM:

To provide necessary theoretical background to study the courses in Water Resources Engineering, Hydropower Engineering and Environmental Engineering fields.

SCOPE:

To provide necessary back ground for understanding the behaviour of flow of water in channels and rivers, and the working principles of Turbines and Centrifugal Pumps.

UNIT – I

DIMENSIONAL ANALYSIS & SIMILITUDE: Dimensional analysis-Rayleigh's method and Buckingham pi theorem-study of Hydraulic models–Geometric, kinematic and dynamic similarities-dimensionless numbers – model and prototype relations.

UNIT-II

BASICS OF TURBO MACHINERY: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency-Angular momentum principle, Applications to radial flow turbines.

UNIT – III

HYDRAULIC TURBINES–I: Layout of a typical Hydropower installation – Heads and efficiencies-classification of turbines-Pelton wheel-Francis turbine-Kaplan turbine-working, working proportions, velocity diagram, work done and efficiency, hydraulic design.

UNIT – IV

HYDRAULIC TURBINES–II: Draft tube – theory and function efficiency, modern developments of turbines, Governing of turbines-Runaway speed of turbines - surge tanks –water hammer.

UNIT – V

PERFORMANCE OF TURBINES: Performance under unit and specific head -unit speed-unit quantity-unit power-specific speed - performance characteristics -cavitation,

UNIT – VI

CENTRIFUGAL PUMPS : Pump installation details-classification-work done- Manometric head-minimum starting speed-losses and efficiencies-specific speed - multistage pumps-pumps in series and parallel-performance of pumps-characteristic curves- NPSH-cavitation.

UNIT – VII

OPEN CHANNEL FLOW-I: Types of flows – Type of channels – Velocity distribution – Energy and momentum correction factors – Chezy's, Manning's; and Bazin formulae for uniform flow – Most Economical sections.

Critical flow: Specific energy-critical depth – computation of critical depth – critical sub-critical and super critical flows.

UNIT – VIII

OPEN CHANNEL FLOW II: Non uniform flow-Dynamic equation for gradually varied flow Mild, Critical, Steep, horizontal and adverse slopes-surface profiles-direct step method- Rapidly varied flow, hydraulic jump, energy dissipation.

TEXT BOOKS:

1. V.L.Streeter, Benjamin Wiley and Bedford, "Fluid Mechanics" (9th Edn), Mc Graw Hill Book company, Asian Students Edition, 2010.
2. Modi P.N and S.N. Seth, "Fluid Mechanics and Hydraulic Machinery", Khanna Publishers, 10th Edn. 2001.

3. Subramanya. K, "Open Channel Flow", Prentice Hall Publications, 5th Edn. 2002.

REFERENCES:

1. Ven Te Chow, "Open Channel Flow", Mc Graw Hill Book company, 4th Edn. 2000.
2. A.K. Mohanty, "Fluid Mehanics", Prentice Hall of India Pvt. Ltd., New Delhi, 1st Edn. 2011.
3. Dr. R.K. Bansal, "A Textbook of Fluid Mechanics and Hydraulic Machines", Laxmi Publications (P) Ltd., New Delhi, 2nd Edn. 2006.
4. Frank.M. White, "Fluid Mechanics" Tata Mc.Grawhill Pvt. Ltd., 2nd Edn. 2000.
5. Srivatsava, "Open Channel Flow", Oxford publishers, 1st Edn. 2009.
6. J.F. Douglas, J.M. Gasirock and J.A. Swaffield, "Fluid Mechanics (LPE)", Pearson Education Publishers, 2nd Edn. 2009.

CONCRETE TECHNOLOGY

Course Code: ACE1113

L	T	P	C
4	0	0	4

AIM:

To impart basic knowledge on manufacturing and performance of ordinary and some special concretes.

SCOPE:

To learn the properties of various ingredients of concrete, To understand the concept of workability and Study various tests on concrete, to know about various types of concrete.

UNIT-I :

CONSTITUENTS OF CONCRETE

Concrete as a Building Material

Cement : Chemical Composition, Chemical and Physical processes of Hydration, Structure of Hydrated Cement, Blended Cements, Properties of cement and their effect on properties of Concrete. (test procedures not required)

Aggregates : Classification, Mechanical, Physical and Thermal properties of Fine and Course aggregates that effect the properties of concrete. (test procedures not required)

Quality of mixing water : Specifications for quality of mixing water and Curing water (test procedures not required)

UNIT – II:

MANUFACTURING OF CONCRETE AND SPECIAL PROCESSES OF CONCRETING

Manufacture of Concrete : Mixing – Transporting – Placing – Compacting – Curing. Safe Stripping Time.

Special Processes of Concreting : Hot and cold weather concreting – Sprayed Concrete – Underwater Concrete –Grouted concrete – Mass concrete – Pumped concrete – Concrete for Liquid Retaining Structures – Slip form construction – Concrete coatings & surface treatments.

UNIT – III:

FRESH CONCRETE:

Properties of Fresh Concrete : need for study

Workability : Definition, Factors affecting workability, significance, Tests available for measurement (test procedures not required)

Segregation and Bleeding : Definitions – causes and effects, measurement – Laittance, Factors effecting performance of Hardened concrete, Water/ Cement Ratio, Abram's law, Powers law, Gel space ratio, Maturity concept.

UNIT – IV:

HARDENED CONCRETE:

Properties of Hardened concrete : Compressive strength – Tensile Strength – Flexural Strength – Young's Modulus and Poissons ratio, Deformation characterstics: Creep – Shrinkage – Soundness & Thermal properties, Durability.

UNIT – V:

TESTING OF HARDENED CONCRETE QUALITY CONTROL : Destructive, partially destructive and Non destructive testing of concrete, codal provisions, relationship between tensile strength and compressive strength, cube strength and cylinder strength.

Variability of Concrete Strength, Concept of Quality, Stages and means of Control, Statistical methods of measuring Variability, Acceptance Criteria, applications.

UNIT – VI:

ADMIXTURES :

Mineral Admixtures : Flyash, GGBS, Silica Fume – origin and manufacture, Chemical Composition, Chemical and Physical processes of hydration, effects on properties of concrete.

Chemical Admixtures : Classification, origin and manufacture, chemical composition, actions and interactions, applications.

UNIT – VII:

SPECIAL CONCRETES-I : Plain concrete – Reinforced Concrete – Prestressed Concrete – Light weight concrete – Cellular concrete – No fines concrete – Aerated and foamed concrete – Smart Concrete – Fiber reinforced concrete – Polymer concrete – Flyash concrete – Self compacting concrete.

UNIT – VIII :

SPECIAL CONCRETES-II: High performance concrete – Very high strength concete – High density concrete – Lime concrete – Sulpher impregnated concrete – Refractory concrete – Radiation shielding concrete – Recycled concrete – Roller compacted concrete.

TEXT BOOKS:

1. A.M.Neville, J.J.Brookes, "Concrete Technology", Pearson Education, 5th Edn. 2009.
2. M.S.Shetty, "Concrete Technology", Chand Publication, 6th Edn. 2010.

REFERENCES:

1. A.M.Neville, "Properties of Concrete", 2nd Edn. 2000.
2. A.R.Shanta Kumar, "Concrete Technology", Oxford University Press, New Delhi, 1st Edn. 2010.
3. N.Krishna Raju, "Design of Concrete Mixes", CBS Publishers and distributors, 2nd Edn. 2007.
4. M.L.Gambhir, "Concrete Technology", Tata McGrawhill Publishers, New Delhi, 3rd Edn. 2008.

BUILDING PLANNING, SERVICES AND DRAWING

PART-A

Course Code: ACE1114

L	T	P	C
3	0	2	4

AIM :

To understand the various planning principles and have basic knowledge on building drawing.

SCOPE:

Student shall have basic knowledge different building bye-laws. The student shall have basic understanding on various planning principles of residential and public buildings.

UNIT – I

BUILDING BYELAWS AND REGULATIONS: Introduction – Terminology – Objectives of building byelaws – Floor area ratio (FAR) – Floor space Index (FSI) – Principles underlying building byelaws – classification of buildings – Open space requirements – built up area limitations – Height of Buildings – Wall thickness – lighting and ventilation requirement.

UNIT – II

RESIDENTIAL BUILDINGS: Minimum standards for various parts of buildings – requirements of different rooms and their grouping – characteristics of various types of residential buildings.

UNIT – III

PUBLIC BUILDINGS: Planning of Educational institutions, hospitals, dispensaries, Office buildings, banks, industrial buildings, hotels and motels, buildings for recreation.

UNIT – IV

Components of building automation system - HVAC, electrical lighting

Components of building automation system - Security, fire-fighting, communication etc.,

PART-B

UNIT – V

SIGN CONVENTIONS AND BONDS: Brick, Stone, Plaster, Sand filling, Concrete, Glass, Steel, Cast iron, Copper alloys, Aluminium alloys etc., Lead, Zinc, tin, white lead etc., Earth, Rock, Timber and Marble. English bond & Flemish bond, odd & even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.

UNIT – VI

DOORS WINDOWS, VENTILATORS AND ROOFS: Paneled Door – paneled and glazed door, glazed windows – paneled windows – Swing ventilator – Fixed ventilator-Couple roof – Collar roof – King Post truss – Queen post truss.

UNIT – VII

Sloped And Flat Roof Buildings

UNIT – VIII

Given line diagram with specification to draw, plan, sections section and elevation

FINAL EXAMINATION PATTERN: The end examination paper should consist of Part A and Part B. Part A consist of five questions in planning portion out of which three questions are to be answered. Part B should consist of two questions from drawing part out of which one is to be answered in drawing sheet. Weight age for Part – A is 50% and Part- B is 50%.

TEXT BOOKS:

1. 'A' Series & 'B' Series of JNTU Engineering College, Anantapur,
2. N.Kumarswamy and A.Kameswara Rao, "Building Planning and Design", New Age Publishers, 1st Edn. 2001.
3. Gurucharan Singh, "Building Planning Scheduling and Design", Khanna Publishers, 1st Edn. 2003.

REFERENCES:

1. Building by laws bye state and Central Governments and Municipal corporations. National Building Code

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Code: AHM1101

L	T	P	C
4	0	0	4

OBJECTIVE

To explain the basic principles of managerial economics, accounting practices and financial management techniques for effective business decision making and to promote entrepreneurial abilities among budding engineers

OUTCOME

To understand the economic environment and to give an idea on various accounting and
financial management techniques for effective utilization of economic resources

UNIT-I

INTRODUCTION TO MANAGERIAL ECONOMICS: Definition, Nature and Scope of Managerial Economics, Demand Analysis, Demand Determinants, Law of Demand and its exceptions

UNIT-II

ELASTICITY OF DEMAND AND DEMAND FORECASTING

Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, Methods of demand forecasting (Survey method, Statistical method, Expert opinion method, Test marketing, Controlled experiment, Judgmental approach)

UNIT-III

THEORY OF PRODUCTION AND COST ANALYSIS : Production Function – Isoquants and Isocosts, Laws of returns, Internal and External Economies of Scale

COST ANALYSIS: Types of Costs, Break Even Analysis (BEA) – Determination of Break Even Point (Simple numerical problems) – managerial significance and limitations of BEA

UNIT-IV

INTRODUCTION TO MARKETS

Market Structures: Types of competition, features of perfect competition, monopoly and monopolistic competition, price output determination in case of perfect competition and monopoly

UNIT-V

FORMS OF BUSINESS ORGANIZATIONS : Features of Business, Advantages, Limitations of Sole Proprietorship, Partnership and Joint Stock Company

UNIT-VI

INTRODUCTION TO FINANCIAL ACCOUNTING : Accounting: Principles, concepts, conventions, double entry book keeping, Journal, Ledger. Trial Balance, Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments, international financial reporting standards (simple numerical problems)

UNIT-VII

FINANCIAL ANALYSIS THROUGH RATIOS : Introduction, Advantages and limitations, Computation, Analysis and Interpretation of Liquidity ratios, Activity ratios, Solvency ratios and Profitability ratios (simple numerical problems)

UNIT-VIII

BUDGETING AND CAPITAL BUDGETING : Introduction to Budgeting: Production budget, Flexible budget and Cash budget

Definition, nature and scope of capital budgeting, features of capital budgeting proposals, methods of capital budgeting: Traditional and discounted methods (simple numerical problems)

TEXT BOOKS:

1. Aryasri , "Managerial Economics and Financial Analysis", Tata McGraw Hill, 3rd Edn.2009
2. Siddiqui and Siddiqui , "Managerial Economics and Financial Analysis", New Age Publishers, 1st Edn. 2005

REFERENCE BOOKS:

1. R L Varshney and K L Maheswari, "Managerial Economics", Sultan Chand & Sons.
2. D Ragnunath Reddy & M V Narasimha Chary, "Managerial Economics and Financial Analysis", SciTech Publications
3. Dwivedi, "Managerial Economics", Vikas Publishers
4. P K Sharma and Shashi K Gupta, "Management Accounting", Kalyani Publishers
5. S P Jain and K L Narang, "Financial Accounting", Kalyani Publishers
6. Bhattacharya, "Management Accounting", Pearson Education
7. P L Mehta, "Managerial Economics", Sultan Chand & Sons

STRUCTURAL ANALYSIS – I

Course Code: ACE1115

L	T	P	C
4	0	0	4

AIM:

To improve the basic principles for analysis of statically indeterminate structuresubjected to static loads and determinate structures subjected to moving loads.

SCOPE:

The student shall be able to analyse (i) propped cantilevers, fixed beams, continuous beams by different methods. (ii) Simply supported beams and trusses subjected to moving loads.

UNIT – I

PROPPED CANTILEVERS : Analysis of propped cantilevers - Shear force and Bending moment diagrams-Deflection of propped cantilevers.

UNIT – II

FIXED BEAMS: Introduction to statically indeterminate beams with U.D.L, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads, shear force and Bending moment diagrams-Deflection of fixed beams, effect of sinking of support, effect of rotation of a support.

UNIT – III

CONTINUOUS BEAMS : Introduction-Clapeyron's theorem of three moments- Analysis of continuous beams with constant moment of inertia with one or both ends fixed-continuous beams with overhang, continuous beams with different moment of inertia for different spans-Effects of sinking of supports-shear force and Bending moment diagrams.

UNIT-IV

TRUSSES: Analysis of trusses using tension –coefficient method.

UNIT – V

ENERGY THEOREMS: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces – Castigliano's first theorem-Deflections of simple beams and pin jointed trusses.

UNIT – VI

MOVING LOADS: Introduction, maximum S.F and B.M at a given section and absolute maximum S.F. and B.M due to single concentrated load, U.D.L longer than the span, U.D.L shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length.

UNIT – VII

INFLUENCE LINES: Definition of influence line for S.F, Influence line for B.M- load position for maximum S.F at a section -Load position for maximum B.M at a section, single point load, U.D.L longer than the span, U.D.L shorter than the span- Influence lines for forces in members of Pratt and Warren trusses.

UNIT –VIII

INDETERMINATE STRUCTURAL ANALYSIS:

Indeterminate Structural Analysis –Determination of static and kinematic indeterminacies –Solution of trusses with upto one degrees of internal and external indeterminacies –Castigliano's theorem

TEXT BOOKS:

1. V.N. Vazirani & M.M.Ratwani, "Analysis of Structures-Vol I & Vol II", Khanna Publications, New Delhi.
2. T.S. Thandavamoorthy, "Analysis of Structures", Oxford University Press, New Delhi
3. Dr. R. Vaidyanathan & Dr. P.Perumal, "Comprehensive Structural Analysis-Vol.I & 2", Laxmi publications Pvt. Ltd., New Delhi

4. C.S. Reddy, "Basic structural Analysis" Tata Mcgrawhill, New Delhi

REFERENCES:

1. S.B.Junnarkar, "Mechanics of Structures", Charotar Publishing House, Anand, Gujrat, 10th Edn. 2000.
2. Gupta, Pandit & Gupta, "Theory of Structures", Tat Mc.Graw – Hill Publishing Co.Ltd., New Delhi, 3rd Edn. 2006.
3. R.S. Khurmi, "Theory of Structures", S. Chand Publishers, 2nd Edn. 2000.
4. B.C.Punmia, "Strength of Materials and Mechanics of Structures", Khanna Publications, New Delhi, 2nd Edn. 2006.
5. B.D. Nautiyal, "Introduction to Structural Analysis", New age International Publishers, New Delhi, 1st Edn. 2008.

FLUID MECHANICS LAB

Course Code: ACE1116

L	T	P	C
0	0	3	2

AIM:

To introduce concepts of fluid flow and hydraulic machines to make the students gainful.

SCOPE:

To Gain basic knowledge on Fluid Statics, Fluid Dynamics, closed conduit flows and know the basic machinery with their efficiencies. Create much awareness on Turbines, Pumps and their performances.

1. EXPERIMENTS:

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice by a constant head method.
3. Determination of Coefficient of discharge for an external mouth piece by variable head method.
4. Calibration of contracted Rectangular Notch and Triangular Notch
5. Determination of Coefficient of loss of head in a sudden contraction and friction factor.
6. Verification of Bernoulli's equation.
7. Impact of jet on vanes
8. Study of Hydraulic jump.
9. Performance test on Pelton wheel turbine
10. Performance test on Francis turbine.
11. Efficiency test on centrifugal pump.

CONCRETE TECHNOLOGY LAB

Course Code: ACE1117

L	T	P	C
0	0	3	2

AIM:

The Concrete Technology Laboratory focuses on the tests on different ingredients of Concrete, Fresh Concrete and hardened Concrete.

OBJECTIVES:

- ✤ To make students realize the importance of evaluating the quality of ingredients .
- ✤ To enable them to evaluate different properties of Cement, Fine aggregate and Course Aggregate
- ✤ To help students understand the importance of properties of Fresh and Hardened Concrete and their evaluation procedures.

LIST OF EXPERIMENTS

TESTS ON CEMENT

1. (a) Determination of Fineness of Cement.
   (b) Determination of Specific Gravity of Cement.
2. (a) Determination of Normal Consistency of Cement.
   (b) Determination of Initial and Final Setting time of Cement.
3. (a) Determination of Soundness of Cement.
   (b) Determination of Compressive Strength of Cement.

TESTS ON AGGREGATE

4. (a) Determination of Fineness Modulus and Zone of Sand.
   (b) Determination of Fineness Modulus of Course Aggregate.
5. (a) Determination of Bulk Density of Fine aggregate.
   (b) Determination of Bulk density of Course aggregate.

6 (a) Determination of Specific Gravity of Fine aggregate.

(b) Determination of Specific Gravity of Course Aggregate.

7. (a) Determination of Bulking of Sand.

(b) Determination of Water absorption of Course Aggregate.

TESTS ON FRESH CONCRETE

8. (a) Determination of Workability of Concrete by Slump Cone test.

(b) Determination of Workability of Concrete by Compaction Factor test (To cast a cube and Cylinder for testing after 7 or 14 days).

9. (a) Determination of Workability of Concrete by Vee-bee Consistometer test.

(b) Determination of Workability of Concrete by Flow table test. (To cast a prism and a cylinder for testing after 7 or 14 days).

TESTS ON HARDENED CONCRETE

10. (a) Determination of Compressive Strength and Youngs Modulus of Concrete cube.

(b) Determination of Compressive Strength and Youngs Modulus of Concrete cylinder.

11. (a) Determination of Flexural Tensile Strength of Concrete Prism.

(b) Determination of Split tensile strength of Concrete cylinder.

DEMONSTRATION

12. (a) Non-destructive testing of Concrete (Rebound hammer).

(b) Determination of moisture content in fine aggregate by Rapid moisture Metre.

SYLLABI FOR V SEMESTER

WATER RESOURCES ENGINEERING- I

Course Code: ACE 1118

L	T	P	C
4	1	0	4

AIM :

To provide the necessary background for understanding the occurence and movement of water in hydrosphere and to enable the student to understand Irrigation Engineering Principles and practices.

SCOPE :

To familiarize the student with the basics of Hydrology, Irrigation Principles and practices, and conveyance of irrigation water.

UNIT-I

INTRODUCTION TO HYDROLOGY : Introduction to Engineering hydrology and its applications, Hydrologic cycle, types and forms of precipitation, rainfall measurement, types of rain gauges, computation of average rainfall over a basin, processing of rainfall data.

UNIT-II

DESCRIPTIVE HYDROLOGY : Abstraction from rainfall-evaporation, factors affecting evaporation, measurement of evaporation-evapotranspiration-Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices. Runoff-components of runoff, factors affecting runoff, stream gauging, effective rainfall, separation of base flow.

UNIT-III

HYDROGRAPH ANALYSIS : Unit Hydrograph, definition, limitations, applications of Unit hydrograph, derivation of Unit Hydrograph, S-hydrograph, IUH, Synthetic Unit Hydrograph.

UNIT-IV

ESTIMATION OF FLOOD DISCHARGE : Design Discharge, Computation of design discharge-rational formula, SCS method, flood

frequency analysis-Gumbel's method, log Pearson III method, basic concepts of flood routing-hydraulic and hydrologic routing, channel and reservoir routing.

UNIT-V

GROUND WATER : Ground water Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, types of wells, Darcy's law, radial flow to wells in confined and unconfined aquifers.

UNIT-VI

INTRODUCTION TO IRRIGATION : Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods of application of Irrigation water, Indian agricultural soils, methods of improving soil fertility, preparation of land for Irrigation, standards of quality for Irrigation water.

UNIT-VII

WATER REQUIREMENT OF CROPS : Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, estimation of consumptive use, Duty and delta, factors affecting duty, depth and frequency of Irrigation, irrigation efficiencies.

UNIT-VIII

DESIGN OF CHANNELS : Classification of canals, design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, canal lining.

TEXT BOOKS:

1. Jayaram Reddy, "Engineering Hydrology", Laxmi Publications Pvt. Ltd., New Delhi, 2nd Edition, reprint 2008.
2. Punmia B.C., Pande B.B.L., Ashok K.R. Jain, Arun K.R. Jain, "Irrigation & Water Power Engineering" Laxmi Publications (P) Ltd., New Delhi, 16th Edition, 2009.
3. R.K.Sharma & T.K. Sharma, "Hydrology and Water Resource Engineering", Dhanpat Rai, 1st Edn. 2009.

REFERENCES:

1. V.P.Singh, "Elementary Hydrology" PHI Publications, 2nd Edn. 2006.
2. P.N.Modi, "Irrigation, Water Resources & Water Power Engineering", Standard Book House, Rajsons Publications Pvt. Ltd., 4th Edn. 2008.
3. D.K. Majumdar, "Irrigation Water Management" Prentice Hall of India, 3rd Printing, 2004.
4. Subramanya K, "Engineering Hydrology" Tata Mc Graw-Hill Publishing Company Ltd., New Delhi, 3rd Edition, 2008.

REINFORCED CONCRETE STRUCTURES- I

Course Code: ACE 1119

L	T	P	C
4	1	0	4

AIM :

The main objective of the course is to impart the basic concepts of design of reinforced concrete structures by limit state and working stress methods.

OBJECTIVE :

The students shall be able to design of beams, columns, footings and slabs including detailing as per IS : 456-2000, SP -16 and other relevant codes.

UNIT-I

INTRODUCTION TO LIMIT STATE DESIGN : Concepts of limit state design- Characteristic loads-Characteristic strength-Partial loads and material safety factors- representative stress- strain curves- Assumptions in limit state design – Stress block parameters – Limiting moment of resistance.

UNIT-II

SINGLY AND DOUBLY REINFORCED BEAMS : Limit state analysis and design of singly reinforced , doubly reinforced, T and L beam sections.

UNIT-III

SHEAR, TORSION AND BOND: Limit state analysis and design of sections for shear and torsion – concept of bond, anchorage and development length, I.S Code provisions. Design examples in simply supported and continuous beams.

UNIT-IV

SLABS : Design of one way slabs – Two way slabs –Continuous slabs using IS coefficients.

UNIT-V

COLUMNS : Short and long columns – under axial loads –uniaxial bending and bi-axial bending – I.S code provisions.

UNIT-VI

FOOTINGS : Footings : Different types of footings – Design of isolated, square, rectangular and circular footings.

UNIT-VII

LIMIT STATE DESIGN : Limit state design for serviceability for deflection, cracking and codal provisions.

UNIT-VIII

INTRODUCTION TO WORKING STRESS METHOD: Introduction – Design for bending – Design procedure – balanced sections – Analysis of a given section in bending – Depth of neutral axis with compression steel – Other design problems by working stress method.

NOTE : All the designs to be taught in Limit State Method

Following plates should be prepared by the students.

1. Reinforcement particulars of T-beams and L-beams.
2. Reinforcement detailing of continuous beams.
3. Reinforcement particulars of columns and footings.
4. Detailing of One way, Two way and continuous slabs

TEXT BOOKS:

1. S.Unnikrishna Pillai & Devdas Menon, "Reinforced Concrete Design" Tata Mc.Graw Hill, New Delhi, 3rd Edition, 2009.
2. N.C. Sinha and S.K Roy, "Fundamentals of Reinforced Concrete" S. Chand Publishers, 2002 4th Edition.
3. N. Krishna Raju and R.N. Pranesh, "Reinforced Concrete Design" New Age International Publishers, New Delhi, 2004, 8th Edition.
4. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, "Limit State Design" Laxmi Publications Pvt. Ltd., New Delhi, 2003.

5. P.C.Varghese, "Limit State Designed of Reinforced Concrete" Printice Hall of India, New Delhi.

REFERENCES :

1. M.L. Gambhir, "Fundamentals of Reinforced Concrete Design" Prentice Hall of India Private Ltd., New Delhi, 2004.
2. P.Purushotham, "Reinforced Concrete Structural Elements - Analysis and design", Tata Mc.Graw-Hill, 1994.
3. Arthus H.Nilson, David Darwin, and Chorles W. Dolar, "Design of Concrete Structures" Tata Mc.Graw-Hill, 3rd Edition, 2005.
4. J.N. Bando Padhyay "Design of Concrete Structures", PHI Publishers, 2010.

GEOTECHNICAL ENGINEERING-I

Course Code: ACE 1120

L	T	P	C
4	1	0	4

AIM :

To study the influence of soil properties on Civil Engineering structures.

OBJECTIVE :

Understanding of various concepts of geotechnical engineering, including classification, Soil strength and the behaviour of the soil when loads are transferred to it from structures constructed in/ on it.

UNIT-I

INTRODUCTION: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass- volume relationships – Relative density.

UNIT-II

INDEX PROPERTIES OF SOILS: Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – I.S. Classification of soils

UNIT-III

PERMEABILITY: Soil water – capillary rise – flow of water through soils – Darcy's law- permeability – Factors affecting permeability, capillary phenomenon in soils – laboratory determination of coefficient of permeability–Permeability of layered systems.

UNIT-IV

SEEPAGE THROUGH SOILS: Total, neutral and effective stresses –quick sand condition – Seepage through soils – Flownets: Construction, Characteristics and Uses.

UNIT-V

STRESS DISTRIBUTION IN SOILS: Boussinesq's and Westergaard's theories for point loads and for areas of different shapes Newmark's influence chart .

UNIT-VI

COMPACTION: Mechanism of compaction – factors affecting compaction– effects of compaction on soil properties – Field compaction equipment – field compaction control.

UNIT-VII

CONSOLIDATION : Stress history of clay; compressibility of soils, Terzaghi's one dimensional consolidation theory, consolidation test, pre-consolidation pressure, e-p and e-log p curves, total settlement.

UNIT-VIII

SHEAR STRENGTH OF SOILS : Mohr – Coulomb Failure theories – Types of laboratory strength tests – strength tests based on drainage conditions – Shear strength of sands – Critical Void Ratio – Liquefaction-shear strength of clays, pore pressure coefficients.

TEXT BOOKS:

1. C. Venkataramiah, "Geotechnical Engineering", New Age International Pvt. Ltd, Revised 3rd Edition, 2008.
2. Gopal Ranjan & ASR Rao, "Basic and Applied Soil Mechanics", New Age International Pvt . Ltd, New Delhi, 2nd Edition, 2008.
2. K.R. Arora, "Soil Mechanics and Foundation Engg.", Standard Publishers and Distributors, Delhi, 5th Edition, 2001.
4. V.N.S.Murthy, "Soil Mechanics and Foundation Engg.", CBS Publishers and Distributors, 4th Edition, 2010.
5. Kalita, Ustav Chandra, "Soil Mechanics & Foundation Enginering", PHI learning, 1st Edition, 2011.

REFERENCES:

1. T.W. Lambe and R.V. Whitman, "Soil Mechanics", Wiley India, 3rd Edition, 2008.
2. Purushotham Raj, " Geotechnical Engineering", Pearson Edition, 2nd Edition, 2009.
3. Manoj Dutta & Gulati S.K, "Geotechnical Engineering", Tata Mc Grawhill Publishers, New Delhi, 2nd Edition, 2006.

4. Roberto Nova, Lawra Gabrieli, “Soil Mechanics”, Wiley Publications, 1st Edition, 2010.
5. D.P.Coduto, “Geotechnical Engineering Principles and Practices”, Pearson, 3rd Edition, 2010.
6. NPTEL Video lectures.
7. IS 2720 all parts, and other Relevant IS codes, Special Publications and Handbooks.

STRUCTURAL ANALYSIS – II

Course Code: ACE 1121

L	T	P	C
4	1	0	4

AIM :

To impart knowledge on various energy and matrix methods of structural analysis.

SCOPE :

The student (i) shall be able to analyse arches, beams, frames by slope deflection method, moment distribution method and Kani's method (ii) shall be able to analyse building frames by approximate methods. (iii) shall be able to apply matrix methods to continuous beams.

UNIT-I

ARCHES : Three hinged, Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature.

UNIT-II

TWO HINGED ARCHES: Determination of horizontal thrust, bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, tied arches – basic concepts of fixed arches.

UNIT-III

APPROXIMATE METHODS : Approximate method of structural analysis, application to building frames. (i) Portal method (ii) Cantilever method.

UNIT-IV

APPROXIMATE METHODS : Derivation of slope deflection equation - application to continuous beams including settlement of supports, single bay- single storey portal frame including side sway.

UNIT-V

MOMENT DISTRIBUTION METHOD : Stiffness and carry over factors – Distribution factors – Analysis of continuous beams with and without sinking of supports – single storey portal frames – including sway - Substitute frame analysis by two cycle method.

UNIT-VI

KANI'S METHOD: Analysis of continuous beams – including settlement of supports - single bay portal frames with side sway.

UNIT-VII

FLEXIBILITY METHOD : Introduction, application to continuous beams including support settlements.

UNIT-VIII

STIFFNESS METHOD: Introduction, application to continuous beams including support settlements.

TEXT BOOKS:

1. Bhavikatti S.S, "Analysis of Structures, Vol. I & II", Vikas Publications, 6th Edition, 2009.
2. Vazirani & Ratwani, "Analysis of structures", Khanna Publications, 19th Edition, 2008.
3. B.C. Punmia, "Strength of Materials and Mechanics of Solids Vol-2", Laxmi Publications, New Delhi, 10th Edition, 2009.
4. B.C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, "Theory of Structures", Laxmi Publications, 12th Edition, 2004.

REFERENCES:

1. Pandit and Gupta, "Structural Analysis (Matrix Approach)", Tata Mc Graw Hill, New Delhi, 2008.
2. S. Ramamurtham, R. Narayan, "Thoery of Structures", Dhanapati Rai Publishing company, 9th Edition, 2010.
3. C.S.Reddy, "Structural Analysis", Tata Mc Graw Hill, New Delhi, 2008.

TRANSPORTATION ENGINEERING - I

Course Code: ACE 1122

L	T	P	C
4	0	0	4

AIM :

To introduce basic concept of Geometric Design of Highways and Traffic Engineering.

SCOPE :

Overview of the highway development and Planning, importance of highway materials, concept of the highway geometric design and basics of traffic engineering using relevant codes.

UNIT-I

HIGHWAY DEVELOPMENT AND PLANNING: Highway development in India – Necessity for Highway Planning- Different Road Development Plans- Classification of Roads- Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports.

UNIT-II

HIGHWAY MATERIALS: Highway materials- soil, aggregate and bitumen –test on aggregate – aggregate properties and their importance. Tests on Bitumen – Bituminous concrete – Requirements of design mix – Marshall method of Bituminous mix design.

UNIT-III

HIGHWAY GEOMETRIC DESIGN-I : Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements- Sight Distance Elements- Stopping sight Distance, Overtaking Sight Distance and intermediate Sight Distance.

UNIT-IV

HIGHWAY GEOMETRIC DESIGN-II : Design of Horizontal

Alignment- Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical alignment-Gradients- Vertical curves.

UNIT-V

TRAFFIC ENGINEERING : Basic Parameters of Traffic-Volume, Speed and Density- Traffic Volume Studies-speed studies- Data Collection and Presentation- Parking Studies and Parking characteristics- Road Accidents-Causes and Preventive measures- Accident Data Recording – Condition Diagram and Collision Diagrams.

UNIT-VI

TRAFFIC REGULATION AND MANAGEMENT : Road Traffic Signs – Types and Specifications – Road markings-Need for Road Markings-Types of Road Markings- Design of Traffic Signals –Webster Method –IRC Method.

UNIT-VII

AT GRADE INTERSECTION DESIGN : Types of Intersections – Conflicts at Intersections- Types of At-Grade Intersections- Channelisation: Objectives –Traffic Islands and Design criteria – Rotary - Types.

UNIT-VIII

GRADE SEPARATED INTER SECTION DESIGN : Types of Grade Separated Intersections- Rotary Intersection – Flyovers, ROB, Cloverleaf (partial, full). Criteria for selection, Advantage, disadvantages of grade separated intersection.

TEXT BOOKS:

1. S.K.Khanna & C.E.G.Justo "Highway Engineering", Nemchand & Bros., 7th Edition, 2000.
2. L.R.Kadiyali and Lal "Principles & Practices of Highway Engineering" Khanna Publications, 4th Edition, 2004.
3. V.N.Vazirani and S.P.Chandra, "Transportation Engineering- Vol. I", Khanna Publications, 4th Edition, 1994.

REFERENCES:

1. S.P.Bindra, "Highway Engineering", Dhanpat Rai & Sons. 4th Edition (1981)

2. Dr. L.R. Kadyali, "Traffic Engineering & Transportation Planning", Khanna Publications, 6th Edition – 1997.
3. NPTEL Videos
4. Indian Road Congress, Ministry of Road Transport and Highways, Special Publications

ESTIMATION & QUANTITY SURVEYING

Course Code: ACE 1123

L	T	P	C
4	0	0	4

AIM :

To provide the basic knowledge on estimation of buildings, roads and drainage works.

OBJECTIVE :

At the end of the course, the student shall be able to do the detailed estimate of buildings and roads.

UNIT-I

INTRODUCTION : General items of work in Building – Standard Units –Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating.

UNIT-II

Detailed Estimates of Buildings.

UNIT-III

Standard specifications for different items of building construction.

UNIT-IV

Rate Analysis – Working out data for various items of work, over head and contingent charges.

UNIT-V

Reinforcement bar bending and bar requirement schedules.

UNIT-VI

Contracts – Types of contracts – Contract Documents – Conditions of contract

UNIT-VII

Valuation of buildings – Purpose and Principles of valuation – Technical terms – Methods of valuation.

UNIT-VIII

Estimation of quantities for road work items.

TEXT BOOKS:

1. B.N. Dutta, "Estimating and Costing", UBS Publishers, 2000, 10th Edition.
2. G.S. Birdie "Estimating and Costing", Dhanapati Rai Publishing Company, 6th Edition, 2005.
3. A.K. Upadhyay, "Civil Estimating and Costing", S.K. Kataria and Sons Publishers, 2010, 8th Edition.

REFERENCES:

1. Standard Schedule of Rates and Standard Data Book by Public Works Department, 2010.
2. I. S. 1200 (Parts I to XXV – 1974, Method of Measurement of Building and Civil Engineering works – B.I.S.)
3. M. Chakraborthi; "Estimation, Costing and Specifications", Laxmi Publications, 2008, 7th Edition.
4. National Building Code - 2010.

TRANSPORTATION ENGINEERING LAB

Course Code: ACE 1124

L	T	P	C
0	0	3	2

AIM :

To develop basic skills in testing of Highway Materials.

SCOPE :

All road aggregate and bitumen testing.

ROAD AGGREGATES:

1. Aggregate Crushing value
2. Aggregate Impact Test.
3. Specific Gravity and Water Absorption.
4. Attrition Test
5. Abrasion Test.
6. Shape tests

BITUMINOUS MATERIALS :

1. Viscosity Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.
5. Marshall mix design
6. Benkelman beam test (Optional)

GEOTECHNICAL ENGINEERING LAB

Course Code: ACE 1125

L	T	P	C
0	0	3	2

AIM :

To enable a student to understand the various index and engineering properties of a soil by experimentation.

SCOPE :

Determination of index and engineering properties of a soil sample.

LIST OF EXPERIMENTS

1. Atterberg's Limits.
2. Field density-core cutter and sand replacement methods
3. Grain size analysis
4. Permeability of soil, constant and variable head tests
5. Compaction test
6. CBR Test
7. Consolidation test
8. Unconfined compression test
9. Direct shear test.
10. Vane shear test

SYLLABI FOR VI SEMESTER

WATER RESOURCES ENGINEERING-II

Course Code: ACE 1126

L	T	P	C
4	1	0	4

AIM :

To provide the necessary background for understanding the concepts of Irrigation structures.

SCOPE :

To provide the necessary background for understanding behavior of various Irrigation Structures (minor and major) and their design principles and construction features.

UNIT-I

DIVERSION HEAD WORKS: Types of Diversion head works-diversion and storage head works, weirs and barrages, layout of diversion head works, components. Causes and failure of hydraulic structures on permeable foundations, Bligh's creep theory, Khosla's theory, determination of uplift pressure, impervious floors using Bligh's and Khosla's theory, exit gradient, functions of u/s and d/s sheet piles.

UNIT-II

CANAL STRUCTURES I: Types of falls and their location, design principles of Sarda type fall, trapezoidal notch fall and straight glacis fall.

UNIT-III

CANAL STRUCTURES II: canal regulation works, principles of design of distributory and head regulators, canal outlets, types of canal modules, proportionality, sensitivity and flexibility.

UNIT-IV

CROSS DRAINAGE WORKS: types, selection of site, design principles of aqueduct, siphon aqueduct and super passage.

UNIT-V

DAMS AND RESERVOIRS : Types of dams, merits and demerits, selection of type of dam, selection of site for dam, types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve.

UNIT-VI

GRAVITY DAMS: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a low gravity dam, stability analysis, drainage galleries.

UNIT-VII

EARTH DAMS: Types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage.

UNIT-VIII

SPILLWAYS: types of spillways, design principles of Ogee spillways, types of spillway gates.

TEXT BOOKS:

1. S.K Garg, "Irrigation Engineering and Hydraulic Structures", Khanna Publishers, 2001.
2. K.R.Arora, "Irrigation, Water Power and Water Resources Engineering", Standard Publishers Distributors, 3rd Edition, 2010.
3. R.K. Sharma and T.K. Sharma, "Irrigation Engineering", S. Chand Publishers, 2007.
4. B.C.Punmia, B.B.L. Pande, Ashok K.R. Jain, Arun K.R. Jain, "Irrigation & Water Power Engineering" Laxmi Publications (P) Ltd., New Delhi, 16th Edition, 2009.

REFERENCES:

1. G.L. Asawa, "Irrigation and Water Resources Engineering", New Age International Publishers, 2005.

2. Varshney R.S., "Concrete Dams", Oxford and IBH Pub. Co.New Delhi, 1978.
3. Varshney R.S., S. C. Gupta & R.L. Gupta "Theory and Design of Hydraulic Structures", Nemchand and Brothers, 1992.
4. Satyanarayana Murthy C, "Water Resources Engineering", New Age International Pvt. Ltd. Publishers, 1st Edition, 1997.
5. Relevant IS codes.

DESIGN OF STEEL STRUCTURES

Course Code: ACE 1127

L	T	P	C
4	1	0	4

AIM :

To acquire basic knowledge in designing various steel structural elements.

SCOPE :

The student shall be able to design steel-compression members, tension members, beams and beam columns, connections, trusses as per IS 800-2007.

UNIT-I

WELDED CONNECTIONS: Introduction, Advantages and disadvantages of welding- Strength of welds-Butt and Fillet welds: Permissible stresses – IS Code requirements. Design of welds, fillet weld subjected to moment acting in the plane and at right angles to the plane of the joints.

UNIT-II

BEAMS: Allowable stresses, Design requirements as per IS Code-Design of simple and compound beams-Curtailment of flange plates, check for deflection, shear, buckling, check for bearing, laterally unsupported beams.

UNIT-III

TENSION MEMBERS: General design of members subjected to direct tension.

COMPRESSION MEMBERS : Effective length of columns, Slenderness ratio – permissible stresses, Design of compression members, Struts etc.

UNIT-IV

BUILT UP COLUMNS : Design of Built up compression members – Design of lacings and battens. Design Principles of Eccentrically loaded columns and splicing of columns.

UNIT-V

DESIGN OF COLUMN BASES: Design of slab base and gusseted bases. Column bases subjected to moment.

UNIT-VI

ROOF TRUSSES: Different types of trusses – Design loads – Load combinations, IS Code recommendations, structural details – Design of simple roof trusses involving the design of purlins.

UNIT-VII

PLATE GIRDER: Design consideration – I S Code recommendations, Design of welded plate girder – Vertical stiffeners design.

UNIT–VIII

Design of Gantry Girders.

Note: The students should prepare the following plates.

Plate 1 Detailing of simple beams

Plate 2 Detailing of compound beams including curtailment of flange plates.

Plate 3 Detailing of Column including lacing and battens.

Plate 4 Detailing of Column bases – slab base and gusseted base

Plate 5 Detailing of steel roof trusses including particulars at joints.

Plate 6 Detailing of Plate girder including curtailment, splicing and stiffeners.

TEXT BOOKS:

1. Bhavikatti, "Design of Steel Structures", University Press. Hyderabad, 6th Edition, 2010.
2. S.K. Duggal, "Design of Steel Structures", Tata Mcgraw Hill, New Delhi, 4th Edition, 2009.

REFERENCES:

1. B.C. Punmia, “Comprehensive Design of Steel Structures”, Ashok Kumar Jain and Arun Kumar Jain, Laxmi Publications, New Delhi, 10th Edition, 2007.
2. P. Dayaratnam, “Design of Steel Structures”, S. Chand Publishers, 2nd Edition, 2009.
3. Prof. Dr. V.L. Shah, Prof. Veena Gore, “Limit State Design of Steel Structures”, Structures Publications, 1st Edition, 2009.

IS CODES:

1. IS -800 – 2007, "Codes of Practice for General Construction in Steel”, BIS, 2007
2. IS – 875 – Part III, “Codes of Practice for Design Loads (other than Earthquake, for Buildings and Structures)”, 1987.
3. Steel Tables.

These codes and steel tables are permitted in the examinations.

ENVIRONMENTAL ENGINEERING-I

Course Code: ACE 1128

L	T	P	C
4	1	0	4

AIM :

To stress upon the aspects of environmental engineering, i) supply of safe drinking water, ii) Safe disposal of sewage, to gain the knowledge of collection of data design and execution of water and waste water treatment plants.

SCOPE:

Necessary theory and knowledge, data requirement and collection of the same. Mathematical formulations for the design of water and waste water treatment units. Full acquaintance with the conventional and miscellaneous treatment units and to learn the knowledge for the execution of the projects.

UNIT-I

INTRODUCTION : Aspects of Environmental Engineering – Protected water supply – Need – Water demands – factors affecting fluctuations – design period – population forecast – water quality and testing – drinking water standards.

UNIT-II

SOURCES OF WATER : Quality , Quantity and other considerations – yield calculations – intakes – systems of water supply – requirements – storage reservoir capacity – pumping – selection of a pump – detection of leakages – economical diameter of pumping main.

UNIT-III

TREATMENT OF WATER : Water treatment, conventional treatment flow diagram – Sedimentation – types – principles – design factors – coagulation – design of clarifloculator – filtration – slow and rapid gravity filters – multimedia and pressure filters – design principles.

UNIT-IV

METHODS OF DISINFECTION & DISTRIBUTION : Disinfection – chlorination – miscellaneous treatment methods – distribution systems – layouts – design- and analysis, Hardy Cross and equivalent pipe method - pipe joints – valves – other appurtenances.

UNIT-V

WASTE WATER MANAGEMENT : Introduction : waste water treatment system – definitions of terms – waste water management systems – collection and conveyance of sewage – sewage flow rates – stormwater – characteristics of sewage – cycles of decay – BOD- COD – ultimate disposal of sewage.

UNIT-VI

DESIGN OF SEWERS : Layouts – design of sewers – sewers appurtenances – sewage pumping – conventional sewage treatment – primary treatment screens – grit chamber – sedimentation tanks – design principles.

UNIT-VII

SECONDARY BIOLOGICAL TREATMENT : Secondary treatment – Biological treatment – trickling filters – Activated Sludge Process – low cost waste treatment methods – Design of oxidation ponds – Aerobic and anaerobic lagoons.

UNIT-VIII

DESIGN OF SLUDGE DIGESTION : Sludge Digestion – Design principles – disposal – septic tanks & Imhoff tanks – Rural latrines – House plumbing – appurtenances.

TEXT BOOKS:

1. G.S. Birdi, "Water supply and sanitary Engineering", Dhanpat Rai & Sons Publishers. 8th Edition, 2010.
2. B.C.Punmia, "Water Supply Engineering, Vol. 1, Waste Water Engineering Vol. II", Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi, 2nd edition, 2008.

3. K.N. Duggal, "Elements of Environmental Engineering", S. Chand Publishers, 7th Edition, 2010.

REFERENCESS:

1. Hammer and Hammer "Water and Wastewater Technology", Prentice Hall of India, 4th Edition 2003.
2. Fair, Geyer and Okun, "Water and Waste Water Engineering", Wiley, 3rd edition, 2010.
3. Metcalf and Eddy, "Waste Water Engineering", Tata Mc Graw Hill, 3rd Edition,2008.
4. Howard S. Peavy, Donand P. Rowe, George Technobanoglous, "Environmental Engineering", Mc Graw – Hill Publications, Civil Engineering Series, 1st edition 1985.

REMOTE SENSING & GIS

Course Code: ACE 1129

L	T	P	C
4	0	0	4

AIM :

To introduce the concepts of Remote Sensing & GIS along with simple applications in Civil Engineering.

SCOPE :

Overview of the latest developments in Remote Sensing Satellites, GIS and its applications in different fields of Civil Engineering.

UNIT-I

PHOTOGRAMMETRY : Introduction – Principle and types of Aerial Photographs, Stereoscopy, Map Vs Mosaic, Ground Control, Parallax Measurements for height.

UNIT-II

REMOTE SENSING-I : Basic concepts and foundation of Remote Sensing – Elements involved in Remote Sensing , Electromagnetic Spectrum, Physics of Remote Sensing Energy Resources, Energy Interactions with Earth Surface Features and Atmosphere.

UNIT-III

REMOTE SENSING-II : Resolution, Sensors and Satellite, Visual Interpretation Techniques - Basic Elements, Converging Evidence, Interpretation for terrain evaluation, Spectral Properties of water bodies, Introduction to Digital data Analysis.

UNIT-IV

GEOGRAPHIC INFORMATION SYSTEM-I : Geographic Information System: Introduction, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS. Types of data representation- Data collection and input overview, data input and

output. Manual digitizing and scanning.

UNIT-V

GEOGRAPHIC INFORMATION SYSTEM –II : Raster GIS, Vector GIS; File management ; Spatial data – Layer based GIS, Feature based GIS mapping. GIS Spatial Analysis: Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data. Integration of RS & GIS, GIS as decision making tool, exposure to various softwares – Arc GIS, ERDAS, ILWIS.

UNIT-VI

WATER RESOURCES APPLICATIONS- I : Land use/Land cover in water resources, Surface water mapping and inventory, Rainfall – Runoff relations and runoff potential indices of watersheds, Flood and Drought impact assessment and monitoring.

UNIT-VII

WATER RESOURCES APPLICATIONS- II : Watershed management for sustainable development and Watershed characteristics – Reservoir sedimentation, Ground water targeting & identification of sites for artificial recharge structures, Drainage morphometry, water depth estimation and bathymetry.

UNIT-VIII

ENVIRONMENTAL AND TRANSPORTATION ENGINEERING APPLICATIONS : Air pollution – Detection & Identification of pollution sources of Surface & Ground Water – Water quality Mapping & Monitoring, Environmental Impact Assessment – Highway alignment-urban Planning and Infrastructure Development.

TEXT BOOKS:

1. Lillesand and Kiefer, "Remote Sensing and Image Interpretation", published by John Wiley and Sons, 5th Edition, 2008.
2. Peter A Burrough and Rachael A, MC Donnell, "Principles of Geographical Information Systems", Oxford Publishers, First Edition, 1998.

3. M.Anji Reddy, "Remote Sensing and Geographical Information systems", B.S.Publications, 3rd Edition, 2006.
4. LRA Narayana, "Basics of Remote Sensing and its applications" Universities press, 1st Edition, 2001
5. Paul R Wolf, " Elements of Photogrammetry with Application in GIS", Published by Mc Graw Hill, 3rd Edition, 2008.

REFERENCES:

1. Micheal N Demers, "Fundamental of GIS" John Wiley & Sons, 3rd Edition, 2008.
2. C.P.Lo Albert, K.W. Yonng, "Concepts & Techniques of GIS", Prentice Hall (India) Publications, 2nd Edition, 2008.
3. Wolf Paul Richard and Dewitt, "Elements of Photogrammetry", Published by Mc Graw Hill, 2nd Edition, 1983.
4. David P Paine, "Aerial Photography and image interpretation", published by Wiley, Higher Education, 2nd Edition, 2006.
5. Kang – Tsung chang, "Introduction to GIS", TMH Publications & Co., 4th Edition, 2007.
6. K.M. Chandra, S.K. Ghosh, "Remote Sensing and Geographical Information System", Narosa Publishing house, 1st Edition, 2007.
7. Ian Heywood, Sarah Cornelius, Steve Carver, "An Introduction to Geographical Information Systems" Pearson Education Asia, 1st Edition, 2000.
8. Bernhardsen, "Geographic Information Systems, An Introduction", Published by John Wiley Sons, 3rd Edition, 2006.

TRANSPORTATION ENGINEERING – II

Course Code: ACE 1130

L	T	P	C
4	0	0	4

AIM :

To introduce basic concept of Pavement Design and Construction, Principles of Railway Engineering, Airport Engineering , Docks and Harbors.

SCOPE :

A detailed study about various modes of transport namely, roads, railways, airport, dock and harbour.

UNIT-I

PAVEMENT DESIGN –I : Pavement Design – CBR method of flexible pavement design – IRC method of flexible pavement design, AASHO method of flexible pavement design.

UNIT-II

PAVEMENT DESIGN–II : IRC method of rigid pavement design – importance of joints in rigid pavements – types of joints – use of tie bars and dowell bars.

UNIT-III

HIGHWAY CONSTRUCTION, MAINTENANCE AND DRAINAGE : Highway construction – construction of earth roads – gravel roads – WBM roads – Bituminous roads – cement concrete roads – reinforced concrete pavements – construction of joints in cement concrete pavements.

Highway Maintenance – Failures of flexible and rigid pavements and their maintenance- strengthening of existing pavements.

Highway drainage – importance of highway drainage – surface, sub surface drainage.

UNIT-IV

HIGHWAY ECONOMICS & FINANCE : Highway user benefits – Highway cost – Economic analysis – Highway finance.

UNIT-V

RAILWAY ENGINEERING-I : Permanent way components – Cross Section of Permanent Way – Functions of various Components like Rails, Sleepers and Ballast –Rail Fastenings – Creep of Rails- Theories related to creep – Adzing of Sleepers- Sleeper density.

UNIT–VI

RAILWAY ENGINEERING- II : Rail joints, welding of rails and creep of rails. Turnouts – left hand turnout – track – junctions – points and crossings – tracks drainage – railway stations and yards – signaling.

UNIT–VII

AIRPORT ENGINEERING : Factors affecting Selection of site for Airport and Layout Design –Computation of Runway length – Correction for Runway Length – Orientation of Runway – Wind Rose Diagram – Runway Lighting system – Taxiways, Apron, Control tower terminal building.

UNIT–VIII

DOCKS & HARBOURS : Types – layout and planning principles – Break waters – Docks – Wharves and Quays – Transit sheds – Ware houses – Navigational Aids.

TEXT BOOKS:

1. S.K.Khanna & C.E.G.Justo, "Highway Engineering", Nemchand & Bros., 7th Edition (2000).
2. S.P.chadula, "Railway Engineering–A text book of Transportation Engineering", S.Chand & Co. Ltd. (2001).
3. L.R.Kadiyali and Lal "Principles & Practices of Highway Engineering" Khanna Publications, 4th Edition, 2004.
4. S.K.Khanna and M.G.Arora, "Airport Planning and Design" Nemchand & Bros., 6th Edition (1999).

5. Rangwala S.C & K.S. "Railway Engineering", Charotar Publications, 14th Edition, 2005.
6. Saxena S.C and Arora S.P "Railway Engineering", Dhanapat Rai Publications, 6th Edition, 2004.
7. Seetharaman "Dock & Harbour Engineering", Umesh Publications, 1st Edition, 2008.

REFERENCES:

1. S.P.Bindra , "Highway Engineering", Dhanpat Rai & Sons.
2. Dr.L.R.Kadyali, "Traffic Engineering & Transportation Planning", Khanna Publications, 6th Edition, 1997.
3. Virendhra Kumar & Statish Chandhra, "Air Transportation Planning & Design", Gal Gotia Publishers, 1999.
4. Robert M. Horonjeff, "Planning and Design of Airports", Mc Graw Hill Publications, 2008.
5. J. S. Mundrey, "Railway Track Engineering", Mc Graw Hill Publications, 4th Edition, 2010.
6. Indian Road Congress, Ministry of Road Transport and Highways, and Special Publications

GEOTECHNICAL ENGINEERING – II

Course Code: ACE 1131

L	T	P	C
4	1	0	4

AIM :

To study the various foundations systems in vogue.

SCOPE :

Analysis and design of foundations for various Civil Engineering structures.

UNIT-I

SOIL EXPLORATION : Need – Methods of soil exploration – Boring and Sampling methods – Field tests – Penetration Tests – Plate load test – Pressuremeter test – planning of exploration programme and preparation of soil investigation report.

UNIT-II

EARTH SLOPE STABILITY : Infinite and finite earth slopes – types of failures – factor of safety of slopes – stability analysis by method of slices, Bishop's Simplified method – Taylor's Stability Number- Stability of slopes of earth dams under different conditions.

UNIT-III

EARTH PRESSURE THEORIES: Rankine's theory of earth pressure – earth pressures in layered soils – Coulomb's earth pressure theory – Culmann's graphical method

UNIT-IV

RETAINING WALLS : Types of retaining walls – stability of retaining walls.

UNIT-V

SHALLOW FOUNDATIONS-I : Types – choice of foundation – Depth of foundation – Safe Bearing Capacity – Terzaghi, Meyerhof, Skempton and IS Methods

UNIT-VI

SHALLOW FOUNDATIONS-II : Safe bearing pressure based on N-value –plate load test – Settlement Analysis – immediate and consolidation settlement.

UNIT-VII

DEEP FOUNDATIONS- I : Types of piles – Load carrying capacity of piles based on static pile formulae – Dynamic pile formulae – Pile load tests – Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

UNIT-VIII

DEEP FOUNDATIONS-II : Types and shapes of wells – Components of wells – functions and design criteria – Sinking of wells – Tilts and shifts.

TEXT BOOKS:

1. B.M. Das, "Principles of Foundation Engineering", Thomson Press, 6th Edition, 2006.
2. Swami Saran, "Analysis and Design of Substructures", Oxford and IBH Publishing Company Pvt Ltd., 2nd Edition - 2007 (Reprint).
3. N.P. Kurian, "Design of foundation system – Principles and Practices", Narosa Publishing house, 3rd Edition, 2005.
4. V.N.S.Murthy, "Soil Mechanics and Foundation Engg." CBS Publishers and Distributors, 4th Edition, 2010.

REFERENCES:

1. Varghese, P.C., "Foundation Engineering" Prentice Hall of India, 1st Edition, 2005.
2. J.E. Bowles, "Foundation Analysis and Design", McGraw-Hill Publishing Company, 5th Edition, 1995.
3. M.J. Tomlinson, "Foundation Engineering", Pearson Publishers, 7th Edition, 2001.
4. S. K.Gulhati & Manoj Datta, "Geotechnical Engineering", Tata Mc.Graw Hill Publishing company New Delhi, 1st Edition 2005.

5. D.P. Coduto, "Foundation Designs – Principles and Practices", Prentice Hall of India, 1st Edition, 2009.

6. Relevant IS codes, Special Publications and Handbooks NPTEL Video lectures.

GEOMATICS LAB

Course Code: ACE 1132

L	T	P	C
0	0	3	2

AIM :

To work with Arc GIS / ERDAS / ILWIS software.

SCOPE :

The student shall be able to prepare various thematic maps and its applications in various fields like water resources and transportation Engineering.

1. Opening and Importing of an Image.
2. Rectification of Images.
3. Subsetting & Mosaicing.
4. Classification – Supervised & Unsupervised.
5. Digitization of Map/Toposheet, Creation of thematic maps.
6. Developing Digital Elevation model, Draping of an image.
7. Simple applications of GIS in Water Resources Engineering & Transportation Engineering.

GIS SOFTWARE :

Arc GIS 9.2

ERDAS 9.1

Mapinfo 6.5

ILWIS

TOTAL STATION :

1. Determination of area
2. Traversing
3. Contouring

4. Determination of Remote height
5. Stake out
6. Distance, Gradient, Difference in height between two inaccessible points
7. GPS

LIST OF EQUIPMENT :

Leveling Staff

Total Station

G.P.S.

ADVANCED COMMUNICATION SKILLS LAB

CODE: AHE1103

L	T	P	C
0	0	3	2

INTRODUCTION :

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

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

OBJECTIVES:

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

- To improve the students' accuracy and fluency in English through a well-developed vocabulary, and enable them listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.

- To enable them communicate their ideas relevantly and coherently in writing.

TEXT BOOK: LANGUAGE IN USE (Upper-Intermediate) ***by Adrian Doff and Christopher Jones, Cambridge University Publications.***

UNIT-I

- Reading and Listening comprehension – reading for facts, guessing meanings from context, scanning, skimming, inference, critical reading
- (Lesson 2: Communicating)

UNIT-II

- Vocabulary building, Creativity & Innovation, Using Advertisements and Music, Case studies
- Decision-Making, Time Management, Positive Thinking
- (Lesson 4: Sports and Games, Lesson 8: In The Market-Place)

UNIT-III

- Cross-Cultural Communication- Problems of Language, Lack of Language equivalency/difficulties in using English.
- Non-Verbal Communication across different Cultures.
- (Lesson 13: Right and Wrong)

UNIT-IV

- Literary reviews- reviewing the choicest genres like science fiction, autobiographies, travelogues, modern poetry etc.

UNIT-V

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

(Lesson 10: Life, the universe and everything & Lesson 16: World Affairs)

UNIT-VI

- Resume writing – structure and presentation, planning, defining the career objective

- Interview Skills – concept and process, pre-interview planning, opening strategies, answering-strategies, interview through tele and video-conferencing

UNIT-VII

- Writing essays for competitive examinations
- Media writing-writing headlines, analyzing newspaper articles
- Analytical writing

UNIT-VIII

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

RECOMMENDED BOOKS:

COMMUNICATIONS SKILLS

1. M. Ashraf Rizvi, "Effective Technical Communication", Tata McGraw-Hill Publishing Company Ltd., 2005.
2. Bhanu Ranjan, "An Approach to Communication Skills", DhanpatRai &Co, 2010.
3. Raymond V. Lesikar, Marie E. Flatley, "Basic Business Communication: Skills for Empowering The Internet Generation", 11th Edition, Tata McGraw-Hill. 2006.
4. Stephen Bailey, "Academic Writing- A Practical guide for students", Routledge Falmer, London & New York, 2004.
5. Dr A. Ramakrishna Rao, Dr G.Natanam & Prof S.A. Sankaranarayanan, "English Language Communication : A Reader cum Lab Manual", Anuradha Publications, Chennai, 2006.
6. Dr. Shalini Verma, "Body Language- Your Success Mantra", S. Chand, 2006.
7. Barron's, "DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice", New Age International (P) Ltd., Publishers, New Delh, Books on TOEFL/GRE/GMAT/CAT, 2011.
8. "IELTS series with CDs", CUP, 2010.

9. Daniel G. Riordan & Steven E. Pauley, "Technical Report Writing Today", Biztantra Publishers, 2005.
10. Andrea J. Rutherford, "Basic Communication Skills for Technology", 2nd Edition, Pearson Education, 2007.
11. Sunita Mishra & C. Muralikrishna, "Communication Skills for Engineers", Pearson Education, 2007.
12. Jolene Gear & Robert Gear, "Cambridge Preparation for the TOEFL" Test, 2010.
13. Meenakshi Raman & Sangeeta Sharma, "Technical Communication", OUP, 2010.
14. Nick Ceremilla & Elizabeth Lee, "Cambridge English for the Media", CUP, 2010

GENERAL READING

1. A Reader's Digest Selection, "Classic Short Stories" (India Today group), 2004.
2. Saros Cowasjee, "More Stories from the Raj and After", HarperCollins Publishers India, 1986.
3. Girish Karnad, "Hayavadana", OUP 1976.
4. A.P.J. Abdul Kalam "Wings of Fire", Universities Press, 1999.
5. Bernard Shaw, "Apple Cart/Arms and the Man", Orient Longman, 2010.
6. Khalil Gibran, "The Prophet" - Rajapal & Sons, 2008.

SYLLABI FOR VII SEMESTER

ENVIRONMENTAL ENGINEERING-II

Course Code : ACE1133

L	T	P	C
4	0	0	4

AIM :

To introduce the advanced concepts of Environmental Engineering.

OBJECTIVE:

Study of Air Pollution Control, Industrial Waste-Water Engineering, Solid Waste Management, Hazardous Waste Treatment, Noise Pollution Control, legal aspects.

UNIT-I

AIR POLLUTION & NOISE POLLUTION: Sources of Air pollution – Air pollutants – classification – effects on man-vegetation – materials – global effects - Noise pollution – Impacts – measurement and control.

UNIT-II

CONTROL OF AIR POLLUTION : Particulates – gaseous pollutants – MINAS – Air quality (without design)

UNIT-III

SPECIAL WATER TREATMENT METHODS: Special treatment methods – Reverse Osmosis – Ion Exchange – Ultra filtration – De-flouridation.

UNIT-IV

INDUSTRIAL WASTE WATER TREATMENT : Theories of Industrial Waste Treatment – Volume Reduction – Strength Reduction – Neutralization – Equalisation – Proportioning – Nitrification and Denitrification – Removal of Phosphates.

UNIT-V

SOLID WASTE MANAGEMENT: Municipal solid wastes – Solid waste characteristics – generation – collection – segregation and transportation

UNIT-VI

HAZARDOUS WASTE TREATMENT METHODS : Hazardous wastes – Nuclear, Bio-medical and Chemical wastes.

UNIT-VII

ENGINEERED SYSTEM OF WASTE MANAGEMENT: Engineered system of management (cycle / recycle, energy recovery, treatment & disposal)

UNIT-VIII

LEGAL ASPECTS OF POLLUTION CONTROL : Legal aspects of Environmental Management – Effluent standards – Air Emission Standards – Water Act – Air Act – Environmental Protection Act – Legal Provisions.

TEXT BOOKS:

1. Henry. G. J. and Heinke G.W., "Environmental Science and Engineering", Pearson Education, 2nd Edition, 1996.
2. Dhameja. K. Suresh, "Environmental Engineering and Management", S.K. Kataria & Sons, 2nd Edition 2005.
3. Howard S. Peavy, Donald R. Rowe, George Tchobanoglous, McGraw-Hill, 1st Edition, 1985.

REFERENCES:

1. Walter J. Weber, "Physico-Chemical process for Waste Quality Control", Wiley- Interscience, 9th Edition, 1972.
2. Rao M.N & Rao H.N., "Air Pollution and Control", Tata McGraw-Hill, 1st Edition 2006.

PRESTRESSED CONCRETE

Course Code : ACE 1134

L	T	P	C
4	1	0	4

AIM :

To study the concept of prestressing, analysis and design of PSC members.

OBJECTIVE:

Understanding the materials used, types of prestressing, prestressing methods, analysis and design of PSC members and deflection criteria.

UNIT-I

INTRODUCTION : Historic development – General principles of prestressing -pre-tensioning and post tensioning – Advantages and limitations of prestressed concrete – Materials – High strength concrete and high tensile steel and their characteristics.

UNIT-II

PRESTRESSING METHODS : I.S.Code provisions, Methods and Systems of Prestressing; Pre-tensioning and post tensioning methods – Analysis of post tensioning – Different systems of pre-stressing like Hoyer system, Magnel Blaten system, Freyssinet system and Gifford Udall System.

UNIT-III

LOSSES OF PRESTRESS: Loss of prestress in pre-tensioned and post-tensioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, Relaxation of steel, slip in anchorage bending of member and frictional losses.

UNIT-IV

ANALYSIS OF SECTIONS FOR FLEXURE : Analysis of sections for flexure; Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons.

UNIT-V

DESIGN OF SECTIONS FOR FLEXURE AND SHEAR : Allowable stress, Design criteria as per I.S.Code – Elastic design of simple rectangular and I-section for flexure, shear, and principal stresses – design for shear in beams – Kern – lines, cable profile.

UNIT-VI

ANALYSIS OF END BLOCKS: Analysis of end Blocks by Guyon's method and Mugnel method, Anchorage zone stress – Approximate method of design – Anchorage zone reinforcement – Transfer of pre-stress pre-tensioned members.

UNIT-VII

COMPOSITE SECTION : Introduction – Analysis of stress – Differential shrinkage – General designs considerations.

UNIT-VIII

DEFLECTIONS OF PRESTRESSED CONCRETE BEAMS: Importance of control of deflections – factors influencing deflections – short term deflections of uncracked members prediction of long term deflections.

TEXT BOOKS:

1. Krishna Raju N, "Prestressed Concrete", Tata Mc.Graw Hill Publications, 4th Edition, 2007.
2. Rajagopalan. N, "Prestressed Concrete", Narosa publications, 2nd Edition, 2006.

REFERENCES:

1. Ramamrutham S., Prestressed Concrete, Dhanpatrai Publications, 4th Edition, 2006.
2. Lin T.Y. & Ned H. Burns, "Design of Prestressed Concrete Structures", John Wiley & Sons, 3rd Edition, 2004.
3. All relevant IS Codes

CONSTRUCTION MANAGEMENT

Course Code : ACE 1135

L	T	P	C
4	0	0	4

AIM:

The course is designed to give introduction to various aspects of construction management.

OBJECTIVE :

Overview of construction contracts, construction planning and scheduling including CPM and PERT, quality and safety management and resource management including crashing of activities. The course will also cover aspects of alternate dispute resolutions and labour legislations.

UNIT-I

CONTRACT MANAGEMENT : Types of contract – contract documents – possible contractual obligations – meaning of specification – tender notice – types – tender documents – earnest money deposit (EMD) and security deposits (SD) – scrutiny and acceptance of a tender – contract agreement – contractual changes and termination of contract – subcontract – rights and duties of sub contractor.

UNIT-II

CONSTRUCTION ORGANIZATION AND SUPERINTENDENCE: Forms of business organizations – sole proprietorship – partnership – joint stock company-Co-operative society – state enterprise- delegation of responsibility, personnel requirement and division of work – decentralization – construction supervision and superintendence – pay rolls and records – purchase and delivery of construction material and equipment – percentage completion report – insurance record – project office requirement – organization chart of a small / medium / large construction company (broad outline only)

UNIT III

PLANNING AND SCHEDULING FOR CIVIL ENGINEERING PROJECT : Objectives of planning – its advantage to client and engineer – limitations –stages of planning by owner & contractor. Scheduling – definition – its preparation – uses and advantages – classification – methods of scheduling – bar chart – job layout – Gantt chart – work breakdown chart (WBC)

UNIT-IV

PROJECT MANAGEMENT THROUGH NETWORKS: Activity – Event – Dummies – basic assumptions in creating a network – rules for drawing networks – Fulkerson's rule for numbering the events, PERT – time estimates – earliest expected time – latest allowable occurrence time – slack. Standard deviation, variance.

UNIT-V

PRECEDENCE NETWORKS: Creating network logic, Relationship Types – Finish to Start, Start to Start, Finish to Finish, Start to Finish, critical path method – ES, EF, LS, LF, Floats – significance of critical path

UNIT-VI

RESOURCE MANAGEMENT : Definition – need for resource management – optimum utilization of resources- finance, materials, machinery, human resources – resources planning – resource leveling and it's objectives" – Time – cost trade off – crashing – need for crashing an activity – methods & tips for crashing – time vs. cost optimization curve – cost slope – its significance in crashing.

UNIT-VII

QUALITY MANAGEMENT AND SAFETY : Importance of quality – elements of quality – quality assurance techniques (inspection, testing, sampling) importance of safety – causes of accidents – role of various parties (designer / employer / worker) in safety management – benefits – approaches to move safety in construction

UNIT-VIII

CONSTRUCTION DISPUTES AND THEIR SETTLEMENT: Introduction – development in disputes – categories of disputes – modes of settlements –Arbitration

CONSTRUCTION LABOUR AND LEGISLATION : Need for legislation – Payment of wages Act – Factories Act – Contract labour (Regulation and abolition Act – Employees Provident Fund (EPF) Act.

TEXTBOOKS:

1. Sengupta.B, & H.Guha., "Construction Management and Planning", Tata Mc. Graw Hill Publishing Company Ltd., New Delhi, 2004.
2. Seetharaman. S, "Construction Engineering & Management", Umesh Publications, Nai Sarak, New Delhi, 2006.
3. Sanga Reddy. S, "Construction Management", Kumaran Publications, Coimbatore, 2004.

REFERENCE BOOKS:

1. Rangwala.S.C., "Construction of Structures and Management of Works", Charotar Publishing House, 3rd Edition, 2000.
2. Mincks and Johnston, "Construction Jobsite Management", Narosa Publications, 4th Edition, Delmar, 1998.
3. Dorsey, Robert, "Case Studies in Building Design and Construction", Prentice-Hall, 3rd Edition,1999.

REINFORCED CONCRETE STRUCTURES-II

Course Code : ACE 1136

L	T	P	C
4	1	0	4

AIM :

To impart concepts of structural engineering required for design of foundations, retaining walls and water tanks.

OBJECTIVE :

The student shall be able to design and detail various types of structures and its elements, as per the relevant IS codes.

UNIT-I

STAIR CASES : Introduction, types of staircases-design of dog-legged staircase-design of open-newel staircase with quarter space landing-design of stairs with central stringer beam.

UNIT-II

COMBINED FOOTINGS : Introduction – Design of combined rectangular footings – Design of combined trapezoidal footings – MAT foundation – Reinforcement detailing and bar bending schedule need to be prepared.

UNIT-III

PILE FOUNDATIONS : Types of piles – Load carrying capacity of piles – Group action in piles – Structural design of RC piles – Design of pile cap for 2 or 3 piles only- Reinforcement detailing and bar bending schedule need to be prepared.

UNIT-IV

CANTILEVER RETAINING WALLS : Introduction – Types of retaining walls – Active and passive earth pressure- Design principles of cantilever retaining walls with horizontal back fill – With horizontal back fill and traffic load – With sloping back fill.

UNIT-V

COUNTER FORT RETAINING WALLS:_ Design principles of counter fort retaining walls with horizontal back fill – With horizontal back fill and traffic load – With sloping back fill- Reinforcement detailing and bar bending schedule need to be prepared.

UNIT-VI

RECTANGULAR WATER TANKS-I: Introduction – General design requirements according to Indian standard code of practice – Design of on ground and under ground water tanks- Reinforcement detailing and bar bending schedule need to be prepared.

UNIT-VII

RECTANGULAR WATER TANKS-II : Introduction – General design requirements according to Indian standard code of practice –Design of over head water tanks- Reinforcement detailing and bar bending schedule need to be prepared.

UNIT-VIII

CIRCULAR WATER TANKS : Introduction – General design requirements according to Indian standard code of practice – Joints in water tanks – Circular tank with flexible joint between floor and wall – Circular tank with rigid joint between floor and wall – Design of Over head tanks - IS code method for design of circular tanks- Reinforcement detailing and bar bending schedule need to be prepared.

FINAL EXAMINATION PATTERN: The end examination pattern should consist of Parts A & B. Part A consists of two questions in design and drawing out of which one question is to be answered. Part B should consist of five questions out of which three are to be answered. Weightage for Part A is 40% and Part B is 60%.

TEXT BOOKS :

1. Punmia B.C., Ashok kumar Jain & Aurn Kumar Jain, "Reinforced Concrete Structures Volume – I", Laxmi Publications Pvt. Ltd., New Delhi, 5th edition, 2008.
2. Varghese P.C., "Limit State Design of Reinforced Concrete Structures", Prentice Hall of India, New Delhi, 3rd Edition,

2005.

REFERENCE BOOKS :

1. Varghese P.C., "Advanced Reinforced Concrete Structures", Prentice hall of India, 4th Edition, 2005.
2. Pillai S.V. and Menon D, "Reinforced Concrete Design", Tata Mc Graw Hill, 2nd Edition, 2006.
3. Krishna Raju N, "Advanced Reinforced Concrete Design", University Press, 4th Edition, 2007.
4. Codes: Relevant IS codes.

EARTHQUAKE RESISTANT DESIGN

(ELECTIVE-I)

Course Code : ACE 1137

L	T	P	C
4	0	0	4

AIM :

To provide the basic knowledge on earthquake resistant design of structures and its detailing.

OBJECTIVE:

At the end of the course, the student shall be able to do the earthquake resistant design and detailing of the buildings.

UNIT-I

INTRODUCTION TO STRUCTURAL DYNAMICS : Theory of vibrations – Lumped mass and continuous mass systems – Single Degree of Freedom (SDOF) Systems – Formulation of equations of motion – Un damped and damped free vibration – Damping – Forced vibrations – Response to harmonic excitation – Concept of response spectrum.

UNIT-II

MULTI-DEGREE OF FREEDOM (MDOF) SYSTEMS (limited to 2 DOF): Formulation of equations of motion – Free vibration – Determination of natural frequencies of vibration and mode shapes – Orthogonal properties of normal modes – Mode superposition method of obtaining response.

UNIT-III

EARTHQUAKE ANALYSIS : Introduction – Rigid base excitation – Formulation of equations of motion for SDOF and MDOF Systems – Earthquake response analysis of single and multi-storied buildings – Use of response spectra.

UNIT-IV

CODAL DESIGN PROVISIONS : Review of the latest Indian seismic code IS:1893 – 2002 (Part-I) provisions for buildings – Earthquake design philosophy – Assumptions – Analysis by seismic coefficient and response spectrum methods – Displacements and drift requirements – Provisions for torsion.

UNIT-V

EARTHQUAKE ENGINEERING : Engineering Seismology – Earthquake phenomenon – Causes and effects of earthquakes – Faults Structure of earth – Plate Tectonics – Elastic Rebound Theory – Earthquake Terminology – Source, Focus, Epicenter etc – Earthquake size – Magnitude and intensity of earthquakes – Classification of earthquakes – Seismic waves – Seismic zones – Seismic Zoning Map of India – Seismograms and Accelerograms.

UNIT-VI

CODAL DETAILING PROVISIONS : Review of the latest Indian Seismic codes IS:4326 and IS:13920 Provisions for ductile detailing of R.C buildings – Beam, column and joints.

UNIT-VII

ASEISMIC PLANNING : Plan Configurations – Torsion Irregularities – Re-entrant corners – Non-parallel systems – Diaphragm Discontinuity – Vertical Discontinuities in load path – Irregularity in strength and stiffness – Mass Irregularities – Vertical Geometric Irregularity – Proximity of Adjacent Buildings.

UNIT-VIII

SHEAR WALLS : Types – Design of Shear walls as per IS:13920 – Detailing of reinforcements.

TEXT BOOKS:

1. Mario Paz, Structural Dynamics, "Theory and Computations", Pearson Education, 6th Edition, 2005.
2. Pankaj Agarwal & Manish Shrikhande, "Earthquake Resistant Design of Structures", Prentice Hall of India, New Delhi, 5th Edition, 2009.
3. Jai Krishna A.R, Chandrasekharan A.R, Brijesh Chandra, "Elements of Earthquake Engineering", South Asian Publishers, New Delhi, 2nd Edition, 2001.

REFERENCES:

1. Chopra A.K., "Dynamics of Structures", Pearson Education, Indian Branch, Delhi, 5th Edition, 2007.
2. Clough & Penzien, "Dynamics of Structures", McGraw Hill, International Edition, 4th Edition, 2008.
3. IS Codes: IS:1893, IS:4326 and IS:13920, Bureau of Indian Standards, New Delhi.

INDUSTRIAL WASTE AND WASTE WATER MANAGEMENT

(ELECTIVE-I)

Course Code : ACE 1138

L	T	P	C
4	0	0	4

AIM :

To gain knowledge in theory and design of Industrial waste water treatment and understand the process.

OBJECTIVE:

Industrial processes –Origin of waste water – various treatment methods code of practices – management.

UNIT-I

INTRODUCTION : Waste water treatment primary, secondary and Tertiary treatment.

UNIT-II

TREATMENT OF INDUSTRIAL WASTE WATER: Basic Theories of Industrial Waste water Management – Volume reduction – Strength reduction – Neutralization – Equalization and proportioning- joint treatment of industrial wastes and domestic sewage – consequent problems.

UNIT-III

EFFLUENT DISPOSAL METHODS : Industrial waste water discharges into streams,Lakes and oceans and problems – Effluent disposal methods.

UNIT-IV

WASTE WATER MINIMISATION : Recirculation of Industrial Wastes – Use of Municipal Waste Water in Industries – Common Effluent Treatment Plants – Advantages and Suitability - Limitations.

UNIT-V

TREATMENT OF WASTE WATER FROM SPECIFIC INDUSTRIES–I : Manufacturing Process and design origin of liquid waste from Textiles, Paper and Pulp industries, Special Characteristics, Effects and treatment methods.

UNIT-VI

TREATMENT OF WASTE WATER FROM SPECIFIC INDUSTRIES–II : Manufacturing Process and design origin of liquid waste from Fertilizers – Thermal Power Plants and Tanneries, Special Characteristics, Effects and treatment methods.

UNIT-VII

TREATMENT OF WASTE WATER FROM SPECIFIC INDUSTRIES–III : Manufacturing Process and design origin of liquid waste from Sugar Mills –Distillers, and Dairy, Special Characteristics, Breweries – Effects and treatment methods.

UNIT-VIII

TREATMENT OF WASTE WATER FROM SPECIFIC INDUSTRIES–IV : Manufacturing Process and design origin of Steel Plants, Oil Refineries, and Pharmaceutical Plants, Special Characteristics, Effects and treatment methods.

TEXT BOOK:

1. Rao M.N. and Dutta, "Waste Water Treatment", Oxford & IBH, New Delhi, 1st edition, 1987.

REFERENCE:

1. Mark J. Hammer and Mark J. Hammer (Jr), "Water and Waste Water Technology", Amazon Publications, 6th Edition, 2001.

TRAFFIC ENGINEERING

(ELECTIVE-I)

Course Code : ACE 1139

L	T	P	C
4	0	0	4

AIM :

To introduce the basic concepts of traffic engineering.

OBJECTIVE:

Over view of the traffic volume studies, study the traffic controls and regulations, detrimental effect of traffic on environment problems of highway capacity.

UNIT-I

TRAFFIC CHARACTERISTICS: Basic characteristics of Traffic- Volume, Speed and Density- Relationship among Traffic parameters.

UNIT-II

TRAFFIC MEASUREMENT: Traffic Volume Studies-Objectives- Types of Volume Studies –Concept of PCU- Data Collection and Presentation – Speed Studies – Types of Speeds- Objectives of Speed Studies- Methods of Conducting speed studies- Data collection and Presentation- Statistical Methods for Analysis of Speed Data.

UNIT-III

HIGHWAY CAPACITY: Definition of Capacity – Importance of capacity – Factors affecting Capacity- Concept of Level of Service- Different Levels of Service- Concept of Service Volume- Peak Hour Factor.

UNIT-IV

PARKING STUDIES: Types of parking facilities – Onstreet and Off Street Parking Facilities- Parking Studies- Parking Inventory Study – Parking Survey by Patrolling Method- Analysis of Parking Data and parking characteristics-Multi Story Car Parking Facility-Design standards.

UNIT-V

TRAFFIC CONTROL & REGULATION: Traffic Problems in Urban areas- Importance of Traffic Control and regulation- Traffic Regulatory Measures- Channelisation- Traffic Signals- Saturation Flow – Signal Design by Webster Method – Signal Phasing and Timing Diagrams.

UNIT-VI

TRAFFIC & ENVIRONMENT : Detrimental effect of traffic on environment – Air Pollution – Pollutants due to Traffic – Measures to reduce Air Pollution due to Traffic- Noise Pollution – Measures to reduce Noise Pollution.

UNIT-VII

TRAFFIC SIGNS AND ROAD MARKINGS : Types of Traffic Signs- cautionary, Regulatory and Informative Signs- Specifications- Pavement markings- Types of Markings – Lane markings and Object markings- Standards and Specifications for Road Markings.

UNIT-VIII

HIGHWAY SAFETY : Problem of Highway Safety – Types of Road accidents- Causes – Engineering Measures to reduce Accidents- Enforcement Measures – Educational Measures- Road Safety Audit- Principles of Road Safety Audit.

TEXT BOOK:

1. Kadiyali L.K, "Traffic Engineering and Transportation Planning, Khanna Publishers", 3rd Edition, 2004.
2. Mannering and Kilareski, "Highway Engineering and Traffic Analysis", John Wiley Publications, 3rd Edition, 2007.

REFERENCES:

1. Khisty C. J., "Transportation Engineering – An Introduction", Prentice Hall, 3rd Edition, 2010.
2. Partha Chakroborthy, Animesh Das, "Principles of Transportation Engineering", Prentice Hall of India, 2nd Edition, 2005.
3. Papacostas C.S., "Fundamentals of Transportation Engineering", Prentice Hall(India), 2nd Edition, 2005.

RENEWABLE ENERGY SOURCES

(ELECTIVE – I)

Course Code: AEE1124

L	T	P	C
4	0	0	4

AIM:

To introduce the importance of renewable energy sources – its generation and advantages.

OBJECTIVE:

At the end of the course, the student understands:

- Issues related to conventional energy sources like depletion of fuel its environmental aspects and thus the need of renewable energy sources.
- Solar radiation – its measurement and estimation of energy to be generated, fundamentals of Photovoltaic Cells.
- Basics of Wind energy generation, bio-fuels and fuel cells.

UNIT-I

ENERGY RESOURCES:

GENERATION AND ENVIRONMENTAL IMPACT : Electrical Energy from conventional sources – Thermal plants, Integrated Gassification Combined Cycle Power Generation, Gas Turbine Plant; Nuclear Power- Nuclear Fission and Fusion; Energy reserves of India – Coal, Oil, Natural Gas, Hydro-electric power potential;

Environmental aspects of Electric Energy Generation – Atmospheric pollution, Hydrocarbons, particulates; Thermal Pollution; Hydroelectric Projects; Nuclear Power Generation and Environment – Natural Radiation, Radioactive Pollution; Operational safety in Nuclear Power Safety; Disposal of Nuclear waste; Impact of Renewable Energy Generation of Environment.

UNIT-II

SOLAR RADIATION AND ITS MEASUREMENT: Solar constant, Spectral distribution of Extraterrestrial Radiation; Terrestrial Solar Radiation; Solar Radiation Geometry; Computation of Cosθ for any location having any orientation; Sunrise, Sunset and Day length; Empirical equation for estimating the availability of solar radiation; Solar Radiation Measurements and data for India.

UNIT-III

SOLAR THERMAL ENERGY COLLECTORS: Introduction, Flat Plate Collectors, Effect of design parameters on performance – Heat Transport System, Selective surfaces, Number of Covers, Spacing; Laws of Thermal Radiation; Transmissivity of the cover system – Transmittance considering absorption only, Transmittivity-Absorptivity product; Performance analysis of a liquid flat-plate collector; Total loss coefficient and Heat Losses; Solar Concertrating collectors – Types, Thermodynamic limits to concentration, Performance analysis of Cylindrical Parabolic Collector; Compound Parabolic Concentrator – Tracking CPC and Solar swing, Performance analysis of CPC; Solar Thermal Energy Storage.

UNIT-IV

SOLAR PHOTOVOLTAIC SYSTEM – Introduction, Semi-conductor materials and doping – p-type and n-type semiconductors, Photon energy, Fermi level, p-n junction; Photovoltaic Effect; Efficiency of Solar Cells, Limits to Cell efficiency; Semiconductor materials for Solar Cells, Application of PV systems, PV Hybrid System; Grid Interactive Solar Power System.

UNIT-V

WIND ENERGY: Introduction, Classification Wind Turbines, Types of Rotors, Terms used in Wind Energy, Aerodynamic Operation of Wind Turbines, Wind Energy Extraction, Extraction of Wind Turbine Power, Wind Characteristics, Mean Wind speed and Energy estimation, Power Density Duration Curve, Wind Power Generation Curve, Modes of Wind Power Generation, Advantages and disadvantages of Wind Energy system, Selection of Optimum Wind Energy Generator, Grid interfacing of a Wind Farm, Methods of Grid connection, Grid system and properties.

UNIT-VI

SMALL HYDROPOWER: Introduction, Power Equation, Classification of Small Hydropower Stations, Classification of Water Turbines, Specific Speed, Major components of small Hydropower Projects; Low-Head Small Hydro Power Projects.

UNIT-VII

BIOMASS ENERGY: Introduction, Biomass Resources – Biofuels, Biogas, Producer Gas; Biogas Plants, Energy Recovery from Urban Waste, Power Generation from Landfill Gas, Power Generation from Liquid Waste, Biomass cogeneration.

Fuel Cells – Introduction, Principle of operation of an Acidic fuel cell, Fuel Cell types, Advantages of Fuel Cell power plants, Fuel Cell battery-powered Bus System.

UNIT-VIII

GEOTHERMAL ENERGY: Introduction to Geothermal energy, structure of the Earth's interior, Plate Tectonic Theory; Geothermal Resources – Hydrothermal resource, Vapour-dominated Resource, Geopressured Resource, Magma; Geothermal Power Generation.

TIDAL ENERGY : Introduction to Tidal Energy, Tidal characteristics, Tidal Energy Estimation, Energy and Power in a Double Cycle System, Development of a Tidal Power Scheme, Important components of Tidal Power Plant, Advantages and disadvantages of Tidal Power.

TEXT BOOK:

1. D.P.Kothari, K.C.Singal and Rakesh Ranjan, "Renewable Energy Sources and Emerging Technologies", PHI Learning Private Limited, Second Edition, 2009.

REFERENCE BOOKS:

1. G.D.Rai, "Non-Conventional Energy Sources", Khanna Publications Limited,1997.
2. Tiwari and Ghosal, "Renewable Energy Sources", Narosa Publications, 2005.

SATELLITE COMMUNICATION

(ELECTIVE-I)

(Common to all branches)

Pre-requisites: None

Course Code: AEC1132

L	T	P	C
4	1	0	4

AIM:

Students will learn Satellite Systems and Communications applications comprehensively and apply this knowledge for understanding the existing Modern Satellite Applications.

OBJECTIVE:

The flow of the syllabus enables students to understand the subject from basics to advanced technologies on Satellite Communications and get prepared for Industry and will not be needing extensive training on these aspects.

UNIT-I

SATELLITE ORBITS : Kepler's Laws, Newton's law, orbital parameters, orbital perturbations, station keeping, geo stationary and non Geo-stationary orbits – Look Angle Determination- Limits of visibility – eclipse-Sub satellite point –Sun transit outage-Launching Procedures - launch vehicles and propulsion.

UNIT-II

SPACE SEGMENT : Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control and Propulsion, communication Payload and supporting subsystems, Telemetry, Tracking and command.

UNIT-III

EARTH SEGMENT : Earth Station Technology— Terrestrial Interface, Transmitter and Receiver, Antenna Systems TVRO, MATV, CATV, Test Equipment Measurements on G/T, C/No, EIRP, Antenna Gain.

UNIT-IV

SATELLITE LINK DESIGN : Satellite uplink and downlink Analysis and Design, link budget, E/N calculation- performance impairments-system noise, inter modulation and interference, Propagation Characteristics and Frequency considerations- System reliability and design lifetime.

UNIT-V

SATELLITE ACCESS : Modulation and Multiplexing: Voice, Data, Video, Analog – digital transmission system, Digital video Broadcast, multiple access: FDMA, TDMA, CDMA, Assignment Methods, Spread Spectrum communication, compression – encryption.

UNIT-VI

SATELLITE APPLICATIONS-COMMUNICATIONS : INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System. Specialized services – E –mail, Video conferencing, Internet.

UNIT-VII

PRINCIPLES OF TV & BROADCASTING : Gross structure, Image continuity, Scanning, flicker, interlaced scanning, number of scanning lines, Fine structure, Tonal Gradation. Video signal dimensions, Horizontal sync. details,Vertical sync. details, Scanning sequence details, Functions of vertical pulse train, Channel bandwidth, vestigial side band transmission, bandwidth allocations for colour transmission.

UNIT-VIII

SATELLITE APPLICATIONS-BROADCAST : Direct Broadcast satellites (DBS)- Direct to home Broadcast (DTH), Digital audio broadcast (DAB)- World space services, Business TV(BTV), GRAMSAT.

TEXT BOOKS:

1. Tri T. Ha, "Digital Satellite Communication", 2nd Edition, McGraw-Hill, 1990.
2. R R Gulati , "Monochrome and colour television", New Age International, 2007.

REFERENCE BOOKS:

1. M. Richharia, 'Satellite Communication Systems-Design Principles", Macmillan 2003
2. N.Agarwal, 'Design of Geosynchronous Space Craft, Prentice Hall, 1986.
3. Bruce R. Elbert, 'The Satellite Communication Applications' Hand Book, Artech House Bostan London, 1997.
4. Wilbur L. Pritchard, Hendri G. Suyderhoud, Robert A. Nelson, 'Satellite Communication Systems Engineering', Prentice Hall/ Pearson, 2007.

AIR POLLUTION AND CONTROL

(ELECTIVE-II)

Course Code : ACE 1140

L	T	P	C
4	0	0	4

AIM :

To understand atmospheric pollution, to analyse causes and effects, strategic planning for control of air pollution.

OBJECTIVE:

Sources – Air pollutants classification – design and operation of control units. Air Quality Management and legal aspects.

UNIT-I

INTRODUCTION : Air Pollution – Definitions, Scope, Significance and Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, point and Non- Point, Line and Areal Sources of air pollution- stationary and mobile sources.

UNIT-II

EFFECT OF AIR POLLUTANTS : Effects of Air pollutants on man, material and vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc.

UNIT-III

THERMODYNAMICS OF AIR POLLUTION : Thermodynamics and Kinetics of Air-pollution – Applications in the removal of gases like SO_x, NO_x, CO, HC etc., air-fuel ratio. Computation and Control of products of combustion.

UNIT-IV

METEOROLOGY OF AIR POLLUTION : Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Influence of Meteorological phenomena on Air Quality-wind rose diagrams.

UNIT-V

AIR POLLUTION MODELLING : Lapse Rates, Pressure Systems, Winds and moisture plume behavior and plume Rise Models; Gaussian Model for Plume Dispersion.

UNIT-VI

AIR POLLUTION CONTROL – PARTICULATE MATTER : Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control.

Equipments – Settling Chambers, Centrifugal separators, filters Dry and Wet scrubbers, Electrostatic precipitators.

UNIT-VII

AIR POLLUTION CONTROL – GASEOUS : General Methods of Control of NO_x and SO_x emissions – In-plant Control Measures, process changes, dry and wet methods of removal and recycling.

UNIT-VIII

AIR QUALITY MANAGEMENT : Air Quality Management – Monitoring of SPM, SO; NO and CO Emission Standards. Conduct of Air pollution survey.

TEXT BOOKS:

1. Rao M.N.and Rao H.V.N., "Air Pollution", Tata Mc.Graw Hill Company, 2nd Edition, 1998.
2. Wark and Warner, "Air Pollution", Harper & Row, New York, 3rd Edition, 1989.
3. Murali Krishna VSG K, "Air Pollution", Kushal & Co, Kakinada, 2nd Edition.

REFERENCE:

1. Trivedy R.K and Goel P.K., "An introduction to Air Pollution", B.S. Publications, 2nd Edition 2009.

GROUND IMPROVEMENT TECHNIQUES

(ELECTIVE-II)

Course Code : ACE 1141

L	T	P	C
4	0	0	4

AIM :

To study the various techniques of improving various soils to improve their load carrying capacity.

OBJECTIVE:

Study of various materials and methods to improve a soil.

UNIT-I

DEWATERING : Methods of de-watering- sumps and interceptor ditches- single, multi stage well points – vacuum well points- Horizontal wells-foundation drains-blanket drains- criteria for selection of fill material around drains –Electro-osmosis .

UNIT-II

GROUTING : Objectives of grouting- grouts and their properties- grouting methods- ascending, descending and stage grouting- hydraulic fracturing in soils and rocks- post grout test.

UNIT-III

IN-SITU DENSIFICATION METHODS IN COHESIONLESS SOILS : Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth.

UNIT-IV

IN – SITU DENSIFICATION METHODS IN COHESIVE SOILS: Preloading or dewatering, Vertical drains – Sand Drains, Sand wick geodrains – Stone and lime columns – thermal methods.

UNIT-V

STABILISATION : Methods of stabilization-mechanical-cement- lime-

bituminous-chemical stabilization with calcium chloride, sodium silicate and gypsum

UNIT-VI

REINFORCED EARTH : Principles – Components of reinforced earth – factors governing design of reinforced earth walls – design principles of reinforced earth walls.

UNIT-VII

GEOSYNTHETICS : Geotextiles- Types, Functions and applications – geogrids and geomembranes – functions and applications.

UNIT–VIII

EXPANSIVE SOILS : Problems of expansive soils – Mechanism of swelling- tests for identification – methods of determination of swell pressure. Improvement of expansive soils – Foundation techniques in expansive soils – under reamed piles, Sand cushion, CNS technique, granular pile anchor technique, stabilization of expansive soils.

TEXT BOOKS:

1. Hausmann M.R., "Engineering Principles of Ground Modification", McGraw-Hill, 3rd Edition, 1998.
2. Purushotham Raj, "Ground Improvement Techniques", Laxmi Publications, 3rd Edition, 2009.

REFERENCES:

1. Moseley M.P., "Ground Improvement", Blackie Academic and Professional, 1st Edition, 1996.
2. Xanthakos P.P, Abramson, L.W and Bruce, "Ground Control and Improvement", D.A John Wiley and Sons, 1st Edition, 2001.
3. Robert M. Koerner, "Designing with Geosynthetics", Prentice Hall, 2nd Edition,1992.

ADVANCED STRUCTURAL DESIGN

(ELECTIVE-II)

Course Code : ACE 1142

L	T	P	C
4	0	0	4

AIM :

To impart concepts of structural engineering required for different types of floors, storage structures and bridges.

OBJECTIVE :

The student shall be able to design and detail flat slabs, grid floors, storage structures and steel bridges as per the relevant IS : codes

UNIT-I

FLAT SLABS : Introduction – Components of flat slab construction- Indian code Recommendations (IS : 456 -2000)- Direct design method – Equivalent frame method – Shear in flat slabs – Detailing of flat slabs- Reinforcement detailing and bar bending schedule need to be prepared.

UNIT-II

GRID FLOORS: Introduction – Analysis and design of grid floors – analysis of rectangular grid floors by Timoshenkos plate theory- Reinforcement detailing and bar bending schedule need to be prepared.

UNIT-III

DESIGN OF MULTI-STORIED FRAMES: Analysis by substitute frame method – Analysis of lateral loads by approximate methods- Reinforcement detailing and bar bending schedule need to be prepared.

UNIT-IV

BUNKERS AND SILOS : Introduction – difference between bunker & silo – concepts of loading and design.

UNIT-V

PORTAL FRAMES : Introduction – Analysis and design of portal frames

UNIT-VI

CHIMNEYS : Introduction to chimneys – Parts of chimney – Stress in RC shafts due to self weight and wind loads – Stress due to temperature difference – Design of RC chimneys.

UNIT-VII

PLATE GIRDER BRIDGES: Analysis and design of Plate girder bridges- Detailed drawings must be prepared.

UNIT-VIII

LIGHT GAUGE STEEL STRUCTURES: Introduction – shapes – definitions – local buckling of plate elements – specifications – design of compression and flexural numbers- Detailed drawings must be prepared.

FINAL EXAMINATION PATTERN: The end examination pattern should consists of Parts A & B. Part A consists of two questions in design and drawing out of which one question is to be answered. Part B should consist of three questions out of which two are to be answered. Weightage for Part A is 40% and Part B is 60%.

TEXT BOOKS:

1. Varghese P.C., "Advanced Reinforced Concrete Structures", Prentice Hall of India Pvt. Ltd., 6th Edition, 2005.
2. Punmia B.C, Ashok Kumar Jain and Arun Kumar Jain, "Reinforced Concrete Structures Vol- 2", Laxmi publications Pvt. Ltd., New Delhi, 5th Edition, 2007.
3. Duggal S.K., "Design of Steel Structures", Mc Graw Hill Publishers, New Delhi, 3rd Edition, 2009.

REFERENCES:

1. Pillai S.U, and Menon D., "Reinforced Concrete Design", Tata Mc. Graw hill Publishing Company, 2nd Edition, 2008.
2. Bhavikatti S.S., "Advanced RCC Design", New Age International Pvt. Ltd., 4th Edition.2008.
3. Codes: Relevant IS: codes.

SOFTWARE DEVELOPMENT ENGINEERING

(ELECTIVE- II)

Course Code: ACS1114

L	T	P	C
4	1	0	4

AIM :

- The aim of this course is to provide general background on the Engineering of Software Development process to students in non computer science departments such as civil, chemical, mechanical, electrical engineering, etc.

OBJECTIVES:

- To provide an understanding of the various processes software engineers may employ in developing contemporary software systems
- To examine all phases of the software development life cycle, from initial planning through implementation and maintenance.
- To develop an understanding of the tools and techniques employed in contemporary software engineering.
- To develop an understanding of the skills required to analyze and design software systems.
- To demonstrate an appreciation of good practices in software engineering.
- To demonstrate the application of software quality concepts.

UNIT-I

INTRODUCTION TO SOFTWARE ENGINEERING: The evolving role of software, Changing Nature of Software, Software Myths.

A GENERIC VIEW OF PROCESS: SOFTWARE ENGINEERING : A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), process patterns, process assessment, personal and team process models.

UNIT-II

PROCESS MODELS: The waterfall model, Incremental process models, Evolutionary process Models, The Unified process, agile methodology.

SOFTWARE REQUIREMENTS : Functional and non-functional requirements, user requirements, System requirements, Interface specification, the Software Requirements document.

UNIT-III

REQUIREMENTS ENGINEERING PROCESS : Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

SYSTEM MODELS : context models, Behavioral models, Data models, object models, structured Methods.

UNIT-IV

DESIGN ENGINEERING : Design process and Design quality, Design concepts, the design model.

CREATING AN ARCHITECTURAL DESIGN : Software Architecture, Data design, Architectural styles and

Patterns, Architectural Design.

UNIT-V

OBJECT ORIENTED DESIGN : Objects and Object classes, An Object Oriented design process,Design

Evolution.

PERFORMING USER INTERFACE DESIGN: Golden rules, User interface analysis and design, interface Analysis, interface design steps, Design evaluation,

UNIT-VI

TESTING STRATEGIES: A strategic approach to software testing, the strategies for conventional

Software, Verification Testing and Validation Testing, Different Types of Testing, the art debugging.

UNIT-VII

Client Server Systems - Meaning, Architecture and Design

Web based Systems - Meaning, Architecture and Design

Data warehouse System - Meaning, Architecture and Design

Introduction to RAD Tool (3-4 lab sessions included)

UNIT-VIII

Write Software Development Specifications that include System Analysis and System design for

a) A Web Based Application System

b) A Data warehouse Application system

TEXT BOOKS:

1. Rojer S Pressman, Roger S., "Software Engineering, A Practitioner's Approach", 7th Edition, TMH, 2008.

2. Han, Jiawel and Kamber Micheline, "Data Mining – Concepts and Techniques", 2nd Edition, Morgan Kaufmann Publishers, 2008.

DATA STRUCTURES FOR ENGINEERING APPLICATIONS

(ELECTIVE- II)

Course Code: AIT1114

L	T	P	C
4	1	0	4

AIM :

To empower students to build efficient software applications with suitable data structures.

OBJECTIVE :

To make students understand the software design techniques for solving engineering applications of their discipline

UNIT-I

RECURSION AND LINEAR SEARCH : Preliminaries of algorithm, Algorithm analysis and complexity, Recursion: Definition, Design Methodology and Implementation of recursive algorithms, Linear and binary recursion, recursive algorithms for factorial function, GCD computation, Fibonacci sequence, Towers of Hanoi.

Chapters 1, 2 from Text Book 1

UNIT-II

SEARCHING TECHNIQUES : Introduction, Linear Search, Transpose Sequential, Search, Interpolation Search, Binary Search, Fibonacci Search.

Chapter 15 from Text Book 2.

UNIT-III

SORTING TECHNIQUES : Basic concepts, insertion sort, selection sort, bubble sort, quick sort, merge sort.

Chapter 12 from Text Book 1

UNIT-IV

STACKS : Basic Stack Operations, Representation of a Stack using Arrays, Stack Applications: Reversing list, Factorial Calculation, In-fix-to postfix Transformation, Evaluating Arithmetic Expressions.

Chapter 3 from Text Book 1.

UNIT-V

QUEUES : Basic Queues Operations, Representation of a Queue using array, Implementation of Queue Operations using Stack.

Chapter 4 from Text Book 1.

UNIT-VI

APPLICATIONS OF QUEUES : Applications of Queues- Enqueue, Dequeue, Circular Queues, Priority Queues.

Chapter 4 from Text Book 1.

UNIT-VII

LINKED LISTS : Introduction, single linked list, representation of a linked list in memory, Operations on a single linked list, merging two single linked lists into one list, Reversing a single linked list, Circular linked list, Double linked list. Chapter 6 from Text Book 2.

UNIT-VIII

TREES : Basic tree concepts, Binary Trees: Properties, Representation of Binary Trees using arrays and linked lists, operations on a Binary tree , Binary Tree Traversals (recursive), Creation of binary tree from in-order and pre(post)order traversals.

Chapter 8 from Text Book 2.

TEXT BOOKS:

1. Richard F, Gilberg & Behrouz A. Forouzan, " Data Structures", 2nd Edition, Thomson, 2007.
2. GAV PAI, "Data Structures and Algorithms", 1st Edition, Tata McGraw-Hill, 2010.

REFERENCES:

1. Seymour Lipschutz, "Data Structure with C", 1st Edition, TMH, 2009.
2. Debasis, Samanta "Classic Data Structures", 2nd Edition, PHI,2009
3. Horowitz,Sahni, Anderson "Fundamentals of Data Structure in C", 2nd Edition, Freed, University Press, 2009.

Note : A small application may be implemented in software from their respective disciplines at the end of the course.

COMPUTER APPLICATIONS IN CIVIL ENGINEERING

Course Code : ACE 1143

L	T	P	C
0	0	3	2

AIM :

To provide basic knowledge on Computer Applications in Civil Engineering.

OBJECTIVE:

The student must be able to analyse multi-storied frames, earth work calculations, sewer pipe design and slope stabilities, using various civil engineering softwares.

EXERCISES:

1. Analysis of beams.
2. Analysis of 2D frames for gravity loads.
3. Analysis of 2D frames for lateral loads.
4. Analysis of 3D frames for gravity loads.
5. Analysis of 3D frames for lateral loads
6. Analysis of 3D frames for combined gravity and lateral loads.
7. Analysis of trusses.
8. Determine the fundamental frequency and mode shapes for a given structure.
9. Calculation of area and volume for a given block level survey data and to plot the contours.
10. To design the pipe network for a sewer line.
11. Calculation of earth pressures on retaining wall and assessment of slope stability of a finite slope.
12. Determination of safe bearing capacity of soil using C.

Note : At least 8 of the above experiments to be conducted.

SOFTWARES:

1. STAAD PRO or Equivalent.
2. SURFER
3. SEWER CAD
4. GEOSLOPE or Equivalent.
5. GEO-5 or Equivalent.
6. TURBO-C compiler.

ENVIRONMENTAL ENGINEERING LAB

Course Code : ACE 1144

L	T	P	C
0	0	3	2

AIM :

To gain knowledge for water quality testing in accordance to IS standards.

OBJECTIVE:

The student must be able to conduct various tests on water.

LIST OF EXPERIMENTS

1. Determination of pH and turbidity
2. Determination and Estimation of total solids, organic solids inorganic solids, determination of conductivity of Total dissolved solids.
3. Determination of Alkalinity/Acidity.
4. Determination of Optimum coagulant dose
5. Determination of Chlorides.
6. Determination of Chlorine demand.
7. Determination of Dissolved Oxygen.
8. Determination of B.O.D
9. Determination of C.O.D
11. Determination of Nitrogen.
12. Determination of total Phosphates.

Note : At least 8 of the above experiments are to be conducted.

TEXT BOOKS:

1. Standard Methods for Analysis of Water and Waste Water – APHA

REFERENCES :

1. Relevant IS Codes and Water & Waste Water Analysis Manual of ICMR or NEERI.
2. Sawyer and Mc. Carty, Chemistry for Environmental Engineering

SYLLABI FOR VIII SEMESTER

BRIDGE ENGINEERING

Course Code : ACE 1145

L	T	P	C
4	0	0	4

AIM :

To acquire basic knowledge in designing various bridge components.

OBJECTIVE :

The student shall be able to design and do the detailing of bridges using relevant IS codes and IRC Corse.

UNIT-I

GENERAL CONSIDERATIONS FOR ROAD BRIDGES: Introduction – Site selection – Soil exploration for site – Selection of bridge type – Economical span – Number of spans – Determination of HFL – General arrangement drawing.

UNIT-II

STANDARD SPECIFICATIONS FOR ROAD BRIDGES : Width of carriageway- Clearances- Loads to be considered- Dead load – I.R.C. standard live loads- Impact effect- Review of I.R.C. loadings- Application of live loads on deck slabs – Wind load – Longitudinal forces- Centrifugal forces- Horizontal forces due to water currents –Buoyancy effect- Earth pressure.

UNIT-III

CULVERTS: Introduction, analysis and design of box culverts- slab culverts – pipe culverts- Reinforcement detailing and bar bending schedule need to be prepared.

UNIT-IV

REINFORCED CONCRETE T-BEAM BRIDGES : Introduction – Analysis and Design of T – Beam Girder bridges- Reinforcement detailing and bar bending schedule need to be prepared.

UNIT-V

DESIGN OF SUBSTRUCTURE: Analysis and Design of Abutments and pier- Reinforcement detailing and bar bending schedule need to be prepared.

UNIT-VI

BRIDGE BEARINGS: Bearings, forces on bearings, design of elastomeric bearings, basics for selection of bearings, expansion joints, closed joints.

UNIT-VII

BRIDGE FOUNDATIONS : Types of foundations, well foundation – open well foundation, components of well foundation – pile foundations – designs not included- Reinforcement detailing and bar bending schedule need to be prepared.

UNIT-VIII

DESIGN OF THREE HINGED ARCH BRIDGES : Introduction- primary loads and stresses- design and detailing-Reinforcement detailing and bar bending schedule need to be prepared.

FINAL EXAMINATION PATTERN: The end examination pattern should consist of Parts A & B. Part A consists of two questions in design and drawing out of which one question is to be answered. Part B should consist of three questions out of which two are to be answered. Weightage for Part A is 40% and Part B is 60%.

TEXT BOOKS :

1. Johnson victor D, "Essentials of Bridge Engineering", Oxford, IBH publishing Co., Ltd., 7th Edition, 2006.
2. Ponnu Swamy, "Bridge Engineering", Mc Graw-Hill Publication, 4th Edition, 2008.
3. Krishna Raju N., "Design of Bridges", Oxford and IBH Publishing Co., Ltd., 4th Edition, 2008.

REFERENCES :

1. Vazirani, Ratvani & Aswani, "Design of Concrete Bridges", Khanna Publishers, 5th Edition, 2006.
2. Jagadish T.R. & M.A. Jayaram, "Design of Bridge Structures", 2nd Edition, 2009.
3. Swami Saran, "Analysis and Design of Sub-Structures", Oxford IBH Publishing Co. ltd., 2nd Edition, 2006.

FINITE ELEMENT METHODS

(ELECTIVE - III)

Course Code : ACE 1146

L	T	P	C
4	0	0	4

AIM :

To impart prerequisites and basic concepts of finite element method as applicable to 1D and 2D structural mechanical problems.

OBJECTIVE:

To introduce fundamentals & significance of FEM. To understand the concept of solving ID, 2D plane stress, plane strain and axi-symmetric problems by FEM .To understand the concept of Isoparametric formulation.

UNIT-I

PRE-REQUISITES OF FEM – I (Methods of Structural Analysis): Classification of Problems in Structural Mechanics, Methods of Structural Analysis – Basic concepts of Strain Energy and Unit Load method, Principle of Virtual Work method, Ritz and Rayleigh-Ritz method.

UNIT-II

PRE-REQUISITES OF FEM – II (Theory of Elasticity) - Introduction – Concept of Stress and Strain, Notation, Sign Convention and Assumptions in Theory of Elasticity. Equilibrium Equations, Stress-Strain Relationships, Strain-Displacement Relationships, Strain Compatibility Equations and Stress Compatibility Equations for 1D, 2D, 3D, Plane Stress. Plane Strain and Axisymmetric Problems.

UNIT-III

INTRODUCTION TO FEM : Limitations of Methods of Structural Analysis, Requirements of an ideal method, Mathematical modeling of Physical problems, Concept of Finite element Method – Perimeter of Circle, Weak form development. History, Merits and Demerits and Applications of Finite element Method. Finite element Method based

Softwares. Steps involved in FEM as applicable to Structural Mechanics Problems.

UNIT-IV

DESCRITIZATION AND CHOICE OF DISPLACEMENT MODEL - Descritization – Element Shapes – Factors affecting choice of element shapes, Elements for 1D, 2D, 3D, Plane Stress, Plane Strain and Axi-symmetric Problems, Aspect Ratio. Nodes – Types of nodes, Requirements for location of nodes. Finite Element mesh – Factors affecting Element size/number of elements. Choice of displacement interpolation model – Requirements of an ideal Displacement Interpolation model, Different models and suitability of polynomial, Factors affecting Nature (single/two variable) and Degree of Polynomial to be chosen, Degree of Polynomial and accuracy of solution.

UNIT-V

FORMULATION OF ELEMENT STIFFNESS MATRIX, SHAPE FUNCTIONS AND STRAIN DISPLACEMENT MATRIX - Element Stiffness matrix Equation – Derivation of stiffness matrix based on Principle of Minimization of Total Potential Energy and Principle of Virtual Work. Static Condensation – Necessity. Shape Functions – Characteristics/Properties of shape functions – Methods of Determining shape functions. Assemblage of Element Stiffness Matrices – Methods of Assemblage and Formulation of Structure Stiffness matrix.

UNIT-VI

ISO-PARAMETRIC FORMULATION - Isoparametric, sub-parametric and super parametric Elements, Procedure for Formulation, Shape functions for Isoparametric Elements.

UNIT-VII

2D ANALYSIS USING F.E.M : Stiffness Matrix for a Two noded Truss Element, Three noded Truss Element and Two noded Beam Element in Local, Global (2D), Natural and Generalised Co-ordinate Systems. Stiffness Matrix for a Three noded C.S.T and L.S.T elements, Four noded and Eight noded Rectangular Elements and Four noded Quadrilateral Elements in Global Co-ordinate System.

UNIT-VIII

APPLICATION OF F.E.M TO STRUCTURAL MECHANICS PROBLEMS - Analysis of 2D –Truss, 2D –Truss with initial Strain/ Rise in Temperature, Analysis of Propped Cantilevers, Fixed beams, Continuous beams, Portal Frames and Plates.

TEXT BOOKS :

1. Tirupati.R. Chandraputla and Ashok D. Belegundu, "Finite Elements Methods in Engineering", Pearson Education Publications, 3rd Edition, 2002.
2. Bhavakatti S.S., "Finite Element Analysis", New Age International Publishers, 2nd Edition, 2010.
3. David V Hutton, "Finite Element Analysis", Tata McGraw Hill, New Delhi, 2nd Edition, 2003.

REFERENCES :

1. Robert D.Cook, David S. Malkus and Michael E.Plesha, "Concepts and Applications of Finite Element Analysis", John Wiley & Sons, 3rd Edition, 2001.
2. Krishna Murthy C.S., "Finite Element Analysis – Theory & Programming", Tata Mc.Graw Hill Publishers, 2nd Edition, 2005.
3. Seshu P., "Text Book of Finite Element Analysis", Prentice Hall of India, 3rd Edition, 2010.

TRANSPORTATION PLANNING AND DESIGN

(ELECTIVE - III)

Course Code : ACE 1147

L	T	P	C
4	0	0	4

AIM :

To introduce the basic concepts of Transportation Planning.

OBJECTIVE:

Overview of the transportation planning process, concept of travel demand, transportation models and modal split concept.

UNIT-I

CONCEPT OF TRAVEL DEMAND : Travel characteristics – origin. Destination, Route mode, purpose – travel demand as a function of independent variables – Assumptions in demand estimation, relation between land use and travel – four step process of Transportation planning.

UNIT-II

TRANSPORTATION PLANNING PROCESS : General concept of Trip – Trip Generation – Trip Distribution – Traffic assignment and mode split , Aggregate and disaggregate Models – Director Demand Models, Sequential and sequential Recursive models.

UNIT-III

DATA COLLECTION AND INVENTORIES : Definition of study area – Zoning principles ; types and sources of Data, Home Interview surveys ; Road side interview surveys; Goods Taxi, IPT surveys ; sampling techniques ; Expansion factors and Accuracy check : Desire line diagram and use.

UNIT-IV

TRIP GENERATION MODELS : Factors governing Trip Generation and Attraction : Multiple linear Regression Models – Category analysis.

UNIT-V

TRIP DISTRIBUTION MODELS METHODS OF TRIP DISTRIBUTION : Growth Factor Models – Uniform Growth Factor Method ; Average Growth Factor Method ; Fratar Method ; Furness Method ; limitation of Growth Factor Models ; Concept of Gravity Model.

UNIT-VI

TRAFFIC ASSIGNMENT AND MODE SPLIT : PURPOSE OF ASSIGNMENT AND GENERAL PRINCIPLES: Assignment Techniques – All-or-nothing assignment : Multiple route assignment : Capacity resistant method, minimum path trees ; diversion curves. Factors affecting mode split – Probit logit and Descriminant Analysis.

UNIT-VII

TRANSPORTATION AND ENVIRONMENT : Detrimental effect of Traffic on Environment : Noise Pollution : Air pollution : Vibrations : Visual Intrusion – Effects and remedial measures.

UNIT-VIII

ECONOMIC EVALUATION OF TRANSPORTATION PLANS : Costs and benefits of transportation projects ; vehicle operating cost ; time saving, accident costs ; methods of economic evaluation – benefit cost ratio method – net present value method ; internal rate of return method.

TEXT BOOKS :

1. Kadiyali L.R., Traffic Engineering and Transportation Planning, Khanna Publishers, Delhi, 8th Ed, 2005.
2. Papa Costas C.S., Fundamentals of Transportation Engineering, Prentice Hall, 2nd Ed, 2006.

REFERENCES :

1. Bruton M.J., "Introduction to Transportation Planning", Hutchinson of London, 4th Ed, 2009
2. Khisty C.J., "Transportation Engineering- An Introduction", Prentice Hall, 3rd Ed, 2008.

SOIL DYNAMICS AND MACHINE FOUNDATIONS

(ELECTIVE - III)

Course Code : ACE 1148

L	T	P	C
4	0	0	4

AIM :

To study the influence of vibration on soil mass.

OBJECTIVE:

Analysis and design of foundation subjected to vibrations.

UNIT-I

THEORY OF VIBRATIONS : Basic definitions- free and forced vibrations with and without damping for single degree freedom system- Resonance and its effect – magnification – Logarithmic decrement – Transmissibility

UNIT-II

NATURAL FREQUENCY OF FOUNDATION – SOIL SYSTEM: Barkan's and IS methods – pressure bulb concept – Pauw's Analogy.

UNIT-III

WAVE PROPAGATION : Elastic waves in Rods – Waves in elastic Half space.

UNIT-IV

DYNAMIC SOIL PROPERTIES : Field and Laboratory methods of determination – Uphole, Down hole and cross hole methods – Cyclic plate load test – Block vibration test – Determination of Damping factor.

UNIT-V

MACHINE FOUNDATIONS : Types, Design criteria, permissible amplitudes and bearing pressure.

UNIT-VI

BLOCK FOUNDATION : Degrees of freedom - analysis under different modes of vibration

UNIT-VII

DESIGN OF FOUNDATIONS FOR RECIPROCATING AND IMPACT MACHINES: Analysis of Two Degree freedom systems under free and forced vibrations -Principles of Design of Foundations for reciprocating and impact machines as per IS code.

UNIT-VIII

VIBRATION ISOLATION: Types and methods – Isolating materials and their properties

TEXT BOOKS:

1) Srinivasulu P. and Vaidyanathan G.V., "Handbook of Machine Foundations", Tata McGraw Hill, 2nd Edition, 1999.

2) Shamsher Prakash, "Soil Dynamics", John Wiley publications, 3rd Edition, 2000.

REFERENCES:

1) Barkan, "Dynamics of Bases and Foundations", McGraw Hill Publishing, 2nd Edition, 1970.

2) Richart, Hall and Woods, "Vibration of Soils and Foundations", Prentice Hall, 1st Edition, 1981.

ELECTRICAL SAFETY MANAGEMENT

(ELECTIVE – III)

Course Code: AEE 1140

L	T	P	C
4	1	0	4

AIM :

To familiarize with the Electrical Safety in hazardous areas and to provide basic precautions in engineering practices.

OBJECTIVE:

To understand various electrical rules and acts, safety precautions in electrical systems

UNIT-I

INTRODUCTION TO ELECTRICAL SAFETY : Terms and definitions, objectives of safety and security measures, Hazards associated with electric current, and voltage, who is exposed, principles of electrical safety, Approaches to prevent Accidents, scope of subject electrical safety, Fire prevention and Fire Fighting.

UNIT-II

ELECTRICAL SHOCKS THEIR PREVENTION AND FIRST AID: Primary and secondary electrical shocks, possibilities of getting electrical shock and its severity, medical analysis of electric shocks and its effects, shocks due to flash/ Spark overs, prevention of shocks, safety precautions against contact shocks, flash shocks, burns, residential buildings and shops.

First Aid: first principles of actions after electric shocks, Artificial respiration, External Cardiac massage, Control of bleeding, burns and scalds and Heat exhaustion

UNIT-III

ELECTRICAL SAFETY IN RESIDENTIAL, COMMERCIAL AND AGRICULTURAL INSTALLATIONS : Wiring and fitting –

Domestic appliances – water tap giving shock – shock from wet wall – fan firing shock – multi-storied building – Temporary installations – Agricultural pump installation – Do's and Don'ts for safety in the use of domestic electrical appliances.

UNIT-IV

SAFETY DURING INSTALLATION, TESTING AND COMMISSIONING, OPERATION AND MAINTENANCE: Preliminary preparations – safe sequence – risk of plant and equipment – safety documentation – field quality and safety - personal protective equipment – safety clearance notice – safety precautions – safeguards for operator's safety.

UNIT-V

ELECTRICAL SAFETY IN HAZARDOUS AREAS : Hazardous zones – class 0,1 and 2 – spark, flashovers and corona discharge and functional requirements – Specifications of electrical plants, equipments for hazardous locations – Classification of equipment enclosure for various hazardous gases and vapours – classification of equipment/enclosure for hazardous locations.

UNIT-VI

EQUIPMENT EARTHING AND SYSTEM NEUTRAL EARTHING: Introduction, Distinction between system grounding and Equipment Grounding, Equipment Earthing, Functional Requirement of earthing system, description of a earthing system, , neutral grounding(System Grounding), Types of Grounding, Methods of Earthing Generators Neutrals.

UNIT-VII

SAFETY MANAGEMENT OF ELECTRICAL SYSTEMS : Principles of Safety Management, Management Safety Policy, Safety organization, safety auditing, Motivation to managers, supervisors, employees.

UNIT-VIII

REVIEW OF IE RULES AND ACTS AND THEIR SIGNIFICANCE : Objective and scope – ground clearances and section clearances – standards on electrical safety - safe limits of current, voltage – earthing

of system neutral – Rules regarding first aid and fire fighting facility.

The Electricity ACT, 2003, (Part1, 2, 3,4 & 5)

TEXT BOOKS:

1. S. Rao, Prof. H.L. Saluja, "Electrical Safety, Fire safety Engineering and Safety Management", Khanna Publishers. New Delhi, 1988.
2. Pradeep Chaturvedi, "Energy Management Policy, Planning and Utilization", Concept Publishing Company, New Delhi, 1997.

WEB REFERENCE:

1. www.apeasternpower.com/downloads/elecact2003.pdf

ENGINEERING ETHICS

(ELECTIVE – III)

Course Code: AEE 1141

L	T	P	C
4	1	0	4

AIM & OBJECTIVE:

To bring awareness of the importance of ethics within the engineering profession as the work of engineers can affect public health and safety. Also to bring awareness of what is called moral autonomy which is the ability to think critically and independently about moral issues and apply this moral thinking to situations that arise in the course of professional engineering practice.

UNIT-I

Introduction. Why ethics? Personal, professional ethics. Origin of ethical thought. Case studies.

UNIT-II

Professionalism and codes of ethics. Codes of ethics. Professional ethics.

UNIT-III

Understanding ethical problems. History of ethical thought. Ethical theories.

UNIT-IV

Ethical problem solving techniques. Analysis of issues in ethical problems. Line diagrams. Flow charts. Conflict problems.

UNIT-V

Risk, safety and accidents. Safety and risks. Accidents.

UNIT-VI

The rights and responsibilities of engineers. Professional responsibilities.

UNIT-VII

Ethics in research and experimentation. Case studies.

UNIT-VIII

Doing the right thing. Case studies.

TEXT BOOK:

1. Charles B. Fleddermann, "Engineering Ethics", Pearson Education, 2nd Edition, 2004.

REFERENCE BOOKS:

1. Roland Schinzinger & Mik. W. Martin "Introduction to Engineering Ethics" Mc GrawHill, Newyork – 2000.
2. Charles E. Harris, JR Michael S.Pritchard and Michel J Rabins. "Engineering Ethics, Concepts & Cases", Wadsworth Publishing Company, Belmont, CA, 2000.

FLUID POWER SYSTEMS

(ELECTIVE-III)

Course Code: AME1150

L	T	P	C
4	0	0	4

AIM& OBJECTIVE :

To provide the student with an in – depth background in the field of fluid power. To provide knowledge related to the operation maintenance and application of fluid power systems.

UNIT-I

INTRODUCTION TO HYDRAULIC SYSTEMS AND ANCILLARY HYDRAULIC SYSTEMS: Introduction to Hydraulic Systems, Construction of Hydraulic Reservoir, Gravity type, Spring-loaded and Gas loaded type Accumulators

UNIT-II

HYDRAULIC PUMPS : Gear pumps, Vane pumps and Piston pumps, Selection of Hydraulic Pumps

UNIT-III

HYDRAULIC CONTROL VALVES : Direction Control Valves, Pressure Control Valves, Flow Control Valves, Servo Valves

UNIT-IV

HYDRAULIC CYLINDERS AND HYDRAULIC MOTORS : Hydraulic cylinder operation and cylinder mountings, Hydraulic cylinder and Cushions, Hydraulic Motors operation- Gear, Vane and Piston motors, Hydraulic Motor performance, Hydrostatic Transmissions

UNIT-V

HYDRAULIC CIRCUITS-I : Introduction, Control of a Single-Acting Hydraulic Cylinder, Control of a Double Acting Hydraulic Cylinder, Regenerative Circuit, Pump-Unloading Circuit, Double-Pump Hydraulic System, Pressure Intensifier Circuit, Counterbalance Valve Application, Hydraulic Cylinder Sequencing Circuits.

UNIT- VI

HYDRAULIC CIRCUITS-II : Cylinder Synchronizing Circuits, Fail Safe Circuits, Speed control of a Hydraulic Cylinder, Speed control of a Hydraulic Motor, Hydraulic Motor Braking System, Hydrostatic Transmission System, Accumulators and Accumulator Circuits, Mechanical-Hydraulic Servo System.

UNIT-VII

PNEUMATIC CIRCUITS AND APPLICATIONS : Introduction to Pneumatics, Basic Pneumatic Circuits and applications.

UNIT-VIII

MAINTENANCE AND TROUBLE SHOOTING OF HYDRAULIC &PNEUMATIC CIRCUITS AND COMPONENTS: Oxidation and Corrosion of Hydraulic Fluids, Maintaining and Deposing of Fluids, Wear of moving parts due to solid particle contamination of the fluid, Problems caused by gases in Hydraulic Fluids, Troubleshooting of Hydraulic System, Common problems in Pneumatic

Systems, Troubleshooting of Pneumatic Systems

TEXT BOOKS:

1. Anthony Esposito, "Fluid Power with Applications", PHI, New Delhi, 1st Edition, 2005.
2. Andrew Parr, "Hydraulics and Pneumatics", Jaico Publishing House, 9th Edition, 2005.

REFERENCES:

1. S.R.Majumdar, Oil Hydraulic Systems , Tata McGraw Hill, 1st Edition ,2002.
2. S.R.Majumdar, "Pneumatic Systems", Tata McGraw Hill, 1st Edition, 2002.

WEB REFERENCES :

1. www.pneumatics.com
2. www.fluidpower.com.

OPTIMIZATION TECHNIQUES

(ELECTIVE-III)

Course Code: ACH1148

L	T	P	C
4	0	0	4

50 Hours of theory + 10 Hours of Lab Practice on MATLAB OPTIMIZATION Toolbox.

AIM & OBJECTIVES:

This course is concerned with formulating the optimization problems and solving them. Advanced topics on Evolutionary Optimization are also treated. MATLAB optimization Toolbox is used to solve large scale optimization problems.

UNIT-I

INTRODUCTION TO PROCESS OPTIMIZATION: Formulation of various process optimization problems and their classification, constrained and unconstrained optimization. Classification of points in the 2D space.

Basic concepts of optimization: Convex Set, Convex functions, necessary and sufficient conditions for stationary points. Calculating Gradient of a function and Hessian matrix. Identifying minima and maxima points.

UNIT-II

LINEAR PROGRAMMING: SIMPLEX algorithm, duality in Linear programming.

UNIT-III

TRANSPORTATION PROBLEM: Solution of Balanced problems using East-West Rule.

UNIT-IV

UNCONSTRAINED OPTIMIZATION: Optimality Criteria, Undirectional search, Powell's Conjugate direction method, Gradient based method: Cauchy's steepest Descent method; Newton's method.

UNIT-V

CONSTRAINED OPTIMIZATION: Kuhn-Tucker conditions, Transformation methods: Penalty function method, method of multipliers.

UNIT-VI

DISCRETE OPTIMIZATION: Enumeration techniques and Branch and Bound method to solve discrete optimization problem**.**

UNIT-VII

GENETIC ALGORITHMS: Working principles, differences between GAs and traditional methods. Various operations like crossover and mutation**.**

SIMULATED ANNEALING. Metropolis Algorithm. (Qualitative treatment of GA and SA only).

UNIT-VIII

MULTIOBJECTIVE OPTIMIZATION (MOO): Different methods to solve MOO like Utility function method and bounded function method. Solving 2D MOO problems graphically and identifying the Pareto set.

TEXT BOOKS:

1. Kalyanmoy D, "Optimization for Engineering Design", Prentice Hall of India, 2005.
2. Rao S.S, "Engineering Optimization-Theory & Practices", New Age International Publishers, New Delhi, 1996.

REFERENCE:

1. Reklaitis, G.V., Ravindran, A., and Ragdell, "Engineering Optimization-Methods and Application", K.M., John Wiley, New York, 1983.

ADVANCED STRUCTURAL ANALYSIS

(ELECTIVE - IV)

Course Code : ACE1149

L	T	P	C
4	0	0	4

AIM :

To impact knowledge on advanced structural analysis.

OBJECTIVE:

The student shall be able to analyse structures by matrix methods.

UNIT-I

MOMENT DISTRIBUTION METHOD : Application to the analysis of portal frames with inclined legs, gable frames

UNIT-II

STRAIN ENERGY METHOD : Application to the analysis of continuous beams and simple portal frames.

UNIT-III

INFLUENCE LINES: Influence line diagrams for Reaction, Shearing force and Bending moment in case of determinate beams and Influence line diagrams for member forces in determinate trusses – application of influence line diagrams.

UNIT-IV

ARCHES : Analysis Two hinged and Three hinged arches using influence lines.

UNIT-V

FLEXIBILITY METHOD: Introduction to the structural analysis by flexibility concept using Matrix approach and application to frames simple grids and trusses.

UNIT-VI

STIFFNESS METHOD: Introduction to the structural analysis by stiffness concept using Matrix approach and application to frames simple grids and trusses.

UNIT-VII

BEAMS ON ELASTIC FOUNDATION: Introduction – Sub grade modulus and stiffness – Analysis of simple beams resting on semi infinite elastic medium and estimation of shear force and Bending moment.

UNIT-VIII

PLASTIC ANALYSIS: Introduction – Idealized stress – Strain diagram – shape factors for various sections – Moment curvature relationship – ultimate moment – Plastic hinge – lower and upper bound theorems – ultimate strength of fixed and continuous beams.

TEXT BOOKS:

1. Pandit and Gupta, "Matrix Methods of Structural Analysis", Tata Mc.Graw Hill, 2nd Edition, 2000.
2. Vazirani and Ratwani., "Analysis of Structures Vol. I & II", Khanna Publications, 4th Edition, 2009.

REFERENCES:

1. Prakash Rao D.S., "Structural Analysis", Sagar Books, 3rd Edition, 2008.
2. Bhavi Katti S.S, "Structural Analysis Vol. I & II", Vikas Publications, 4th Edition, 2010.

ENVIRONMENTAL IMPACT ASSESSMENT & MANAGEMENT

(ELECTIVE - IV)

Course Code : ACE1150

L	T	P	C
4	0	0	4

AIM :

To acquire the knowledge and skills for the preparation E.I.A for various developmental activities.

OBJECTIVE:

It is mandatory requirement to include E.I.A for all projects. After studying the course / subject, the student should be able to plan for an E.I.A. study and suggest EMP.

UNIT-I

INTRODUCTION : Environment and its interaction with human activities. Environment Imbalances, Basic concept of EIA, Elements of EIA, - Environmental attributes, Indicators Screening and Scoping. (E.I.S. / Environmental Impact Statement).

UNIT-II

ENVIRONMENT SETTING : Environmental Inventory, Environmental Indicators – Parameters, Indicators for terrestrial subsystems, Indicators for aquatic subsystems, Socio-economic indicators, Indicators for health and nutrition.

UNIT-III

E I A METHODOLOGIES: Important consideration for choosing a methodology, categorization of methodologies Review Criteria (E.M.P) Environmental Management Plan. Step by Step procedure of preparing an E.I.A.

UNIT-IV

PREDICTION AND ASSESSMENT OF IMPACTS ON THE AIR

ENVIRONMENT : On the surface water Environment, on vegetation and cold life.

UNIT-V

PREDICTION AND ASSESSMENT OF IMPACTS ON SOIL AND GROUND WATER ENVIRONMENT : On the Biological Environment, on the Socio-Economic Environment.

UNIT-VI

PREDICTION AND ASSESSMENT OF IMPACTS ON THE CULTURAL ENVIRONMENT : Decision Methods for evaluation of alternatives, Public participation.

UNIT-VII

ENVIRONMENTAL AUDIT : Environmental legislation, objectives Environmental Audit, Types, Audit Protocol, Evaluation of Audit data and preparation of audit report.

UNIT-VIII

IMPACT ASSESSMENT : Preparation of Impact Assessment for some industries and case studies – Standard and mandatory requirements. Environmental risk analysis – Definition of Risk. Fault Tree analysis, Consequence Analysis – Cost – Benefit analysis – Life cycle assessment, Resource Balance – Energy balance & Management Review.

TEXT BOOKS:

1. Jain, R.K., Urban L.V., Stracy, G.S., "Environmental Impact Analysis", Vau Nostrand Reinhold Co, New York, 2nd Ed., 2004.
2. Anjaneyulu, Vall Manickam, "Environmental Impact Assessment Methodologies", B.S.Publications, Sultanbazar, Hyderabad, 1st Ed., 2007.

REFERENCES:

1. Ran, J.G. & Wooten, D.C., "Environmental Impact Assessment", Mc Graw Hill Pub. Co. Ltd, New York, 2nd Edition, 2008.
2. UNESCO, "Methodologies, Guidelines for the Integrated Environmental Evaluation of Water Resources Development", UNESCO/UNEP, Paris, 1987.

ADVANCED FOUNDATION ENGINEERING

(ELECTIVE - IV)

Course Code : ACE1151

L	T	P	C
4	0	0	4

AIM :

To study the various foundations systems for structures such as tall towers, bridges etc.

OBJECTIVE:

Analysis and design of foundations for structures such as tall towers, bridges and design of temporary retaining structures.

UNIT-I

FOUNDATION DESIGN BASICS-I : Depth, spacing of footings, erosion problems, water table effects, foundations on sands, silts, clays, landfills (qualitative treatment only)

UNIT-II

FOUNDATION DESIGN BASICS –II : Introduction to design of spread footings, rectangular footings, eccentrically loaded spread footings, basics of beams on elastic foundation and ring foundations.

UNIT-III

MAT FOUNDATIONS : Types, bearing capacity, settlements, subgrade reaction, design guidelines

UNIT-IV

DEEP FOUNDATIONS- III : Stresses during pile driving, tension piles, negative skin friction, under-reamed piles.

UNIT-V

DEEP FOUNDATIONS- IV : Guidelines for design of pile caps, batter piles, laterally loaded piles- ultimate capacity of laterally loaded piles.

UNIT-VI

DEEP FOUNDATIONS -V : Drilled piers – uses, load carrying capacity, settlements.

UNIT-VII

PILE FOUNDATIONS : Cantilever sheet piles and anchored bulkheads, Earth pressure diagram Determination of Depth of embedment in sands and clays – Timbering of trenches- Earth pressure diagrams – Forces in struts.

UNIT-VIII

COFFER DAMS : Stability, bearing capacity, settlements (qualitative treatment only).

TEXT BOOKS:

1. Das, B.M., "Principles of Foundation Engineering", PWS Publishing, Singapore, 4th Edition, 1999.
2. Bowles, J.E., "Foundation Analysis and Design", McGraw- Hill International, 4th Edition, 1988.

REFERENCES :

1. Venkataramaiah C., "Geotechnical Engineering", NewAge International Pvt.Ltd, Publishers, 5th Edition, 2009.
2. Swami Saran, "Analysis and Design of Substructures", Oxford & IBH Publishing Company Pvt.Ltd, 3rd Edition, 2009.
3. Gopal Ranjan & ASR Rao, "Basics and Applied Soil Mechanics", New Age International Pvt.Ltd, Publishers, 4th Edition, 2002.

GREEN BUILDINGS AND INFRASTRUCTURE

(ELECTIVE - IV)

Course Code : ACE 1153	L	T	P	C
Pre-requisites: None	4	0	0	4

AIM:

To impart knowledge regarding environmental sustainability and environmentally responsible green buildings.

OBJECTIVE:

The student must be able to develop skills to promote eco friendly characteristics in the area of buildings and identify crucial technologies, facilities and applications that help in developing green buildings.

UNIT-I

INTRODUCTION : Introduction to Green Buildings.

UNIT-II

MACRO- ENVIRONMENT : Elements of climate, weather, Water cycle, Carbon cycle, Environmental quality, Deforestation, climatic change, Ozone depletion and implications.

UNIT-III

MICRO-ENVIRONMENT : Natural environment vis-à-vis built environment. Living environment characteristics and components of Urban Ecosystem, solar radiation, heat flow, air-movement, Land use, drainage and sanitation.

UNIT-IV

CONCEPTS OF GREEN FIELD DEVELOPMENT : Brown field development, environmental impact and ecological balance, FAR, layouts, sustainable Site development, vegetation, landscape elements, alternative services and technologies, rain water harvesting, on site sewerage retention, treatment, recycle and reuse.

UNIT -V

BUILDING RESOURCES : Passive energy system Design, Building envelope, orientation and components of building fabric and Shading, High rise buildings, modular building Construction, curtain walls, Sourcing and recycling of building materials, alternative Calcareous, metallic and non metallic, materials

UNIT-VI

BUILDING INFRA STRUCTURE: Active Energy Systems in buildings, Utilities and services, building automation. electro-mechanical systems, lifts and transportation, captive power plant and equipment, operation & maintenance

UNIT-VII

INDOOR AIR QUALITY : Fresh air requirements standards, Sick Building Syndrome and pollutants.

UNIT-VIII

BUILDING RATING SYSTEMS : Building auditing, points system, components, and weight age, agencies and institutions, GBC, TERI etc, green buildings in the contexts of Indian sub continent.

TEXT BOOKS :

1. Koenigsberger, O.H., "Manual of Tropical Housing and Building", Orient Longman publishers, Chennai, 1st Edition, 2003.
2. Odum, P. Eugene., "Ecology and Environments", Oxford and IBH Publishers, New Delhi, 2nd Edition, 2005.

REFERENCES:

1. Greening Building – Green Congress, US.(web).
2. HSMI. Sustainable Building Technology – HUDCO, HSMI (Human Settlement Management Institution, New Delhi.

INTRODUCTION TO AIRCRAFT STRUCTURES

(ELECTIVE - IV)

Course Code : ACE1154	L	T	P	C
Pre-requisites: None	4	0	0	4

AIM:

To impart knowledge on the materials and analysis of Aircraft structures.

OBJECTIVE:

To acquire fundamentals of structural analysis, properties of various materials used, concepts of air worthiness and certifications.

UNIT-I

OVERVIEW OF THE AIRCRAFT DESIGN PROCESS: Introduction, Phases of Aircraft Design, Aircraft Conceptual Design Process, Conceptual Stage, Preliminary Design, Detailed Design, Design Methodologies

UNIT-II

FUNDAMENTALS OF STRUCTURAL ANALYSIS : Review of Hooke's Law, Principal stresses, Equilibrium and Compatibility, Determinate Structures, St Venant's Principle, Conservation of Energy, Stress Transformation, Stress Strain Relations

UNIT-III

INTRODUCTION TO AIRCRAFT STRUCTURES : Types of Structural members of Fuselage and wing section Ribs, Spars, Frames, Stringers, Longeron, Splices, Sectional Properties of structural members and their loads, Types of structural joints, Type of Loads on structural joints

UNIT-IV

AIRCRAFT LOADS : Aerodynamic Loads, Inertial Loads, Loads due to engine, Actuator Loads, Maneuver Loads, VN diagrams, Gust Loads, Ground Loads, Ground conditions, Miscellaneous Loads

UNIT-V

AIRCRAFT MATERIALS AND MANUFACTURING PROCESSES : Material selection criteria, Aluminum Alloys, Titanium Alloys, Steel Alloys, Magnesium Alloys, copper Alloys, Nimonic Alloys, Non Metallic Materials, Composite Materials, Use of Advanced materials Smart materials, Manufacturing of A/C structural members, Overview of Types of manufacturing processes for Composites, Sheet metal Fabrication ,Machining, Welding, Superplastic Forming And Diffusion Bonding

UNIT-VI

STRUCTURAL ANALYSIS OF AIRCRAFT STRUCTURES : Theory of Plates- Analysis of plates for bending, stresses due to bending, Plate deflection under different end conditions, Strain energy due to bending of circular, rectangular plates, Plate buckling, Compression buckling, shear buckling, Buckling due to in plane bending moments, Analysis of stiffened panels in buckling, Rectangular plate buckling, Analysis of Stiffened panels in Post buckling, Post buckling under shear. **Sample Exercises**.

Theory of Shells-Analysis of Shell Panels for Buckling, Compression loading, Shear Loading / Shell Shear Factor, Circumferential Buckling Stress, **sample exercises**

Theory of Beams-Symmetric Beams in Pure Bending, Deflection of beams, Unsymmetrical Beams in Bending, Plastic Bending of beams, Shear Stresses due to Bending in Thin Walled Beams, Bending of Open Section Beams, Bending of Closed Section Beams, Shear Stresses due to Torsion in Thin Walled Beams. **Sample Exercises**.

Theory of Torsion- Shafts of Non-Circular Sections, Torsion in Closed Section Beams, Torsion in Open Section Beams, Multi Cell Sections, **Sample Exercises**.

UNIT-VII

AIRWORTHINESS AND AIRCRAFT CERTIFICATION : Definition, Airworthiness Regulations, Regulatory Bodies, Type certification, General Requirements, Requirements Related to Aircraft Design Covers, Performance and Flight Requirements, Airframe Requirements, Landing

Requirements, Fatigue and Failsafe requirements, Emergency Provisions, Emergency Landing requirements

UNIT-VIII

AIRCRAFT STRUCTURAL REPAIR : Types of Structural damage, Nonconformance, Rework, Repair, Allowable damage Limit, Repairable Damage Limit, Overview of ADL Analysis, Types of Repair, Repair Considerations and best practices

TEXT BOOKS :

1. Daniel P.Raymer, "Aircraft Design-A Conceptual Approach", AIAA education series,6th Edition.
2. Michael Niu, "Airframe Structural Design", Conmilit Press, 1988,2nd Edition.
3. Michael Niu, "Airframe Stress Analysis and Sizing", Conmilit Press, 1999,3rd Edition.
4. Roger D. Schaufele, "The Elements of Aircraft Preliminary Design", Aries Publications, 2000.
5. Dale Hurst, "Aircraft Structural Maintenance", Avotek publishers, 2nd Edition, 2006.
6. Frank Delp, Michael J. Kroes & William A. Watkins, "Aircraft Maintenance & Repair", Glencoe &McGraw-Hill,6th Edition,1993.
7. "An Introduction to Aircraft Certification; A Guide to Understanding Jaa", Easa and FAA by Filippo De Florio, Butterworth-Heinemann

WEB RESOURCES :

1. http://www.aero.org/
2. http://www.rl.af.mil/rrs/resources/griffiss_aeroclub/aircraft.html
3. http://en.wikipedia.org/wiki/Tesla_turbine
4. http://ameslib.arc.nasa.gov/randt/1999/aero/aero.html
5. http://www.ctas.arc.nasa.gov/project_description/pas.html
6. http://www.moog.com/noq/_acoverview__c463/

7. http://www.dcmt.cranfield.ac.uk/aeroxtra/e339.htm
8. http://www.aeromech.usyd.edu.au/structures/as/acs1-p4.htm
9. http://www.av8n.com/how/htm/xref.html
10. http://www.aviation-history.com/video.html

DESIGN CONCEPTS FOR ENGINEERS

(ELECTIVE – IV)

Course Code: AEE1142

L	T	P	C
4	1	0	4

AIM & OBJECTIVE:

To teach the principles of design, and how they apply to engineering design projects and future job activities. It teaches the design process , rather than the technical details of any one engineering field. Basic design principles of , and design tools, are introduced.

UNIT-I

What is engineering? Definition. Various fields of engineering. Engineering professional bodies.

UNIT-II

What is design? Difference between analysis , design, and replication. Good design versus bad design. The design cycle. Overall objectives.

UNIT-III

Modeling and analysis. Gathering information. Build document and test. Revise. Informal brain storming. Examples.

UNIT-IV

Project management and team work skills. Working in a team . Building a team. Job description. Team meetings. Working with other teams.

UNIT-V

Time line. Pert. Documentation. Logbook. Technical reports. Electronic documentation. Case studies.

UNIT-VI

Engineering tools. Estimation. Significant figures. Plots.Prototyping. Reverse engineering. Computer analysis.

UNIT-VII

The human machine interface. How people interact with machines. Ergonomics. Societies view of engineering. Learning from mistakes. Role of failure. Case studies.

UNIT-VIII

Learning to speak, write, and make presentations. Importance of good communication. Preparing for meetings. Preparing a formal presentation. Technical papers. Proposals. Instructional manuals.

TEXT BOOK:

1. Mark .N Horenstien, "Design Concepts for Engineers", Prentice Hall, 4th Edition, 2009.

REFERENCE BOOK:

1. Balbir S. Dillon, "Advanced Design Concepts for Engineers", Technology Publishing Company, 1st Edition, 1998.