Vidya Jyothi Institute of Technology (Autonomous)

(Accredited by NAAC & NBA Approved By A.I.C.T.E., New Delhi, Permanently Affiliated to JNTU, Hyd)
Aziz Nagar, C.B.Post, Hyderabad -500075

Department of Civil Engineering

R18 COURSE STRUCTURE

CIVIL ENGINEERING

I YEAR I SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	L	T	P/D	Total Credits	Total Hours	Total Marks
A21001	English	2	0	0	2.0		100
A21002	Mathematics-I	3	1	0	4.0		100
A21004	Chemistry	3	1	0	4.0		100
A21501	Programming For Problem Solving-I	2	0	0	2.0		100
A21081	English Language Skills Lab	0	0	2	1.0		75
A21083	Chemistry Lab	0	0	3	1.5		75
A21381	Engineering Workshop	0	1	3	2.5		75
A21581	Programming For Problem Solving Lab-I		0	2	1.0		75
TOTAL CRIEDTS					**18**		700

I YEAR II SEMESTER **COURSE STRUCTURE**

Subject Code	Subject Name	L	T	P/D	Total Credits	Total Hours	Total Marks
A22006	Mathematics-II	3	1	0	4.0		100
A22007	Engineering Physics	3	1	0	4.0		100
A22302	Engineering Graphics & Modeling	1	0	3	2.5		100
A22303	Engineering Mechanics	4	0	0	4.0		100
A22502	Programming For Problem Solving-II	2	0	0	2.0		100
A22084	English communication Skills Lab (ECSL)	0	0	2	1.0		75
A22085	Engineering Physics Lab	0	0	3	1.5		75
A22582	Programming For Problem Solving Lab-II	0	0	2	1.0		75
TOTAL CREDITS					**20**		725

Note: All End Examinations (Theory and Practical) are of three hours duration.

Vidya Jyothi Institute of Technology (Autonomous)

(Accredited by NAAC & NBA Approved By A.I.C.T.E., New Delhi, Permanently Affiliated to JNTU, Hyd)
Aziz Nagar, C.B.Post, Hyderabad -500075

Department of Civil Engineering

II Year I Semester

Subject Code	Subject Name	L	T	P/D	Total Credits
A23009	Numerical Methods & Partial Differential Equations	3	0	0	3.0
A23101	Fluid Mechanics	3	0	0	3.0
A23102	Solid Mechanics – I	4	0	3	4.0
A23103	Engineering Geology	3	0	0	3.0
A23104	Surveying & Geomatics	3	0	2	3.0
A23010	Professional Communications	2	0	0	2.0
A23181	Surveying & Geomatics Lab	0	0	2	1.0
A23182	Engineering Geology Lab	0	0	2	1.0
A23MC1	Environmental Science	**2**	**0**	**0**	**-**
Total Number of Credits					**20**

II Year II Semester

Subject Code	Subject Name	L	T	P/D	Total Credits
A24013	Probability & Statistics	3	0	0	3.0
A24207	Principle of Electrical Engineering	3	0	0	3.0
A24105	Solid Mechanics-II	3	0	0	3.0
A24106	Environmental Engineering	3	0	0	3.0
A24107	Structural Analysis	3	0	0	3.0
A24108	Building Materials and Construction	3	0	0	3.0
A24183	Environmental Engineering Lab	0	0	2	1.0
A24184	Solid Mechanics Lab	0	0	2	1.0
A24MC1	Gender Sensitization	**2**	**0**	**0**	**-**
Total					**20**

Vidya Jyothi Institute of Technology (Autonomous)

(Accredited by NAAC & NBA Approved By A.I.C.T.E., New Delhi, Permanently Affiliated to JNTU, Hyd)
Aziz Nagar, C.B.Post, Hyderabad -500075

Department of Civil Engineering

III/I Semester

S.No.	Course Code	Category	Course Title	L	T	P	C
1	A25016	H&S-2	Managerial Economics and Financial Analysis	3	0	0	3
2	A25110	PC – 8	Design of Reinforced Concrete Structures	3	1	0	3
3	A25111	PC – 9	Geotechnical Engineering	3	1	0	3
4	A25112	PC – 10	Concrete Technology	3	1	0	3
5	A25113 A25114 A25115	PE – 1	1. Advanced Structural Analysis 2. Building planning & Drawing 3. Air Pollution and Control Methods	3	1	0	3
6	A25116 A25117	OE – 1	1. Smart Cities	3	0	0	3
7	A25185	ES Lab – 1	CAD Lab.	0	0	3	1
8	A25087	H&S Lab.	Advance Communication Skills Lab	0	0	3	1
9	A25TP1	ES – 2	Quantitative Methods & Logical Reasoning	2	0	0	1
Total number of Credits							**21**

III/II Semester

S.No.		Category	Course Title	L	T	P	C
1	A26118	PC - 11	Foundation Engineering	3	1	0	3
2	A26119	PC – 12	Design of Steel Structures	3	1	0	3
3	A26120	PC – 13	Hydraulics & Hydraulic Machinery	3	0	0	3
4	A26121	PC – 14	Water Resources Engineering	3	1	0	3
5	A26122 A26123 A26124	PE – 2	1. Construction Engineering Management 2. Ground Improvement Techniques 3. Finite Element Method	3	1	0	3
6	A26125 A26126	OE – 2	1. Green Building Technologies 2. Environmental Pollution & Control Methods	3	0	0	3
7	A26186	PC Lab – 5	Geotechnical Engineering Lab	0	0	3	1
8	A26187	PC Lab – 6	Fluid Mechanics & Hydraulic Machinery Lab	0	0	3	1
9	A26TP1	H&S-3	Personality Development & Behavioural Skills	2	0	0	1
Total number of Credits							**21**

Vidya Jyothi Institute of Technology (Autonomous)

(Accredited by NAAC & NBA Approved By A.I.C.T.E., New Delhi, Permanently Affiliated to JNTU, Hyd)
Aziz Nagar, C.B.Post, Hyderabad -500075

Department of Civil Engineering

IV/I Semester

S. No.	Course Code	Category	Course Title	L	T	P	C
1	A27127	PC – 15	Highway Engineering	3	1	0	3
2	A27128	PC – 16	Estimation & Costing	3	1	0	3
3	A27129 A27130 A27131	PE – 3	1. Pre stressed Concrete Structure 2. Earthquake Engineering 3. Green Building Technologies	3	1	0	3
4	A27132 A27133 A27134	PE – 4	1. Railway Airport and Harbour Engineering 2. Advanced Structural Design 3. Ground water Hydrology	3	1	0	3
5	A27135 A27136	OE – 3	1.Remote Sensing & GIS 2.Introduction to Earthquake Engineering	3	0	0	3
6	A27188	PC Lab – 7	Concrete & Highway Material Lab	0	0	3	1
7	A27189	PC Lab - 8	Computational Lab	0	0	3	1
8	A271P1	--	Industry Oriented Mini Project	0	0	5	3
Total number of Credits							**20**

IV/II Semester

S. No.	Course Code	Category	Course Title	L	T	P	C
1	A28137	PC – 17	Repair and Rehabilitation of structures	3	1	0	3
2	A28138	PC – 18	Remote Sensing & GIS	3	1	0	3
3	A281TS	--	Technical Seminar	0	0	2	2
4	A281CV	--	Comprehensive Viva Voce	0	0	0	2
5	A281P2	--	Major Project	0	0	20	10
Total number of Credits							**20**

Vidya Jyothi Institute of Technology (Autonomous)

(Accredited by NAAC & NBA Approved By A.I.C.T.E., New Delhi, Permanently Affiliated to JNTU, Hyd)
Aziz Nagar, C.B.Post, Hyderabad -500075

Department of Civil Engineering

FAST TRACK
BATCH 2018-22

II/I Semester

S. No.	Category	Course Title	L	T	P	C
1	H&S –1	Professional Communication	2	0	0	2
2	BS – 1	Partial Differential Equations & Numerical Methods	3	1	0	3
3	ES – 1	Fluid Mechanics	3	1	0	3
4	PC – 1	Solid Mechanics– I	4	1	0	4
5	PC – 2	Engineering Geology	3	1	0	3
6	PC – 3	Surveying & Geomatics	3	1	0	3
7	PC LAB – 1	Surveying & Geomatics Lab	0	0	3	1
8	PC LAB – 2	Engineering Geology Lab	0	0	3	1
9	MC – 1	Environmental Science	2	0	0	--
Total number of Credits						**20**

II/II Semester

S. No.	Category	Course Title	L	T	P	C
1	BS – 2	Probability & Statistics	3	1	0	3
2	ES – 2	Principles of Electrical Engineering	3	0	0	3
3	PC – 4	Solid Mechanics - II	3	1	0	3
4	PC – 5	Environmental Engineering	3	1	0	3
5	PC – 6	Structural Analysis	3	1	0	3
6	PC – 7	Building Materials and construction Techniques	3	0	0	3
7	PC Lab – 3	Environmental Engineering Lab	0	0	3	1
8	PC Lab – 4	Solid Mechanics Lab	0	0	3	1
9	MC – 2	Gender sensitization	2	0	0	-
Total number of Credits						**20**

Vidya Jyothi Institute of Technology (Autonomous)

(Accredited by NAAC & NBA Approved By A.I.C.T.E., New Delhi, Permanently Affiliated to JNTU, Hyd)
Aziz Nagar, C.B.Post, Hyderabad -500075

Department of Civil Engineering

III/I Semester

S. No.	Category	Course Title	L	T	P	C
1	H&S-2	Managerial Economics and Financial Analysis	3	0	0	3
2	PC – 8	Design of Reinforced Concrete Structures	3	1	0	3
3	PC – 9	Geotechnical Engineering	3	1	0	3
4	PC – 10	Concrete Technology	3	1	0	3
5	PE – 1	1. Advanced Structural Analysis 2. Building planning & Drawing 3. Air Pollution and Control Methods	3	1	0	3
6	OE – 1	1. Elements of Civil Engineering 2. Smart City	3	0	0	3
7	ES Lab – 1	CAD Lab.	0	0	3	1
8	H&S Lab.	Advance Communication Skills Lab	0	0	3	1
9	ES – 2	Quantitative Methods & Logical Reasoning	2	0	0	1
Total number of Credits						**21**

III/II Semester

S. No.	Category	Course Title	L	T	P	C
1	PC - 11	Foundation Engineering	3	1	0	3
2	PC – 12	Design of Steel Structures	3	1	0	3
3	PC – 13	Hydraulics & Hydraulic Machinery	3	0	0	3
4	PC – 14	Water Resources Engineering	3	1	0	3
5	PE – 2	1. Construction Engineering Management 2. Ground Improvement Techniques 3. Finite Element Method	3	1	0	3
6	PC – 17	Repair and Rehabilitation of structures	3	1	0	3
7	OE – 2	1. Green Building Technologies 2. Environmental Pollution & Control Methods	3	0	0	3
8	PC Lab – 5	Geotechnical Engineering Lab	0	0	3	1
9	PC Lab – 6	Fluid Mechanics & Hydraulic Machinery Lab	0	0	3	1
10	H&S-3	Personality Development & Behavioural Skills	2	0	0	1
Total number of Credits						**24**

Vidya Jyothi Institute of Technology (Autonomous)

(Accredited by NAAC & NBA Approved By A.I.C.T.E., New Delhi, Permanently Affiliated to JNTU, Hyd)
Aziz Nagar, C.B.Post, Hyderabad -500075

Department of Civil Engineering

IV/I Semester

S. No.	Category	Course Title	L	T	P	C
1	PC – 15	Highway Engineering	3	1	0	3
2	PC – 16	Estimation & Costing	3	1	0	3
3	PE – 3	1. Pre stressed Concrete Structure 2. Earthquake Engineering 3. Green Building Technologies	3	1	0	3
4	PE – 4	1. Railway Airport and Harbour Engineering 2. Advanced Structural Design 3. Ground water Hydrology	3	1	0	3
5	PC – 18	Remote Sensing & GIS	3	1	0	3
6	OE – 3	1.Remote Sensing & GIS 2.Introduction to Earthquake Engineering	3	0	0	3
7	PC Lab – 7	Concrete & Highway Material Lab	0	0	3	1
8	PC Lab - 8	Computational Lab	0	0	3	1
9	--	Industry Oriented Mini Project	0	0	5	3
Total number of Credits						**23**

IV/II Semester

S. No.	Category	Course Title	L	T	P	C
1	--	Technical Seminar	0	0	2	2
2	--	Comprehensive Viva Voce	0	0	0	2
3	--	Major Project	0	0	20	10
Total number of Credits						**20**

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NBA, Approved By A.I.C.T.E., New Delhi, Permanently Affiliated to JNTU, Hyderabad)

MATHEMATICS-I

(Matrices and Calculus)

I YEAR B.Tech, I SEMESTER

L	T/	P/D	C
3	1/-/-		4

Course Objectives:

1. Determine the rank of the matrix and investigate the solution of system of equations by applying the concepts of consistency.
2. Concepts of Eigen values and Eigen vectors and the nature of quadratic form by finding Eigen values.
3. Concepts of sequence and series and identifying their nature by applying some tests.
4. Mean value theorems geometrical interpretation and their application to the mathematical problems, Evaluation of improper integrals using Beta and Gamma functions
5. Partial differentiation, Total derivative and finding maxima minima of functions of several variables.

Course Outcomes: After learning the contents of this course the students must able to:

1. Write the matrix representation of system of linear equations and identify the consistency of the system of equations.
2. Find the Eigen values and Eigen vectors of the matrix and discuss the nature of the quadratic form.
3. Analyse the convergence of sequence and series.
4. Discuss the applications of mean value theorems to the mathematical problems, Evaluation of improper integrals using Beta and Gamma functions.
5. Examine the extrima of functions of two variables with/ without constraints.

UNIT-I: Matrices and Linear System of Equations

Matrices and Linear system of equations: Real matrices – Symmetric, skew - symmetric, Orthogonal. Complex matrices: Hermitian, Skew – Hermitian and Unitary. Rank-Echelon form, Normal form. Solution of Linear Systems – Gauss Elimination, Gauss Jordan & LU Decomposition methods.

UNIT-II: Eigen Values and Eigen Vectors

Eigen values, Eigen vectors – properties, Cayley-Hamilton Theorem (without Proof) - Inverse and powers of a matrix by Cayley-Hamilton theorem – Diagonolization of matrix- Quadratic forms: Reduction to Canonical form, Nature, Index, Signature.

UNIT-III: Sequences & Series

Basic definitions of Sequences and series, Convergence and divergence, Ratio test, Comparison test, Cauchy's root test, Raabe's test, Integral test ,Absolute and conditional convergence.

UNIT-IV:Beta & Gamma Functions and Mean Value Theorems

Gamma and Beta Functions-Relation between them, their properties – evaluation of improper integrals using Gamma/ Beta functions.

Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Generalized Mean Value theorem (all theorems without proof) – Geometrical interpretation of Mean value theorems.

UNIT-V: Functions of several variables

Partial Differentiation and total differentiation, Functional dependence, Jacobian Determinant-Maxima and Minima of functions of two variables with constraints and without constraints, Method of Lagrange Multipliers.

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. Advanced Engineering Mathematics by Jain &IyengarNarosa Publications.

REFERENCES:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

Chemistry

B.Tech I-Year **L/ T/ P C**
3 / 1/ - 4

Course Objectives:

1. To bring adaptability to the concepts of chemistry and to acquire the required skills to become perfect engineer.
2. To impart the basic knowledge of atomic, molecular and electronic modifications which make the students to understand the technology based on them.
3. To acquire the knowledge of electrochemistry, corrosion, polymers and water treatment which are essential for the engineers and in industry.
4. To impart the knowledge of stereochemistry and synthetic aspects useful for understanding reaction pathways.

Course Outcomes:

The course will enable the student to:

1. Acquire knowledge of atomic, molecular and electronic changes related to conductivity.
2. Apply the various processes of treatment of water for both domestic and industrial purpose.
3. Apply the knowledge of electrode potentials for the protection of metals from corrosion.
4. Analyze the major chemical reactions that are used in the synthesis of compounds.
5. Apply the knowledge of polymers in every day's life.

UNIT (I) Atomic and molecular structure

Introduction, Concept of atomic and molecular orbitals, Crystal field theory- Crystal field splitting patterns of transition metal ion d- orbital- tetrahedral & octahedral geometries.

LCAO, Molecular orbitals of di-atomicmolecules, Molecular orbital energy level diagrams of diatomic molecules (N_2, O2 & F_2).Pi-molecular orbitals of butadiene and benzene.

UNIT II: Water Technology

Hardness of water, expression of hardness ($CaCO_3$ equivalent), units and types of hardness.Estimation of temporary and permanent hardness of water by EDTA method. Numerical problems based on hardness of water. Potable water: characteristics, treatment of water for domestic supply. Desalination of brackish water: reverse osmosis. Alkalinity of water and its determination. Boiler feed water and its treatment: Internal treatment (colloidal, phosphate calgon conditioning of water). External treatment (ion –exchange process).

UNIT (III): Electrochemistry and corrosion

Electrode, electrode potential, galvanic cell, cell reactions and cell notation, cell EMF, types of electrodes (Calomel electrode and Quinhydrone electrode),Determination of P^H using quinhydrone electrode. Nernst equation, Numerical problems.

BATTERIES: Introduction to cell and battery, Primary (lithium cell) and secondary cells, (lead-Acid cell, and Lithium ion cells). Fuel cells – Methanol – Oxygen fuel cell, advantages and engineering applications of fuel cells.

Corrosion: Introduction, types of corrosion: chemical and electrochemical corrosion, factors affecting the rate of corrosion: nature of the metal, position of metal in galvanic series, purity of metal, nature of corrosion product, nature of environment: effect of temperature, effect of pH,

humidity. Corrosion control methods: Cathodic protection: sacrificial anode method and impressed current cathode method. Protectivecoatings: metallic coatings (anodic and cathodic), methods of application on metals- electroless plating (of Ni).

UNIT (IV): Stereochemistry

Structural isomers and stereoisomers, configurations, symmetry and chirality, enantiomers, diastereomers, optical activity.Conformations of n-butane.

Organic reactions and synthesis of a drug molecule

Introduction to reactions involving substitution (SN1 & SN2), addition (addition of HBr to propene, Markownikoff and Anti Markownikoff addition), elimination, oxidation (oxidation of alcoholsusing $KMnO_4$& CrO_3), reduction (reduction of carbonyl compounds by $LiAlH_4$& $NaBH_4$).Synthesis of a commonly used drug molecule- paracetamol and Asprin.

UNIT (V): Polymer Chemistry

Introduction, classification of polymers, types of polymerization (addition and condensation, mechanisms not included). Plastics- types of plastics -thermoplastics and thermosetting plastics.Preparation, properties and engineering applications of PVC, Teflon and Bakelite. Fibers: Nylon 6, 6 and Terelene (Dacron). Elastomers: natural rubber, structure, vulcanization. Synthetic rubbers: Buna-S & Butyl rubber.Conducting polymers: classification, polyacetylene and applications.

Biodegradable polymers: Types, examples: Polyhydroxy butyrate (PHB), Polyglycolic acid (PGA), Polylactic acid (PLA). Applications of biodegradable polymers.

Text Books:

(i) Engineering Chemistry by P.C Jain & Monica Jain, DhanpatRai Publishing Company.
(ii) Engineering Chemistry by ShashiChawla, DhanpatRai Publishing Company.

Reference Books:

(i) Physical Chemistry, by P. W. Atkins
(ii) Text book of Engineering Chemistry by Dr.M.Tirumala Chary & Dr. E.Laxminarayana.

CHEMISTRY LABORATORY

B.Tech I-Year

L	T	P	C
0	0	3	1.5

Laboratory Objectives:

Thecourse consists of experiments related to the principles of chemistry required for engineering students. The student will learn:

- Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
- To determine the rate constant of reactions from concentrations as a function of time.
- The measurement of physical properties like adsorption, surface tension & viscosity.
- To analyze the salt and also to synthesize drug molecules.

Laboratory Outcomes:

The experiments will make the student gain skills on:

- Determination of parameters like hardness, alkalinity and chloride content in water.
- Estimation of rate constant of a reaction from concentration-time relationships.
- Determination of physical properties like adsorption, surface tension and viscosity.
- Synthesize a small drug molecule and analyse a salt sample
- Calculation of strength of compound using instrumentation techniques.

Choice of 10-12 experiments from the following:

1. Estimation of total hardness of water by complex metric method using EDTA.
2. Determination of alkalinity of water
3. Determination of chloride content of water by Argentometry.
4. Estimation of HCl by conductometric titration
5. Estimation of mixture of acids by conductometric titration
6. Estimation of HCl by potentiometric titration
7. Estimation of Fe^{2+} by potentiometry using $KMnO_4$
8. Determination of the rate constant of a reaction.
9. Determination of surface tension by stalagmometer.
10. Determination of viscosity of a liquid by Ostwald's viscometer.
11. Synthesis of an Aspirin and Paracetamol.
12. Verification of Freundlich adsorption isotherm-adsorption of aceticacid on charcoal.
13. Determination of acid value of an oil
14. Chemical analysis of an inorganic salt.

TEXT BOOKS:

1. Vogel's Textbook of Quantitative Chemical Analysis

2. Essentials of experimental engineering chemistry, ShashiChawla, DhanpatRai& Co

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R. N. Goyal and HarrmendraGoel.
2. A text book on experiments and calculations. S.S. Dara.

ENGLISH

L	T	P	C
2	0	0	2

Learning Objectives: The Course will help to

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
- Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
- Develop study skills and communication skills in formal and informal situations.

Course Outcomes: Students should be able to

- Infer the importance of scientific discoveries in promoting social responsibilities.
- Comprehend the given texts and respond appropriately.
- Communicate confidently and transfer information into various forms of writing.
- Understand the importance of health and nutrition.
- Present various form of business writing skills for successful careers.

UNIT –I

A. Vocabulary:
1.1: The concept of Word Formation
1.2: Synonyms, antonyms, and standard abbreviations.

B. 'The Raman Effect' from the prescribed textbook **'English for Engineers'** published by **Cambridge University Press**.
Grammar: Articles & Prepositions
Reading : Reading and Its Importance- Techniques for Effective Reading.
Writing : Organizing principles of paragraphs in documents.

UNIT –II

A. Letter Writing
2.1: Sentence Structures, Use of phrases and clauses in sentences
2.2: Root words and Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.

B.'Ancient Architecture in India' from the prescribed textbook **'English for Engineers'** published by Cambridge University Press.
Reading: Improving Comprehension Skills – Techniques for Good Comprehension
Writing:Writing Formal Letters -Eg. Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT –III

A. Identifying Common Errors in Writing
3.1: Subject-Verb agreement in number, gender and person

3.2: Information Transfer-Process writing

B. 'Blue Jeans' from the prescribed textbook **'English for Engineers'** published by **Cambridge UniversityPress.**
Grammar: Tenses: Types and uses.
Reading: Sub-skills of Reading- Skimming and Scanning

UNIT –IV

A. Nature and Style of Sensible Writing
4.1: Describing & Defining
4.2: Identifying common errors in writing

B. 'What Should You Be Eating' from the prescribed textbook **'English for Engineers'** published by **Cambridge University Press**.
Reading: Intensive Reading and Extensive Reading

UNIT –V

A. Writing Practices
5.1: Cohesive devices
5.2: Précis Writing

B. 'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook **'English for Engineers'** published by **Cambridge University Press**.
Vocabulary: Technical Vocabulary and their usage
Reading : Reading Comprehension-Exercises for Practice
Writing :Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Report - Writing a Report.

Textbook

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.

Suggested Readings:

1. Green, David. Contemporary English Grammar –Structures and Composition. MacMillan India. 2014 (Print).
2. Rizvi, M. Ashraf. Effective Technical Communication. Tata McGraw –Hill. 2015 (Print).
3. Raman, Meenakshi and Sharma, Sangeeta. "Technical Communication- Principles andPractice". Third Edition. New Delhi: Oxford University Press. 2015. Print.
4. Practical English Usage. Michael Swan. OUP. 1995.

5. Remedial English Grammar. F.T. Wood. Macmillan.2007.
6. On Writing Well. William Zinsser. Harper Resource Book. 2001.
7. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
8. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
9. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

ENGLISH LANGUAGE SKILLS LAB

L /T/P/D C

0 / 0/2/0/ 1

Course Objectives: The Course will help to

- Engage the students in independent language learning.
- Nurture the fluency of students in spoken English and neutralize their mother tongue influence
- Train students to use language appropriately in formal and informal contexts.

Course Outcomes: Students should be able to

- Reproduce speech sounds and improve fluency of language.
- Understand syllables and consonant clusters for appropriate pronunciation.
- Exhibit effective professional skills with rhetoric eloquence.
- Deliver enthusiastic and well-practiced presentation.
- Learn Task-Based Language Learning (TBLL) through various language learning activities effectively.

Exercise-I

CALL Lab: Introduction to Pronunciation - Speech Sounds, Vowels and Consonants-

Practice for Listening

ICS Lab : Ice-Breaking activity and JAM session

Exercise-II

CALL Lab: Silent Letters, Consonant Clusters, Homographs

ICS Lab **:** Common Everyday Situations: Conversations and Dialogues

Exercise-III

CALL Lab: Syllables

ICS Lab **:** Communication at Workplace, Social and Professional Etiquette

Exercise-IV

CALL Lab: Word accent and Stress Shifts

ICS Lab **:** Formal Presentations, Visual Aids in Presentations

Exercise-V

CALL Lab: Intonation, Situational dialogues for practice

ICS Lab **:** Interviews, Types of Interviews

Minimum Requirement of infra structural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

i) P -IV Processor

a) Speed – 2.8 GHZ

b) RAM – 512 MB Minimum

c) Hard Disk – 80 GB

ii) Headphones of High quality

2. Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a Digital stereo –audio & video system and Camcorder etc.

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. Suresh Kumar, E. &Sreehari, P. 2009. A Handbook for English Language Laboratories. New Delhi: Foundation
2. Speaking English Effectively 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
3. Sasi Kumar, V &Dhamija, P.V. How to Prepare for Group Discussion and Interviews. Tata McGraw Hill
4. Hancock, M. 2009. English Pronunciation in Use. Intermediate. Cambridge: CUP
5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
6. Hewings, M. 2009. English Pronunciation in Use. Advanced. Cambridge: CUP

7. Marks, J. 2009. English Pronunciation in Use. Elementary. Cambridge: CUP
8. A textbook of English Phonetics for Indian Students by T. Balasubramanian (Macmillan)
9. Lab Manual: A Manual entitled "English Language Communication Skills (ELCS) Lab Manual- cum- Work Book", published by Cengage Learning India Pvt. Ltd, New Delhi. 2013.

PROGRAMMING AND PROBLEM SOLVING-I

B.Tech. I-Year, I-Sem.

L	T	P	C
2	-	-	2

Course Outcomes: At the end of this course, the student would be able to

CO. 1 Design algorithms and flowcharts for real world applications using 'C'

CO. 2 Know the usage of various operators in Program development

CO. 3 Design programs involving decision and iteration structures.

CO. 4 Apply the concepts code reusability using Functions

CO. 5 Analyze various searching and solving techniques using Arrays

UNIT - I

Problem Solving Using Computers: Introduction, Algorithms, Flowcharts and Pseudo code.
Overview of C Language: Introduction, Salient Features of C Language, Structure of a "C" Program.

C-Language Preliminaries: Keywords and Identifiers, Constants, Variables, Data Types, and Input/ Output Statements with suitable illustrative "C" Programs.

UNIT-II

Operators: Assignment Operators, Relational and Logical Operators, Increment and Decrement Operators, Bitwise Operators, Ternary Operator, Type Conversion, Precedence and Associativity with suitable illustrative "C" Programs.

UNIT-III

Statements in C:
Conditional/Decision Statements: if, if-else, Nested if-else, else-if ladder, and Switch-Statement with suitable illustrative "C" Programs.
Loop Control Statements: while, do-while and for with suitable illustrative "C" Programs.

UNIT-1V

Functions: Introduction to Functions, benefits of functions, types of functions, Function calls, return vs exit ( ), Parameter Passing mechanisms, Call-by-Value, Recursion, Storage Classes.

UNIT-V

Arrays: Introduction to Arrays, One-Dimensional Arrays, Two-Dimensional Arrays, Arrays and Functions
Searching and Sorting: Linear Search, Binary Search, Bubble Sort, Insertion Sort.

Text Books:

1. B.A.Forouzon and R.F. Gilberg, "COMPUTER SCIENCE: A Structured Programming Approach Using C", Third edition, CENGAGE Learning, 2016.
2. Ashok N. Kamthane, "C and Data Structures", Pearson Education. 2010.

Reference Books:

1. M.T.Somashekara, "Problem Solving Using C", PHI, 2nd Edition 2009.
2. A.K.Sharma, Computer Fundamentals and Programming in C, 2nd Edition, University Press.

PROGRAMMING AND PROBLEM SOLVING LAB – I

	L	T	P	C
B.Tech. I-Year, I-Sem.	-	-	2	1

Course Outcomes: At the end of this course, the student would be able to
CO 1: Apply the specification of syntax rules for numerical constants and variables, data types
CO 2: Know the Usage of various operators and other C constructs
CO 3: Design programs on decision and control constructs
CO 4: Develop programs on code reusability using functions
CO 5: Implement various searching and sorting algorithms using arrays

Week 1:
Ubuntu and Linux Commands

Week 2:
Designing of flowcharts and algorithms using raptor tool
1. Areas of Polygons
2. Calculation of Simple and Compound Interest
3. Swapping of Two numbers with and without temporary variable
4. Checking whether a number is even or odd
5. Sum of first ‘n’ natural numbers
6. Checking a number whether it is divisible by any given number
7. Evaluation of mathematical expressions.
8. Programs using scanf ( ) and printf ( ) statements.

Week 3:
Programs on operators

Week 4, 5 & 6:
Programs Conditional Statements

Week 7-9:
Programs on Control Statements

Week 10 &11:
Programs on Functions

Week 12:
Programs on One Dimensional Arrays

Week 13:
Programs on Two Dimensional Arrays

Week 14:

Implementation of Linear Search and Binary Search

Week 15:
Implementation of Bubble Sort and Insertion Sort

Week 16:
Review

ENGINEERING WORKSHOP
(Common to all branches)

L	T/	P	C
0	4	2. 5	

(i) Lectures & videos: (10 hours)
Course Outcomes

Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials

Detailed contents

1. Manufacturing Methods- Metal Forming, Machining, Advanced manufacturing methods (2 lectures)
2. CNC machining, Additive manufacturing (2 lectures)
3. Fitting operations & power tools (1 lecture)
4. House wiring (1 lecture)
5. Carpentry (1 lecture)
6. Plastic moulding(1 lecture)
7. Metal casting (1 lecture)
8. Welding (1 Lecture)

(ii) Workshop Practice:

Laboratory Outcomes:

- ✓ Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
- ✓ They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- ✓ By assembling different components, they will be able to produce small devices of their interest.

Detailed contents:

1. Machine shop (Lathe machine)
2. Fitting shop
3. Carpentry
4. House Wiring
5. Welding shop (Arc welding)
6. Tin Smithy

Suggested Text:

(i) HajraChoudhury S.K., HajraChoudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.

(ii) Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 4th edition, Pearson Education India Edition, 2002.

Reference Books:

(iii) Gowri P. Hariharan and A. Suresh Babu,"Manufacturing Technology – I" Pearson Education, 2008.

(iv) Roy A. Lindberg, "Processes and Materials of Manufacture", 4th edition, Prentice Hall India, 1998.

MATHEMATICS-II

(ORIDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS)
(COMMON TO ALL BRANCHES)

I YEAR B.Tech, II SEMESTER **L T/P/D C**
3 1/-/- 4

Course Objectives:

1. Methods of solving the differential equations of first and higher orders.
2. Properties of Laplace Transforms, Laplace Transforms of various functions and finding the solutions of differential equations using Laplace Transforms.
3. Evaluation of multiple integrals.
4. The basic properties of vector valued functions and their applications to line, surface and volume integrals.

Course Outcomes: After learning the contents of this course the students must be able to:

1. Classify the various types of differential equations of first order and first degree and apply the concepts of differential equations to the real world problems.
2. Solve higher order differential equations and apply the concepts of differential equations to the real world problems.
3. Find the Laplace Transform of various functions and apply to find the solutions of differential equations.
4. Evaluate the multiple integrals and identify the vector differential operators physically in engineering problems.
5. Evaluate the line, surface and volume integrals and converting them from one to another by using vector integral theorems.

UNIT-I: First order ODE and their Applications

Formation of Differential equations, Differential equations of first order and first degree: exact, linear and Bernoulli, Applications of ODE: Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

UNIT-II: Higher Order Linear Differential Equations

Linear differential equations of second and higher order with constant coefficients, RHS term of the type f(X) = $e^{ax}, \sin ax, \cos ax$ *and* $x^k, e^{ax}V(x), x^kV(x)$. Method of variation of parameters.

UNIT-III: Laplace transforms

Laplace transform of standard functions – Inverse transform – first shifting Theorem, Transforms of derivatives and integrals – Unit step function – second shifting theorem – Dirac's delta function – Convolution theorem – Periodic function - Differentiation and integration of transforms – Application of Laplace transforms to ordinary differential equations.

UNIT-IV: Multiple Integrals & Vector Differentiation

Multiple integrals - double and triple integrals – change of order of integration (Only Cartesian form)- change of variables (Cartesian to Polar for double integral, Cartesian to Spherical for triple integral). Gradient- Divergence- Curl and their related properties - Potential function - Laplacian and second order operators.

UNIT-V: Vector Integration

Line integral, work done, Surface and Volume integrals. Vector integrals theorems: Green's, Stoke's and Gauss Divergence Theorems (Only Statements & their Verifications).

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Advanced Engineering Mathematics by Jain &IyengarNarosa Publications.

REFERENCES:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

Engineering Physics
(Common to Civil, EEE & Mech.)

B. Tech II-Sem. **L T P C**
3 1 0 4

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

1. Interpret the forced damped harmonic oscillations and Transverse waves
2. Identify various optical phenomena of light
3. Explain the working principle of optical fibers and lasers
4. Describe the crystalline structures of solids
5. Classify magnetic and dielectric behavior of materials

UNIT-I Oscillations and Waves
Simple harmonic motion, equation of simple harmonic motion, Simple Pendulum, Torsional pendulum, damped harmonic motion-heavy, critical and light damping, energy decay in a damped harmonic oscillator, power dissipation, quality factor. Forced vibration, steady state motion of forced damped harmonic oscillator, Amplitude of forced vibration, Resonance, Electrical analogy of simple harmonic oscillator. Transverse waves in a stretched string, differential equation, reflection and transmission of transverse waves at a boundary, standing waves.

UNIT-II Wave Optics
Huygen's principle, superposition of waves, coherence and methods to produce coherent sources, young's double slit experiment, interference by parallel thin film by reflection, Newton's rings. Diffraction: Introduction, Fraunhofer diffraction at single slit, plane diffraction Gratings and its resolving power. Polarization: Introduction, methods of polarization, double refraction- Nicol Prism.

UNIT-III Fiber Optics and Lasers
Introduction, total internal reflection, acceptance angle and numerical aperture, losses associated with optical fibers, step and graded index fibers, applications of optical fibers.Introduction to interaction of radiation with matter: stimulated absorption, spontaneous emission and stimulated emission, Einstein's coefficients and their relation, characteristics of a laser, components of a laser: active medium, pumping source, optical resonator. Population inversion, Construction and working of Ruby laser, He-Ne laser and Semiconductor laser. Applications of lasers.

UNIT-IV Crystal Structures, Crystal Planes and XRD
Space lattice – Unit cell – Lattice parameter – Crystal systems – Bravais lattices, Atomic radius – Co-ordination number - Structures and Packing fractions of Simple Cubic – Body Centered Cubic – Face Centered Cubic crystals. Miller Indices for Crystal planes and directions – Inter planar spacing of orthogonal crystal systems –Diffraction of X-rays by crystal planes and Bragg's law–Powder method – Applications of X-ray diffraction.

UNIT-V Dielectric and Magnetic properties of Materials
Dielectric polarization, permittivity and dielectric constant, polar and non-polar dielectrics, Electronic, Ionic and Orientation Polarization – Calculation of electronic and Ionic Polarizability – Internal fields – Claussius – Mossotti equation – Basic concepts of Piezo, Pyro and Ferro electricity, applications of dielectrics. Introduction to magnetism – Basic definitions - Origin of magnetic moment, Bohr magneton – Classification of magnetic materials (Dia, Para and Ferro)- Domain theory of ferromagnetism, Hysteresis curve – Soft and Hard magnetic materials – properties of Anti ferro and Ferri magnetic materials, applications.

Text books:

i. A Text book of Engineering Physics by M N Avadhanulu, P G Kshirsagar; S Chand.
ii. Engineering Physics by B K Pandey and S Chaturvedi; CENGAGE Learning.

Reference books:

i. Oscillations and waves in physics, Ian G. Main
ii. The physics of vibrations and waves, H.J. Pain

Engineering Physics Lab

L	T	P	C
0	0	3	1.5

Course Outcomes

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

1. Characterize the mechanical properties of given material
2. Demonstrate various types of oscillation and rotational motion to determine the mechanical parameters
3. Identify the magnetic induction along the axis of current carrying coil
4. Apply the optical phenomena to characterize optical sources and components
5. Describe the electrical characteristics LCR and RC circuits.

LIST OF EXPERIMENTS

1. Torsional pendulum: Determination of Rigidity modulus of a material
2. Fly-wheel : Determination of moment of Inertia
3. Melde's Experiment: Determination of frequency of electrically maintained tuning fork
4. Sonometer: Determination of velocity of Transverse wave in a string
5. Newton's rings: Determination of the radius of curvature of the given lens by forming Newton's rings
6. Diffraction grating: Determination of wavelength of given light using diffraction grating
7. Dispersive power: Determination of dispersive power of the prism material using spectrometer
8. Single Slit Diffraction using Lasers- Determination of Wavelength of a Monochromatic Source.
9. Stewart & Gee's experiment: Determination of magnetic induction along the axis of current carrying coil
10. LCR Circuit: Determination of Resonance frequency of forced electrical oscillator
11. RC- Circuit: Determination of time constant of RC-circuit
12. Optical Fiber: Determination of Numerical Aperture of Optical Fiber.

Note: Any 10 experiments are to be performed

Reference Text Books:

1. Engineering Physics Theory and Practical, C. K. Pandey, A. K. Katiyar
2. Engineering Physics Lab Manual, C. V. MadhusudanRao

ENGINEERING MECHANICS

B.Tech. I Year II Sem. **L T P C**
3 1 0 4

Course Objectives:

The objectives of this course are to

- Explain the resolution of a system of forces, compute their resultant and solve problems using equations of equilibrium.
- Perform analysis of bodies lying on rough surfaces.
- Locate the centroid of a body and compute the area moment of inertia and mass moment of inertia of standard and composite sections.
- Explain kinetics and kinematics of particles, projectiles, curvilinear motion, centroidal motion and plane motion of rigid bodies.
- Explain the concepts of work-energy method and its applications to translation, rotation and plane motion and the concept of vibrations.

Course Outcomes:

At the end of the course, students will be able to

- Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces.
- Solve problem of bodies subjected to friction.
- Find the location of centroid and calculate moment of inertia of a given section.
- Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotator motion and rigid body motion.
- Solve problems using work energy equations for translation, fixed axis rotation and plane motion and solve problems of vibration.

UNIT-I:

Introduction to Engineering Mechanics - Force Systems :Basic concepts, Particle equilibrium in 2-D & 3-D; Rigid Body equilibrium; System of Forces, Coplanar Concurrent Forces, Components in Space – Resultant- Moment of Forces and its Application; Couples and Resultant of Force System, Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems.

UNIT-II:

Friction: Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies, wedge friction, screw jack & differential screw jack; Centroid and Centre of Gravity - Centroid of Lines, Areas and Volumes from first principle, centroid of composite sections; Centre of Gravity and its implications. – Theorem of Pappus.

UNIT-III:

Area moment of inertia- Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections; Product of Inertia, Parallel Axis Theorem, Perpendicular Axis Theorem Mass Moment of Inertia :

Moment of Inertia of Masses - Transfer Formula for Mass Moments of Inertia – Mass moment of inertia of composite bodies.

UNIT-IV:

Review of particle dynamics- Rectilinear motion; Plane curvilinear motion.Relative and constrained motion; Work-kinetic energy, power, potential energy.Impulse-momentum (linear, angular); Impact (Direct and oblique).

UNIT-V:

Kinetics of Rigid Bodies -Basic terms, general principles in dynamics; Types of motion, D'Alembert's principle and its applications in plane motion and connected bodies; Work Energy principle and its application in plane motion of connected bodies; Kinetics of rigid body rotation.

TEXT BOOKS:

1. Shames and Rao (2006), Engineering Mechanics, Pearson Education
2. Reddy Vijay Kumar K. and J. Suresh Kumar (2010), Singer's engineering Mechanics – Statics & Dynamics.

REFERENCE BOOKS:

1. Timoshenko S.P and Young D.H., "Engineering Mechanics", McGraw Hill International Edition, 1983.
2. Andrew Pytel, JaanKiusalaas, "Engineering Mechanics", Cengage Learning, 2014.

ENGINEERING GRAPHICS & MODELING

I Year B.Tech. II Sem.

L	T/ P	C
1	3 2	2.5

Course Outcomes:

All phases of manufacturing or construction require the conversion of new ideas and design concepts into the basic line language of graphics. Therefore, there are many areas (civil, mechanical, electrical, architectural and industrial) in which the skills of the CAD technicians play major roles in the design and development of new products or construction. Students prepare for actual work situations through practical training in a new state-of-the-art computer designed CAD laboratory using engineering software.

The student will learn:

Introduction to engineering design and its place in society
Exposure to the visual aspects of engineering design
Exposure to engineering graphics standards
Exposure to solid modeling
Exposure to computer-aided geometric design
Exposure to creating working drawings
Exposure to engineering communication

UNIT – I

Principles of Engineering Graphics and their significance, usage of Drawing instruments, Conic sections including the Rectangular Hyperbola (General method only), Cycloid, Epicycloid, Hypocycloid and Involute. Scales -plane and diagonal only.

*Introduction to CAD:*Introduction to CAD software and its importance, standard toolbar/menus and navigation tools used in the software .using commands LIMITS ,UNITS, GRID,TEST ,MOVE,OFFSET ,MIIROR,ROTATE, TRIM, EXTEND, FILLET etc. Drawing lines using line command. Drawing Spline, Ellipse, Circle, Rectangle etc.Concept of layers and Dimensioning.

UNIT – II

Principles of orthographic projections – Conventions. Projections of points, projections of lines (first angle projection) inclined to both planes (traces and midpoint problem to be excluded).

*Implementation in CAD:*Drawing orthographic projections of points and lines using CAD package.

UNIT – III

Projections of Planes: Projections of planes inclined to both the planes.
Projections of Solids:Projections of regular solids inclined to both the planes (prisms, pyramids, cones and cylinders, Change of potion method only).

Implementation in CAD: Drawing orthographic projection of planes and solids using CAD package.

UNIT – IV

Sections and Sectional Views of Right AngularSolids of Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone, Draw the sectional orthographic views of geometrical solids.
*Implementation in CAD:*Concept of hatching,drawing sectional views of solids and development of right regular solids using CAD package.

UNIT – V

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions, Isometric Views of lines, Planes, Simple and compound Solids, Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions.

Implementation in CAD: Drawing isometric views of simple and compound solids. Drawing isometric views from given orthographic views and vice-versa using CAD package.

Note: Implementation in CAD (For Internal Evaluation Weightage Only)

Suggested Text:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House.
2. Shah, M.B. &Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education.

Reference Books:

3. Agrawal B. &Agrawal C. M. (2012), Engineering Graphics, TMH Publication Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers.
4. CAD Software Theory and User Manuals.

ENGLISH COMMUNICATION SKILLS LAB

L /T/P/D C

0 / 0/2/0/ 1

Course Objectives: The Course will help to

- Differentiate the variations in language pronunciation
- Equip students with necessary training in listening and speaking skills
- Train students to express themselves fluently and appropriately in formal and informal contexts.

Course Outcomes: Students should be able to

- Understand the variants in pronunciation.
- Identify the diverse purposes of listening and speaking.
- Discuss ideas in diverse communicative settings.
- Exhibit increased confidence in public speaking.
- Display critical thinking, problem solving and decision making skills through GD's.

Exercise – I

CALL Lab:Common Indian Variants in Pronunciation – Differences between British and American Pronunciation.

ICS Lab : Spoken vs. Written language-Formal and Informal English- Introducing Oneself and Others.

Exercise – II

CALL Lab: Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening.

ICS Lab : Features of Good Conversation – Strategies for Effective Communication Role-Play-Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise – III

CALL Lab: Information Transfer

ICS Lab : Descriptions- Narrations- Giving Directions and Guidelines, Giving Instructions – Seeking Clarifications – Asking for and Giving Directions –Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice –Making Suggestions.

Exercise – IV

CALL Lab: Past Tense Marker and Plural Marker

ICS Lab : Public Speaking – Exposure to Structured Talks - Non-verbal Communication- Making a Short Speech – Extempore

Exercise – V

CALL Lab: Intonation- Sentence Stress -Weak Forms and Strong Forms.

ICS Lab : Group Discussion, Mock Group Discussion sessions

Minimum Requirement of infra structural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

System Requirement (Hardware component):

Computer network with LAN with minimum 60 multimedia systems with the following specifications:

i) P -IV Processor

a) Speed – 2.8 GHZ

b) RAM – 512 MB Minimum

c) Hard Disk – 80 GB

ii) Headphones of High quality

2. Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. Suresh Kumar, E. &Sreehari, P. 2009. A Handbook for English Language Laboratories. New Delhi: Foundation.
2. Speaking English Effectively 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
3. Sasi Kumar, V &Dhamija, P.V. How to Prepare for Group Discussion and Interviews. Tata McGraw Hill.

4. Hancock, M. 2009. English Pronunciation in Use. Intermediate. Cambridge: CUP.
5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
6. Hewings, M. 2009. English Pronunciation in Use. Advanced. Cambridge: CUP.
7. Marks, J. 2009. English Pronunciation in Use. Elementary. Cambridge: CUP.
8. **A textbook of English Phonetics for Indian Students** by T. Balasubramanian (Macmillan).
9. **Lab Manual:** A Manual entitled "**English Language Communication Skills (ELCS) Lab Manual- cum- Work Book**", published by Cengage Learning India Pvt. Ltd, New Delhi. 2013

PROGRAMMING AND PROBLEM SOLVING-II

B.Tech I-Year, II-Sem.

L	T	P	C
2	-	-	2

Course Outcomes: At the end of this course, the student would be able to

CO. 1 Identify various string handling functions in 'C'

CO. 2 Develop programs with user defined data types.

CO. 3 Use dynamic memory allocation functions with pointers.

CO. 4 Distinguish between stacks and queues.

CO. 5 Analyze various dynamic data structures.

UNIT – I

Overview of Arrays and Functions

Strings: Introduction to Strings, String I/O, String Operations with and without built-in functions (strlen( ), strcmp( ), strcat( ),strcpy( ), and strrev( ))

UNIT -II

Structures: Definition and Initialization of Structures, Accessing structure members, Nested Structures, Array of Structures, Structures and Functions, Unions, typedef, Enumerated Data types.

UNIT-III

Pointers: Introduction to Pointers, Pointer Arithmetic, Pointers and Arrays, Pointers to Structures, Pointers and Strings, Function - Call by Reference, Pointers to Pointers, Dynamic Memory Allocation.

UNIT-IV:

Introduction to Data Structures: Lists and Operations, Linear and Non linear Data structures

Stacks- Introduction to Stacks, Operations, Implementation of Stack using Arrays

Queues- Introduction to Queues, Operations, Implementation of Queues using Arrays

UNIT-V

Linked Lists: Introduction to Linked List, Operations on Single Linked List (search, Insertion & Deletion)

Files: Introduction to Files, File Operations (Open, Close, read & Write).

Text Books:

1. B.A.Forouzon and R.F. Gilberg, "COMPUTER SCIENCE: A StructuredProgramming Approach Using C", Third edition, 2016

2. Ashok N. Kamthane, “C and Data Structures”, Pearson Education.

Reference Books:

1. M.T.Somashekara, “Problem Solving Using C”, PHI, 2nd Edition 2009.
2. A.K.Sharma, Computer Fundamentals and Programming in C, 2nd Edition, University Press
3. PradipDey and ManasGhosh, "Programming in C 2/e", Oxford University Press, 2nd Edition 2011.
4. Rajaraman V., "The Fundamentals of Computers", 4th Edition, Prentice Hall of India, 2006.
5. R S Bichker, "Programming in C", University Press, 2012.

PROGRAMMING AND PROBLEM SOLVING LAB – II

B.Tech. I-Year II-Sem.

L	T	P	C
-	-	2	1

Course Outcomes: At the end of this course, the student would be able to

CO 1: Build programs on various string handling functions

CO 2: Develop applications on user defined data types

CO 3: Apply dynamic memory allocation through pointers

CO 4: Implement linear data structures through stacks and queues

CO 5: Create linked list dynamically through stacks and queues

Week 1:
Overview of Arrays and Functions

Week 2 & 3:
Programs on Strings with and without string built-in Functions

Week 4:
Programs on Accessing Structures, and Nested Structures

Week 5& 6:
Array of Structures, Structures and Functions, Pointers to Structures

Week 7:
Unions, typedef and enum

Week 8:
Programs on pointers with its implementation, pointer arithmetic, pointer expression and Single Dimensional and Two dimensional array programs.

Week 9:
Pinter to structures, Programs on Call by Value and Reference, Pointers to Pointers

Week 10:
Programs on Dynamic Memory Allocation Functions.

Week 11:
Programs on Stacks and Queues Using Arrays

Week 12 & 13:
Single Linked List Programs

Week 14 &15:
Programs on File Operations

Week 16:
Review

PROFESSIONAL COMMUNICATION

L	T / P /C
0	2 / 0 /2

Course Objectives

- Develop self appraisal for future challenges
- Understand professional etiquette and learn appropriate mannerism
- Learn about leadership, team building skills
- Attempt to solve problems by taking appropriate decisions
- Present effectively in formal situations

Course outcomes

A student learns:

- CO1:Acquire enhanced personality
- CO2:Exhibit appropriate professional etiquette
- CO3:Practice team building with strong communication skills
- CO4:Develop problem solving skills and decision-making
- CO5:Demonstrate effective presentation skills

Unit: I: Self Appraisal

Self Introspection/ Self Retrospection
Introducing self & others
Goal setting
SWOT Analysis,

Unit: II: Professional Etiquette

Etiquette-Telephone Etiquette- Netiquette
Email, Social Network
Behavioural Traits
Case study

Unit: III: Team Building

Leadership skills-Case Studies
Team Essentials
Negotiation Skills

Group Discussion-Functional Aspects

Unit: IV: Logical Thinking and Analytical Reasoning

Decision Making
Problem Solving
Conflict management
Case Study

Unit: V: Presentation Skills

Poster Presentation
Oral Presentation-Individual Presentation, Team Presentation, Thematic Presentation

Textbooks:

1. Rao,M.S. *Soft Skills Enhancing Employability*.New Delhi: I.K.Publishing House,2010.
2. Rao, Nageshwar. *Communication Skills.* New Delhi: Himalaya Publishing House Pvt.Ltd, 2008

References

1. Ashrif Rizvi. *Effective Technical Communication*, Tata Mc Grahill, 2011.
2. Daniel G. Riordan & Steven E. Pauley.*Technical Report Writing Today*, Biztantra Publishers, 2005.

NUMERICAL METHODS AND PARTIAL DIFFERENTIAL EQUATIONS

L	T/P/D	C
3	- / - / -	3

Course Objectives

- The goal of this course is to facilitate mastery and application of a wide range of advanced mathematical methods and techniques.
- The main objective of this course is to provide the student with a repertoire of mathematical methods that are essential to the solution of advanced problems encountered in the fields of applied physics and engineering.
- In addition, this course is intended to prepare the student with mathematical tools and techniques that are required in advanced courses offered in engineering programs.
- To develop the study skills in formal and informal ways in the subject.

Course outcomes

After learning the contents of this course the students must be able to:

- CO1: Develop skills in solving engineering problems involving Algebraic and transcendental equations.
- CO2: Acquires the knowledge of interpolation in predicting future out comes based on the present knowledge and also to fit different types of Curves.
- CO3: To know various types of numerical methods in solving engineering problems.
- CO4: Classify the nature of second and Higher order partial differential equations and find the solutions of linear and non linear PDE.
- CO5: To apply Partial differential Equations in different engineering problems.

UNIT-I: Numerical Techniques: Solution Of Algebraic And Transcendental Equations

Introduction - The Bisection Method- The Method of False Position- The Iteration Method- Newton-Raphson Method. Solving system of linear Non- Homogeneous equations by Jacobi's and Gauss- Seidel Iteration methods.

UNIT-II: Curve Fitting And Numerical Integration

Curve fitting: Fitting a straight line -second degree curve-exponential curve, power curve by method of least squares.
Numerical integration – General Quadrature (Newton's Cote's formula), Trapezoidal rule, Simpson's rule $\left(\frac{1}{3}^{rd} \ \& \frac{3}{8}^{th}\right)$.

UNIT-III: Numerical Solutions Of Ivp's

Numerical solution of Ordinary Differential equations: Introduction- Solution by Taylor's series method- Picard's Method of successive approximations- Single step methods-Euler's Method - Runge-Kutta (second and classical fourth order) Methods- Predictor Corrector method- Adam's - Bashforth method .

UNIT-IV: Partial Differential Equations

Introduction- Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions- Solutions of first order Linear (Lagrange) Equation, Nonlinear Equations- Charpits Method.

UNIT-V: Applications Of Partial Differential Equations

Introduction- Classification of general second order partial differential equations- Method of separation of variables for second order equations- Applications of Partial Differential Equations- One dimensional wave equation – One dimensional heat equation- Steady State two dimensional Heat equation(or Laplace equation).

Textbooks

1. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
2. Numerical Methods by S. S. Sastry – PHI Publications

References

1. Introductions of Numerical Methods by Jain & Iyengar
2. Numerical Methods by E. Balaguruswamy by Tata-Mc Graw Hill

FLUID MECHANICS

L	T	P/D	C
3	1	0	3

Course Objectives

- To familiarize with the properties of fluids and the applications of fluid mechanics.
- To provide fundamental knowledge of fluids, its properties and behavior under various conditions of internal and external flows.
- To imbibe basic laws and equations used for analysis of static and dynamic fluids.
- To inculcate the importance of fluid flow measurement and its applications in Industries
- To determine the losses in a flow system, flow through pipes, boundary layer flow and flow past immersed bodies.
- To formulate and analyze problems related to calculation of forces in fluid structure interaction.

Course Outcomes

After completion of this course students will be able to

- CO1: Identify and obtain the values of fluid properties and relationship between them and understand the principles of continuity, momentum, and energy as applied to fluid motions.
- CO2: Develop an appreciation for the properties of Newtonian fluids.
- CO3: Use laws of conservation in integral form and apply them to determine forces and moments on surfaces of various shapes.
- CO4: Compute hydrostatic and hydrodynamic forces.
- CO5: Use Euler's and Bernoulli's equations and the conservation of mass to determine velocities, pressures, and accelerations for incompressible and inviscid fluids.
- CO6: Analyze and design pipe networks.

UNIT – I

Introduction: Dimensions and units – Physical properties of fluids, specific gravity, viscosity, surface tension, vapor pressure and their influences on fluid motion pressure at a point, Pascal's law, Hydrostatic law – atmospheric, gauge and vacuum pressure – measurement of pressure. Pressure gauges, Manometers: differential and Micro Manometers. Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces – Center of pressure. Derivations and problems.

UNIT – II

Fluid kinematics: Description of fluid flow, Stream line, path line, streak lines and stream tube. Classification of flows: Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two , three dimensional flows – stream and velocity potential functions, flownet analysis.

UNIT – III

Fluid dynamics and measurement of flow: Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, (Navier – Stoke's equations (Explanationary) Momentum equation

and its application – forces on pipe bend. Pitot tube, Venturi meter and orifice meter – classification of orifices, flow over rectangular, triangular, trapezoidal and Stepped notches – Broad crested weirs.

UNIT – IV

Closed conduit flow: Reynold's experiment – Characteristics of Laminar & Turbulent flows. Laws of Fluid friction – Darcy's equation, ,variation of friction factor with Reynold's number – Moody's Chart, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic gradient line. Pipe network problems, flow between parallel plates, flow through long tubes, flow through inclined tubes.

UNIT – V

Boundary Layers: Approximate Solutions of NavierStoke's Equations – Boundary layer – concepts, Prandtl 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.

Text Books

1. *Fluid Mechanics by Modi and Seth, Standard book house. Hydraulics and Fluid Mechanics Including Hydraulics Machines (English) 20 Edition*
2. *Fluid Machines by R.K.Rajput, S. Chand &company Ltd. 2011 Edition.*

References

1. *A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) ltd., New Delhi 2005*
2. *Fluid Mechanics by Frank.M. White (Tata Mc.Grawhill Pvt. Ltd.) McGraw-Hill Higher Education; 7 ed. 2010*
3. *Fluid Mehanics by A.K. Mohanty ,Prentice Hall of India Pvt. Ltd., New Delhi 2ed.*
4. *http://nptel.iitm.ac.in*

SOLID MECHANICS – I

L	T	P/D	C
3	1	0	3

Course Objectives

- To provide basic knowledge in mechanics of materials so that the students can solve real engineering problems and design engineering systems.
- To develop the theoretical basis and to derive the theories of the strength of materials with sound mathematical principles and to enable students to systematically solve engineering problems regardless of difficulty.
- To provide the knowledge in solving shear force and bending moment diagram for several loading conditions.
- To provide advanced level of strength of materials problems for design purposes.
- To introduce various failure criteria for general stress states at points.

Course Outcomes

Students who successfully complete this course will have demonstrated ability to

- CO1: Ability to apply basic Civil Engineering knowledge of stress and strain at a point as well as the stress-strain relationships for homogenous, isotropic materials.
- CO2: Students will be able to develop confidence and competence in solving shear force and bending moment diagram for several loading conditions.
- CO3: Students will be able to determine bending stresses for different sections of the beams.
- CO4: Ability to Determine and illustrate principal stresses, maximum shearing stress, and the stresses acting on a structural member.
- CO5: Ability to determine deflections beams.

UNIT – I

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 modulii and the relationship between them – Bars of varying section – composite bars – Temperature stresses, Elastic constants.

Strain Energy – Resilience – Gradual, sudden, impact and shock loadings – simple applications.

UNIT – II

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, uniformly distributed load, uniformly varying loads and combination of these loads – Point of contraflexure – Relation between S.F, B.M and rate of loading at a section of a beam.

UNIT – III

Flexural Stresses: Theory of simple bending – Assumptions – Derivation of bending equation: M/I = f/y =E/R – 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.

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

UNIT – IV

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 – V

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 including overhanging beams.

Conjugate Beam Method: Introduction – Concept of conjugate beam method. Difference between a real beam and a conjugate beam. Deflections of determinate beams with constant and different moments of inertia.

TextBooks

1. *Strength of Materials by R.K.Bansal, Lakshmi Publications House Pvt. Ltd.2010*
2. *Strength of Materials by S.S.Bhavikatti, Vikas Publishing House Pvt. Ltd.2008*

References

1. *Mechanics of Structures Vol –I by H.J.Shah and S.B.Junnarkar, Charotar Publishing House Pvt. 31st Edition : 2014*
2. *Strength of Materials by D.S Prakash Rao, Universities Press Pvt. Ltd.1999*
3. *Strength of Materials by S.S.Rattan, Tata McGraw Hill Education Pvt. Ltd.2nd ed. 2011*
4. *http://nptel.iitm.ac.in*

ENGINEERING GEOLOGY

L	T	P/D	C
3	1	0	3

Course Objectives

- To provide knowledge about various branches of geology and its importance.
- Evaluation of physical and chemical propperties of minerals and rocks.
- To study and identify different types of natural materials like rocks, minerals and soil.
- Explains about various geological structures.
- The importance of geological maps and language helpful for Civil Engineering projects.

Course Outcomes

Students who successfully complete this course will have demonstrated ability to

- CO1: Able to classify different rocks and minerals across the construction sites.
- CO2: Identify the main and most common igneous, sedimentary and metamorphic rocks encountered by foundations and construction.
- CO3: To describe and interpret the geological structures in the geological maps and cross sections
- CO4: Identify potential geological hazards and various structures and ways of preventing and dealing with them.
- CO5: To establish and describe topographical and geological sections.

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 tunnels weathering of common rock like “Granite”

UNIT – II

Mineralogy: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of some common rock forming minerals. [Examples: Feldsper, Quartiz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economics minerals such as Pyrite, Hematite, Magnetite, Chromite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite]

Petrology: Definition of rock, Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous, Sedimentary and metamorphic rocks their distinguishing features, Megascopic and microscopic study of rocks [eg: Granite, Dolerite, Basalt, Pegmatite, Laerite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate]

UNIT – III

Structural Geology: Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults uncomfornities, and joints – their important types and case studies. Their importance Insitu and drift soils, common types of soils, their origin and occurrence in India, Stabilisation of soils, Ground water, Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration.

UNIT – IV

Importance of geophysical studies: Principles of geophysical study by Gravity methods, Magnetic methods, Electrical methods, Seismic methods, Radiometric methods and Geothermal method, Special importance of Electrical resistivity methods, and seismic refraction methods, Improvement of competence of sites by grouting etc, fundamental aspects of rock mechanics and Environmental Geology.

UNIT – V

Geology of Dams, Reservoirs And Tunnels: 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 – Purposes of tunneling, effects of Tunneling on the ground role of Geological Considerations (ie. Tithological, structural and ground water) in tunneling over break and lining in tunnels.

Text Books

1. *Engineering Geology by N.Chennakesavulu, Mc-Millan, India Ltd. 2005*
2. *Engineering Geology for Civil Engineers – P.C. Varghese PHI Learning. 2012*

References

1. *Krynine& Judd, Principles of Engineering Geology &Geotechnics, CBS Publishers & Distribution*
2. *Engineering Geology by SubinoyGangopadhyay, Oxford university press.*
3. *http://nptel.iitm.ac.in*

SURVEYING & GEOMATICS

L	T	P/D	C
3	1	0	3

Course Objectives

- To provide knowledge of mathematics, science, and engineering to understand the measurement techniques and equipment used in land surveying.
- Explain about the topographic map which requires both elevation and horizontal distances.
- Illustration of techniques, skills, and modern engineering tools necessary for engineering practice.
- To describe how geographical information is used, managed, and globally.
- To provide knowledge about the principles, applications, trends, and pertinent issues of geographical information systems and sciences, including remote sensing (RS), Photogrammetry, cartography, and global positioning systems (GPS).

Course Outcomes

Students who successfully complete this course will have demonstrated ability to

- CO1: Students will be able to perform a detailed surveying at any site by any method.
- CO2: Ability to use modern survey equipment to measure angles and distances.
- CO3: Ability to measure differences in elevation, draw and utilize contour plots, and calculate volumes for earthwork.
- CO4: To develop applications of environmental remote sensing and GIS which can directly enhance service delivery on land use management, ground water management/prospects, agriculture, forestry, food and water security, disaster management, etc.
- CO5: Avail the need for lifelong learning through the discussion of recent changes in survey procedures and equipment.

UNIT – I

Introduction to surveying: Overview of plane surveying (chain, compass, theodolite and plane table), Objectives, Principles and classifications, Scales, Conventional Symbols, Signals.

UNIT – II

Distances and direction: Distance measurement methods, use of chain, tape and electronic distance measurements, meridians, azimuths and bearings, declination, computation of angle.

UNIT – III

Leveling and contouring: Concept and Terminology, Temporary adjustments – method of leveling. Characteristics and Uses of contours – methods of conducting contour surveys and their plotting. Embankments and cutting for a level section and two level sections with and without transverse slopes.

UNIT – IV

Modern field surveying systems: Principle of electronic distance measurements, types of EDM instruments, distomat, total station – parts of a total station – accessories – advantages and applications, field procedure for total station survey, errors in total station survey.

UNIT – V

Introduction to Remote Sensing: Global positioning systems – segments, GPS measurements, errors in biases, surveying with GPS, Co-ordinate transformation, accuaracy considerations,electromagnetic spectrum, interaction of electromagnetic radiation with the atmosphere and earth surface, Remote sensing data aquisation, platforms and sensors, visual image interpreatation, digital image processing.

Text Books

1. *Duggal S K, "Surveying (Vol – 1 & 2), Tata Mc.Graw Hill Publishing Co. Ltd. New Delhi, 2004.*
2. *AnjiReddy.M Remote sensing geographical Information system, B.S. publications, 2001.*

References

1. *Surveying and Leveling by R. Subramanian, Second Edition Oxford University Press – 2012*
   Chandra A M, "Plane Surveying" and "Higher Surveying" New age International Pvt. Ltd., Publishers, New Delhi, 2002.
2. *Surveying Theory and Practice Seventh edition by James M. and Anderson Edward M. Mikhail TATA McGraw Hill January 1998*

SURVEYING & GEOMATICS LAB

L	T	P/D	C
0	0	2	1

List of experiments

1. Survey of an area by chain surveying.
2. Determination of two inaccessible points by using prismatic compass.
3. Surveying of a given area by prismatic compass (closed traverse) and plotting after adjustment.
4. Radiation & intersection method by plane table survey.(Any one exercise)
5. Exercise on fly levelling using dumpy level.
6. An exercise on L.S, C.S and Plotting
7. Trigonometric leveling – Heights and distance problem
8. Determination of Area & Remote height using total station
9. Traversing & Contouring using total station
10. Distance, gradient, Diff. height between two inaccessible points using total station
11. Study on use of GPS for data collection
12. Collection of Point Data, Line Data, and Polygon Data using GPS.

List of equipment required

1. Chains, Tapes, Ranging rods, Cross staff, Arrows, Tripods
2. Prismatic Compass
3. Dumpy Level (or) Auto level
4. Transit theodolite
5. Total station
6. Hand-held GPS

ENGINEERING GEOLOGY LAB

L	T	P/D	C
0	0	2	1

List of experiments

1. Study of physical properties and identification of minerals.
2. Study of physical properties and identification of rocks (Igneous Rocks)
3. Study of physical properties and identification of rocks (Sedimentary Rocks)
4. Study of physical properties and identification of rocks (Metamorphic Rocks)
5. Microscopic study of rocks
6. Microscopic study of Minerals
7. Study of Geological Structures like Faults and Folds
8. Study of Geological Structures like Tilted Bed models and unconformities
9. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.
10. Simple Structural Geology problems.

ENVIRONMENTAL SCIENCE

L/P/DC
2 -/-/- 0

Course Objectives

Student will be able to understand/ define/ explain/ state / identify**:**

- The concepts of ecosystem, value of biodiversity, threats and conservation of biodiversity
- The limitations of the resources and impacts of over utilization of all natural resources.
- Sources and effects of environmental pollutions and the available techniques to control the pollution
- The global environmental issues like climate change, ozone hole and the scope of EIA, Environmental Management Plan, environmental audit and EIA methods.
- Environmental acts and rules, the sustainable goals along with measures required for the sustainability.

Course Outcomes

Students will be able to:

- CO1:Define and explain the structure and functions of ecosystem, value of biodiversity, threats and conservation of biodiversity.
- CO2:Explain the limitations of the resources and impacts of over utilization of all natural resources.
- CO3:Explain the sources and effects of environmental pollutions and list the available techniques to control the pollution.
- CO4:Explain the global environmental issues like climate change, ozone hole and can explain the scope of EIA, Environmental Management Plan, environmental audit and list the EIA methods.
- CO5:Mention the salient features of environmental acts and rules, define the sustainable goals along with measures required for the sustainability.

UNIT I:

Ecosystem: Definition, Scope and Importance of ecosystem, Structure and Functions of ecosystem: Food chains, Food Web and Ecological Pyramids, Flow of energy; Bio-magnification. **Biodiversity and Biotic Resources**: Introduction, Definition, levels of Biodiversity, Value of biodiversity, Hot spots of biodiversity, Threats to biodiversity, conservation of biodiversity: In-Situ and Ex-situ conservation.

UNIT II:

Natural Resources: Classification of Resources, **Water resources**: use and over utilization of surface and ground water, Dams: benefits and problems, Rain water harvesting; **Energy resources**: growing energy needs, Renewable and Non Renewable Energy resources. **Land resources**: land degradation – Landslide and Soil Erosion; **Forest Resources –** Uses and Exploitation.

UNIT III:

Environmental Pollution And Control: Types of Pollution, Sources, Effects and Control measures of Air Pollution ,Water Pollution ,Soil Pollution and Noise Pollution.

UNIT IV:

Global Environmental Problems and Global Efforts: Green house effect, Global Warming, climate change and their impacts on human environment; Ozone depletion and Ozone depleting substances (ODS); Aid Rains.

Environmental Impact Assessment (EIA): Scope of EIA and EIA methods, scope of Environmental audit and Environmental Management Plan.

UNIT V:

Environmental Policy, Legislation, Rules And Regulations: Salient features of Environmental Protection act, Air (Prevention and Control of pollution) Act- 1981, Water (Prevention and Control of pollution) Act-1974, Forest Conservation Act, Municipal solid waste, Hazardous waste, E-waste, Bio-medical waste, Radioactive waste Rules.

Towards Sustainable Future: Concept of Sustainable Development, Sustainable goals defined by UN, Threats to Sustainability, Environmental Education, Role of IT in Environment, Smart Cities, Concept of Green Building, Low Carbon Lifestyle, Life cycle assessment and Ecological Foot Print.

Text books:

1. Text Book of Environmental Studies by Anubha Kaushik (4th Edition), New age International Publishers.
2. Environmental studies by Erach Bharucha 2005, University Grants Commission, University Press.

Reference books:

1. Text book of Environmental Science and Technology by M.Anji Reddy 2007
2. Environmental Science: Towards a Sustainable Future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.

PROBABILITY AND STATISTICS

L	T/P/D	C
3	- / - / -	3

Course Objectives

- To learn random variables that describe randomness or an uncertainty in certain realistic situation
- To learn Binomial geometric and normal distributions
- To learn Sampling distribution of mean, variance, point estimation and interval estimation and the testing of hypothesis and ANOVA
- By using correlation to identify the strength and direction of a linear relationship between two variables and using regression to predict how much a dependent variable changes based on adjustments to an independent variable, you are empowered to make objective, data-driven decisions regarding your processes.
- To fit a desired curve by the method of least squares for the given data

***Course Outcomes*:**

After learning the contents of this course the students must be able to:

- CO1: To differentiate among random variables involved in the probability models which are useful for all branches of engineering.
- CO2: Derive relationship among variety of performance measures using probability distributions.
- CO3: Acquire elementary knowledge of parametric and non parametric –tests and understand the use of observing state analysis for predicting future conditions.
- CO4: Identify and examine situations that generate using problems and able to solve the tests of ANOVA for classified data.
- CO5: Apply proper measurements, Indicators and techniques of Correlation and regression analysis.

Course Syllabus

UNIT-I: Probability And Random Variables

Introduction to Probability, Random variables- Discrete and Continuous, Expectation, Probability Distribution Function, Mass Function/ Density Function of a Probability Distribution.

UNIT-II: Probability Distributions

Fitting of Binomial, Poisson & Normal distributions and their properties (only Statements) Moment Generating Functions of the above three distributions and hence finding the mean and variance.

UNIT-III: Sampling Theory & Testing Of Hypothesis I

Sampling Distribution-Definition of Sample, Population, and Types of Sampling. Estimation-Point estimation, Interval estimation, Testing of Hypothesis- Null hypothesis – Alternative hypothesis, Type I, & Type II errors – critical region confidence interval for mean, Testing of hypothesis for single mean and difference between the means for large samples.

Confidence interval for the proportions, Tests of hypothesis for the proportions- single and difference between the proportions for large samples

UNIT-IV: Testing Of Hypothesis II

Small Samples - t-distribution, F-Distribution, χ^2 distribution, ANOVA for one-way classified data

UNIT-V: Correlation, Regression & Curve Fitting

Coefficient of Correlation-Regression coefficients- The lines of Regression- The Coefficient of Rank Correlation.

Curve Fitting- Fitting a Straight line- Second Degree Polynomial- Exponential, Power Curve by Method of Least Squares.

Text Books

1. Probability and Statistics for Engineers, by Richard Arnold Johnson, Irvin Miller and John E Freund, New Delhi Prentice Hall.
2. Probability and Statistics, by T. K. V. Iyangar others, S. Chand Publications

.

References

1. Fundamentals of Mathematical Statistics, by S C Guptha and V K Kapoor, S Chand.
2. Introductory Methods of Numerical Analysis, by S S Sastry, PHI Learning PVT Ltd.

PRINCIPLES OF ELECTRICAL ENGINEERING

L	T	P	C
3	0	0	3

Course Objectives:

- To introduce the basic concepts of electrical engineering parameters and quantities.
- To analyse AC and DC circuits.
- To understand the construction operation and analysis of transformers, DC machines.
- To introduce the operation of measuring instruments.

Course Outcomes:

After this course the student can
CO1**:** understand basics of electrical circuits, parameters, and operation of the transformers in the energy conversion process, electromechanical energy conversion,
CO2**:** Analyse DC machines
CO3**:** Use measuring instruments like voltmeter, ammeter, wattmeter for measuring electrical quantities etc.
CO4**:** Apply the concepts of electrical engineering to design or analyse basic electrical circuits and machinery.

UNIT - I
Introduction To Electrical Engineering
Ohm's law, basic circuit components, Kirchhoff's laws,simple problems.
Network Analysis
Basic definitions, types of elements, types of sources, resistive networks, inductive networks, capacitive networks, and series parallel circuits, star delta and delta star transformation. , Network theorems- Superposition, Thevenins's, Maximum power transfer theorems and simple problems.

UNIT- II Alternating Quantities
Principle of ac voltages, waveforms and basic definitions, root mean square and average values of alternating currents and voltage, form factor and peak factor, phasor representation of alternating quantities, the J operator and phasor algebra, analysis of ac circuits with single basic network element, single phase series circuits.

UNIT- III Transformers
Principles of operation, Constructional Details, Ideal Transformer and Practical Transformer, Losses, Transformer Test, Efficiency and Regulation Calculations (All the above topics are only elementary treatment and simple problems).

UNIT- IV D.C. Machines
D.C GENERATORS
Principle of operation of dc machines, types of D.C generators, EMF equation of D.C generator.
D.C MOTORS
Principle of operation of dc motors, types of D.C motors, torque equation, simple problems

UNIT – V Electrical Appliances

Fuse, Circuit breakers, difference between fuse and circuit breaker, electrical relay, Types of Batteries, battery backup, RPS, UPS (elementary treatment only), Earthing-types of earthing.

Textbooks:

1. Principles of Electrical Engineering, V.K Mehta, Rohit Mehta, S.Chand Publications.
2. Basic Electrical Engineering, T.K.Nagasarkar and M.S. Sukhija, Oxford University Press..

Reference Books:

1. Basic Electrical Engineering, Abhijit Chakrabarthi, Sudiptanath, Chandrakumar Chanda, Tata-McGraw- Hill.
2. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI.

SOLID MECHANICS – II

L	T	P/D	C
3	1	0	3

Course Objectives

- To provide basic knowledge in analysis of the tostionof circular shafts & energy storage devices Springs.
- To obtain solutions to column buckling and plate problems
- Calculate the stresses and strains associated with thin-wall spherical and cylindrical pressure vessels.
- To provide numerical methods to solve unsymmetrical bending of structures.

Course Outcomes

Students who successfully complete this course will have demonstrated ability to

- CO1: Analyze and design of tosion circular shafts for uniform and composite members
- CO2: Students will be able to identify mechanical energy storage devices like springs and design of coiled and helical springs.
- CO3: Ability to Calculate the failure load for eccentrically loaded columns and struts.
- CO4: Demonstrate an understanding of relevant design codes
- CO5: Students will be able to Understand the concept of direct and bending stresses
- CO6: Ability to analyse the concept of unsymmetrical bending.

UNIT – I

Torsion of circular shafts: Theory of pure torsion – Derivation of Torsion equations $T/J = q/r = N\theta/L$ – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending, torsion and end thrust – Design of shafts according to theories of failure.

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 – II

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 – Perry's formula.

UNIT – III

Direct and bending stresses: Stresses under the combined action of direct loading and bending moment, 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 bending moment about both axis.

UNIT – IV

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.

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.

UNIT – V

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 axis – Resolution of bending moment into two rectangular axes through the centroid – Location of neutral axis - Deflection of beams under unsymmetrical bending.

Shear centre: Introduction – Shear centre for symmetrical and unsymmetrical (channel, I, T and L) sections

Text Books

1) *Strength of Materials by R.K.Bansal, Lakshmi Publications House Pvt. Ltd.6th ed. 2015*
2) *Strength of Materials by R.K Rajput, S.Chand & Company Ltd.4th revised ed 2017.*

References

1) Fundamentals of Solid Mechancis by M.L.Gambhir, PHI Learning Pvt. Ltd 2009
2) Strength of Materials by S.S.Bhavikatti, Vikas Publishing House Pvt. Ltd.2008.
3)Mechanics of Materials by R.C.Hibbeler, Pearson Education 9th ed 2014
4) Strength of Materials by S.S.Rattan, Tata McGraw Hill Education Pvt. Ltd 2008.
5) http://nptel.iitm.ac.in

ENVIRONMENTAL ENGINEERING

L	T	P/D	C
3	1	0	3

Course Objectives

- To know the various lab tests involve in knowing the properties of water and sewage
- To provide the knowledge of methods of conducting the lab test
- To know about the design of septic tank, sludge digestion tank

Course Outcomes

- CO1: Know the standard limits of water and sewage
- CO2: Have the knowledge of the consultancy potential of water and sewage test.
- CO3: Ability to design biological treatment and trickling filter .
- CO4: To understand the concept of water treatment and sewage treatment layout plan

UNIT – I

Introduction: Waterborne diseases – protected water supply – Population forecasts, design period – types of water demand – factors affecting – fluctuations – fire demand – water quality and testing – drinking water standards, sources of water – Comparison from quality, quantity and other considerations – intakes – infiltration galleries.

UNIT – II

Layout and general outline of water treatment units: sedimentation – principles – design factors – coagulation-flocculation clarifier design – coagulants - feeding arrangements, Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation - comparison of filters – disinfection – theory of chlorination, chlorine demand - other disinfection practices- Miscellaneous treatment methods.

UNIT – III

Water distribution systems: Types of layouts of distribution system- design of distribution system- Hardy cross and equivalent pipe methods – service reservoirs – determination of storage capacity. Conservancy and water carriage systems – sewage and storm water estimation – time of concentration – storm water overflows, combined flow – characteristics of sewage – examination of sewage – B.O.D – C.O.D equations.

UNIT – IV

Design of sewers: Shapes and materials – sewer appurtenances manholes – inverted siphon – catch basins – flushing tanks – ejectors, pumps and pump houses – house drainage – components requirements – sanitary fitting traps – one pipe and two pipe systems of plumbing.

UNIT –V

Design of different units: sedimentation tank – design of screens – grit chambers – principles and design of biological treatment – trickling filters.

Text books

1. *Water supply and sanitary Engineering by G.S. Birdi, Dhanpat Rai& Sons Publishers ,8th edition,(2010).*
2. *B.C.Punmia, "Water Supply Engineering", Vol. 1, "Waste water Engineering Vol. II", 2nd Edition, Ashok Jain &Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi, 2008.*
3. *Water Supply & Environmental Engineering by A.K. Chatterjee. 8thediton, (2013)*

Reference

1. *Water and Waste Water Engineering by Fair Geyer and Okun,3rd edition (2011)*
2. *Environmental Engineering by P. Venugopal Rao (PHI) (2002).*
3. *Waste water engineering by Metcalf and Eddy (2002).*
4. *Unit operations in Environmental Engineering by Robert Noyes,(1994)*

STRUCTURAL ANALYSIS

L	T	P/D	C
3	1	0	3

Course Objectives

- To introduce the concept of global structural stability, theory of structural analysis, and methods in structural analysis.
- To provide knowledge in indeterminate structure and methods of analysis.
- Analysis of indeterminate beams by slope deflection & moment distribution method.
- Calculation of the deflection of trusses, beams and frames by using unit load method & Analysis of two pinned arches.
- To provide the concept of stress critical due to moving loads.

Course Outcomes

Students who successfully complete this course will be able to

- CO1: Distinguish between stable and unstable and statically determinate and indeterminate structures and also
- CO2: Apply equations of equilibrium to structures and compute the reactions.
- CO3: Evaluate and draw the influence lines for the reactions, shears, and bending moments in beams and girders due to moving loads
- CO4: Use approximate methods for analysis of statically indeterminate structures.
- CO5: Calculate the deflections of truss structures and beams.

UNIT – I

Propped cantilever and fixed beams: Determination of static and kinematic indeterminacies for beams Analysis of Propped cantilever and fixed beams, including the beams with different moments of inertia, subjected to uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads – Shear force and Bending moment diagrams for Propped Cantilever and Fixed Beams – Deflection of Propped cantilever and fixed beams; effect of sinking of support, effect of rotation of a support.

UNIT – II

Continuous beams: Introduction – Continuous beams, Clapeyron's theorem of three moments – Analysis of continuous beams with constant and variable moments of inertia with one or both ends fixed – continuous beams with overhang, Effects of sinking of supports. Derivation of slope – deflection equation, application to continuous beams with and without settlement of supports.Analysis of continuous beams with and without settlement of supports using Moment Distribution Method, Shear force and Bending moment diagrams, Elastic curve.

UNIT – III

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 – Unit Load Method. Deflections of simple beams and pin-jointed plane trusses. Deflections of statically determinate bent frames.

Arches: Introduction – Types of Arches – Comparision between Three hinged and Two hinged Arches. Linear Arch. Eddy's theorem. Analysis of Three hinged arches (Semicircular, Segmental and parabolic arches without temperature effect and yielding of support).

UNIT – IV

Analysis of perfect frames: Types of frames – Perfect, Imperfect and Redundant pin jointed frames. Analysis of determinate pin jointed frames using method of joints, method of sections for vertical loads, horizontal loads and inclined loads.

UNIT – V

Moving loads and influence lines: Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load U.D load longer than the span, U.D load shorter than the span, two point loads with fixed distance between them and several point loads – Equivalent uniformly distributed load – Focal length. Definition of influence line for SF, Influence line for BM – load position for maximum SF at a section – Load position for maximum BM at a section – Point loads, UDL longer than the span, UDL shorter than the span – Influence lines for forces in members of Pratt and Warren trusses. Equivalent uniformly distributed load. Focal length.

Text Books

1. *Structural Analysis Vol –I & II by V.N.Vazirani and M.M.Ratwani, Khanna Publishers.2008*
2. *Structural Analysis Vol I & II by G.S.Pandit and S.P.Gupta, Tata McGraw Hill Education Pvt. Ltd.2 edition (10 April 2008)*
3. *Theory of structures by S. Ramamrutham ,Dhanpat rai publishing company.New ninth revised and enlarged edition.*

References

1. *Mechanics of Structures Vol –II by H.J.Shah and S.B.Junnarkar, Charotar Publishing House Pvt. Ltd.2007.*
2. *Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Education Pvt. Ltd 2001.*
3. *Structural Analysis -I by S.S.Bhavikatti, Vikas Publishing House Pvt. Ltd.2009.*
4. *http://nptel.ac.in*

BUILDING MATERIALS AND CONSTRUCTION TECHNIQUES

L	T	P/D	C
3	0	0	3

Course Objectives

- To provide knowledge about the detailed Classificatio, manufacturing & tests of stones and bricks .
- Explanation about source of cement and admixtures, manufacturing & tests of cements.
- Description about the structure of timber manufacturing of glass and properties.
- Explains about the Usage of metals and steels in construction.
- Listing out the finishing work materials and formwork of the construction.

Course Outcomes

At the conclusion of the course students will be able to:

- CO1: Identify the various building materials
- CO2: Understand the minimum standard required to designate and use the material in construction.
- CO3: Understand the uses of different material like concrete, masonry, wood, steel or with a combination of these materials in consruction domain.
- CO4: Describe various types of interior and exterior finishes.
- CO5: Various tests requied for the building material.

UNIT – I

Stones & Bricks: Building stones – classifications and quarrying – properties – structural requirements, Composition of Brick earth – manufacture and structural requirements, classification – Field and laboratory tests on bricks (compressive strength, water absorption, efflorescence, dimension and warpage).

Masonry: Definition and terms used in masonry. Brick masonry, characteristics and requirements of good brick masonry, Bonds in brick work, Header, Stretcher, English, Flemish bond, Stone masonry, Requirements of good stone masonry, Classification, characteristics of different stone masonry, Joints in stone masonry. Types of walls; load bearing, partition walls, cavitywalls.

UNIT – II

Cement &Admixtures: Ingredients of cement – manufacture – Chemical composition – different types of cement and its uses, Hydration – field & lab tests on cements**,** Admixtures – mineral & chemical admixtures – uses.

Tiles, Timber and Glass: Introduction, Classification of Tiles, Tests on Tiles (Water absorption, Bulk density & Abrasion). Timber Structure, Types and properties, seasoning. Glass – properties, classification.

UNIT – III

Metals in constructions: Principle and characterstics of steel, Aluminium, Classification of steel, Tests on metals (Tension, Brittleness test, hardness test)

Paints: Purpose, types, ingredients and defects, Preparation and applications of paints to new and old plastered surfaces, wooden and steel surfaces.

UNIT – IV

Miscellaneous Materials: Gypsum – Classification, Plaster of Paris, Gypsum wall Plasters, Gypsum Plaster Boards, Adhesives, Heat and sound insulating materials, Geosynthetics.

Modern Materials: Glass – Ceramics – Sealants for joints – Fibre glass reinforced plastic – Clay products – Refractories – Composite materials – Types – Applications of laminar composites – Fibre textiles– Geomembranes and Geotextiles for earth reinforcement.

UNIT –V

Plastering and Pointing: Purpose, materials and methods of plastering and pointing, defects in plastering – Stucco plastering, lathe plastering. Damp proofing **–** causes, effects and methods. Formwork **–** Requirements – types of form work – standards – scaffolding – shoring – underpinning.

Textbooks

1. *Engineering Materials by Rangwala, S. Chand and Company Ltd–Edition2017*
2. *Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain – LaxmiPublications (P) ltd.,10th ed. 2008*

References

1. *Building Materials by Duggal, New Age International.4th revised ed. 2010*
2. *Building Materials by P.C.Varghese, PHI. 2nd revised ed. 2015*
3. *Building Construction by PC Varghese PHI. 1st ed. 2007.*
4. *Basics of Civil Engg by SubhashChander; Jain Brothers 1st ed. 2008*
5. *http://nptel.iitm.ac.in*

ENVIRONMENTAL ENGINEERING LAB

L	T	P/D	C
0	0	2	1

Course Outcomes

- CO1: To understand the optimum composition of different contaminations in water and relative treatment methods in order to ,make it potable to ensure the health aspects of society.
- CO2: To Demonstrate the different test to designate the water quality

List of experiments

1. Determination of pH and turbidity
2. Determination of Conductivity and total dissolved solids
3. Determination of Alkalinity and Acidity
4. Determination of Chlorides
5. Determination of Iron
6. Determination of Dissolved Oxygen
7. Determination of Nitrates
8. Determination of Optimum dose of Coagulant
9. Determination of Chlorine Demand
10. Determination of B.O.D
11. Determination of C.O.D
12. Presumptive Coliform test

List of major equipment

1. PH meter
2. Turbidity meter
3. Conductivity meter
4. D.O. Meter
5. B.O.D. Incubator
6. C.O.D. Digestor
7. Bacteriological Incubator
8. UV Spector photometer
9. Autoclave
10. Muffle furnace
11. Jar test apparatus
12. Hot air oven

SOLID MECHANICS LAB

L	T	P/D	C
0	0	2	1

List of experiments

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

List of Major Equipment

1. UTM for conducting tension test on rods.
2. Torsion testing machine
3. Brinnell's / Rock well's hardness testing machine
4. Spring testing machine
5. Izod Impact machine
6. Shear testing machine
7. Beam setup for Maxwell's theorem verification.
8. Continuous beam setup
9. Electrical Resistance gauges.
10. Cantilever Beam.

GENDER SENSITIZATION

L T / P / C

0 2 / 0 / 0

Course Objectives

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Course Outcomes

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

UNIT-I

Understanding Gender

Gender: Why Should We Study It? (*Towards a World of Equals*: Unit -1) **Socialization:** Making Women, Making Men (*Towards a World of Equals*: Unit -2) Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

UNIT-II

Gender And Biology

Missing Women: Sex Selection and Its Consequences (*Towards a World of Equals*: Unit -4) Declining Sex Ratio. Demographic Consequences.

Gender Spectrum: Beyond the Binary (*Towards a World of Equals*: Unit -10)

Two or Many? Struggles with Discrimination.

UNIT-III

Gender And Labour

Housework: the Invisible Labour (*Towards a World of Equals*: Unit -3)

"My Mother doesn't Work." "Share the Load."

Women's Work: Its Politics and Economics (*Towards a World of Equals*: Unit -7)

Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

UNIT-IV

Issues Of Violence

Sexual Harassment: Say No! (*Towards a World of Equals*: Unit -6)

Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "*Chupulu".*

Domestic Violence: Speaking Out (*Towards a World of Equals*: Unit -8)

Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading: New Forums for Justice.

Thinking about Sexual Violence (*Towards a World of Equals*: Unit -11)

Blaming the Victim-"I Fought for my Life…." - Additional Reading: The Caste Face of Violence.

UNIT-V

Gender: Co - Existence

Just Relationships: Being Together as Equals (*Towards a World of Equals*: Unit -12)

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers.

Additional Reading: Rosa Parks-The Brave Heart.

Textbook

All the five Units in the Textbook**, "*Towards a World of Equals: A Bilingual Textbook on Gender*"** written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by **Telugu Akademi, Hyderabad**,Telangana State in the year **2015**.

Note: Since it is an Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

Reference books

1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012

DESIGN OF REINFORCED CONCRETE STRUCTURES

L	T	P/D	C
3	1	0	3

Course objectives

- To provide the basic concepts of reinforced concrete design
- To impart the knowledge of codalprovsuopns in design.
- To provide the design guidelines of simple structural elements such as beams, Columns, footings &foundations,slabs and staircase

Course outcome

Upon successful completion of this course students will be abe able to

- CO1: Understand the various design concepts and design a beam under flexure and draw the reinforcement details.
- CO2: Design the beam under shear and torsion, Calculate the anchorage and development length and check the serviceability requirements for RC structural elements.
- CO3: Analyze and solve various RC slabs and draw the reinforcement details
- CO4: Classify short, long columns and draw the reinforcement details
- CO5: Explore the design concept of footing & staircase.

UNIT – I

Concepts of RC design: Introduction- Structure - Components of structure - Different types of structures - Loads – Different types of Loads – Dead Load, Live Load, Earthquake Load and Wind Load - Working stress method – Ultimate load method – Limit State method – Stress-strain curve for concrete, steel – Partial safety factor – Characteristic values – Stress Block parameters – IS: 456 2000 provisions.

Design and detailing of beams: Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections.

UNIT – II

Shear, torsion and bond: Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, IS Code provisions. Design examples in simply supported and continuous beams, detailing.Limit state of serviceability for deflection and cracking – IS Code provisions.

UNIT – III

Design and detailing of slabs: Design of one way, two way and continuous slabs using IS Codal provisions and coefficients, Cantilever slab / Canopy slab. Introduction to Yield line theory.

UNIT – IV

Design and detailing of short and long columns: Subjected to axial loads – uniaxial and biaxial bending – IS Code provisions.

UNIT – V

Design and detailing of footings and staircase: Different types of footings – Design of isolated, square, rectangular and circular footings – Introduction to combined footings. Design of staircase (dogleged type)

Text books

1. *Reinforced concrete design by N.Krishna Raju & R.N Pranesh, New Age International publishers New Delhi 2003.*
2. *Pillai and Menon, Reinforced Concrete Design, 3/e, Tata McGraw Hill, 2009.*

Reference books

1. *Fundamentals of Reinforced Concrete deisign by M.L Ghambhir, Prentice Hall of India,2013.*
2. *Plain and Reinforced Concrete, Vol. I, Jain &Jaikrishna, Nemchand Brother, 2012.*
3. *A.K. Jain, Reinforced Concrete – Limit State Design, 7/e Standard book house, 2012.*
4. *P.C. Varghese, Limit State Design of Reinforced Concrete, 2/e, Prentice Hall of India,2013.*
5. *Reinforced Concrete Design by S. Unnikrishna Pillai &Devdas Menon, Tata McGraw Hill, 2009.*

IS Code

1. IS: 456 2000 *Indian Standard plain and reinforced concrete - code of practice (Fourth Revision) Tenth Reprint APRIL 2007*
2. SP16, *Design Aids for Reinforced Concrete to IS 456:1978*

Note : IS: 456 2000 and SP16 *is provided during examination*

Vidya Jyothi Institute of Technology
(An Autonomous Institution)
(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)
Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

GEOTECHNICAL ENGINEERING

L	T	P/D	C
3	1	0	3

Course objectives

- To provide the basic knowledge of soil formation and the Engineering properties of various soils
- To understand the engineering aspects of soil
- Prepare civil engineering students to analyze groundwater conditions in geotechnical engineering practice.
- To give the idea about soil hydraulics and streeses conditions of soil.

Course outcomes

On successful completion of this course, it is expected that the students will be able to,

- CO1: Illustrate the soil formation and classification.
- CO2: Explain the Hydrostatic effect in soil mass.
- CO3: Illustrate the stress distribution mechanism and compaction in soil mass.
- CO4: Illustrate the mechanism of consolidation.
- CO5: Identify the Shear strength parameters through analytical and experimental approach.

UNIT – I

Introduction: Soil formation – soil structure and clay mineralogy – Adsorbed water –Mass,volume relationship – Relative density.

Index properties of soils: Grain size analysis – Sieve and Hydrometer methods –consistency limits and indices – I.S. Classification of soils.

UNIT – II

Permeability: Soil water – capillary rise – flow of water through soils – Darcy's law, Permeability – Factors affecting – laboratory determination of coefficient of permeability – Permeability of layered soils – Insitu permeability tests (Pumping in & pumping out test).

Effective stress & seepage through soils: Total, neutral and effective stresses – principle of effective stress – quick sand condition – Introduction to Seepage through soils – Flow nets – Characteristics and Uses of flow nets.

UNIT – III

Compaction: Mechanism of compaction – factors affecting compaction – effects of compaction on soil properties. – Field compaction Equipment – compaction quality control.

Stress distribution in soils: Boussinesq's and Westergaard's theories for point loads ,uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under a point load along the vertical and horizontal plane.

UNIT – IV

Consolidation: Types of compressibility – immediate settlement, primary consolidation and Secondary consolidation – stress history of clay; e-p and e-log-p curves – normal consolidation soil, over consolidated soil and under consolidated soil – pre-consolidation Pressure and its determination – Terzaghi's 1-D consolidation theory.

UNIT – V

Shear strength of soils: Introduction of shear strength – Mohr - Coulomb Failure theories – Types of laboratory strength tests – Direct Shear test, Vane shear test – strength tests based on drainage conditions – Tri-Axial test strength envelops – Shear strength of sands – dilatancy, Critical void ratio – Concept of liquefaction.

Text books

1. *Soil Mechanics and Foundation Engg, (7th edition) by Dr.Arora, K.R., Standard Publishers and Distributors, Delhi, 2010*
2. *Soil Mechanics and Foundation Engineering by VNS Murthy, CBS Publishers and Distributors 2016.*
3. *Principles of Foundation Engineering, (7th edition) by Braja M. Das,Cengage Learning,2011*

References

1. *Geotechnical Engineering, (3rd edition) by Venkataramiah, C., New Age International Pvt . Ltd, 2010.*
2. *Soil Mechanics by Lambe and Whitman, T.W., Indian Wiley, 2009.*
3. *Geotechnical Engineering by Purushotham Raj., McGraw-Hill, New Delhi, 2000.*
4. *Geotechnical Engineering by Manoj Dutta and Gulati, S.K., Tata McGraw-Hill, New Delhi,2005.*
5. *Basic and applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt Ltd., New Delhi 2016, third edition.*

Vidya Jyothi Institute of Technology
(An Autonomous Institution)
(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)
Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

CONCRETE TECHNOLOGY

L	T	P/D	C
3	1	0	3

Course objectives

- To understand the properties of ingredients of concrete
- To study the behavior of concrete at its fresh and hardened state
- To study about the concrete design mix
- To know about the procedures in concreting
- To understand special concrete and their use

Course outcomes

On completion of the course, the students will be able to

- CO1: Understanding the properties of cements and admixtures.
- CO2: Analyse the properties of aggregates.
- CO3: Evaluate the properties of fresh concrete.
- CO4: Analyse the behavior of hardened concrete and durability of concrete.
- CO5: Design the concrete mix using IS Code and describe the special concretes.

UNIT – I

Cement: Portland cement – chemical composition – Hydration, Setting of cement – Structure of hydrate cement – Test on physical properties – Different grades of cement.

Admixtures :Types of admixtures – mineral and chemical admixtures.

UNIT – II

Aggregates: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregate – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded aggregate – Maximum aggregate size.

UNIT – III

Fresh Concrete: Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water.

UNIT – IV

Hardened Concrete : Water / Cement ratio – Abram's Law – Gelspaoe ratio – Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength - Curing.

Testing of Hardened Concrete: Compression tests – Tension tests – Factors affecting strength – Flexure tests – Splitting tests – Non-destructive testing methods

Elasticity, Creep & Shrinkage– Modulus of elasticity – Dynamic modulus of elasticity – Posisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – types of shrinkage.

UNIT – V

Mix Design : Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by various methods – BIS method of mix design.

Special Concretes: Introduction to Light weight concrete – Cellular concrete – No-fines concrete – High density concrete – Fibre reinforced concrete – Polymer concrete – High performance concrete – Self compacting concrete.

Text books

1. *Properties of Concrete by A.M.Neville – 5th edition 2011*
2. *Concrete Technology by M.S.Shetty. – S.Chand&Co. ;7th ed 2015*

References

1. *Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi 5th ed 2004*
2. *Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi 2006*
3. *Concrete: Micro structure, Properties and Materials – P.K.Mehta and J.M.Monteiro, Mc-Graw Hill Publishers 4th ed. 2014*

Vidya Jyothi Institute of Technology
(An Autonomous Institution)
(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)
Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

ADVANCED STRUCTURAL ANALYSIS (PE1)

L	T	P/D	C
3	1	0	3

Course objectives

- To introduce the students to the concept of global structural stability, theory of structural analysis, and methods in structural analysis.
- To provide the knowledge of Analysis of indeterminate structures
- To provide the knowledge of conventional methods of structural Analysis

Course outcomes

On successful completion of this course, it is expected that the students will be able to,

- CO1: Analyze the continuous beams, portal frames by Kani's method.
- CO2: Differentiate Static and kinematic Indeterminacy of Trusses by Castiglione's second theorem.
- CO3: Evaluate the shear forces and bending moments in Two-Hinged arches and to execute secondary stresses due to rise of temperature and Elastic Shortening of rib.
- CO4: Analyze the Multi-storey frames by approximate methods for gravity (vertical) and horizontal loads.
- CO5: Understand the concept of Matrix method for the analysis of continuous beams and Pin jointed plane frames.

UNIT – I

Kani's method: Analysis of continuous beams and portal frames including side sway due to unsymmetrical vertical loading.

UNIT – II

Indeterminate Trusses: Determination of Static and Kinematic indeterminacies – Analysis of trusses having single and two degrees of internal and external indeterminacies – Castigliano's second theorem.

UNIT – III

Two hinged arches: Introduction – classification of two hinged arches – analysis of two hinged parabolic arches, analysis of circular arches – secondary stresses in two hinged arches due to temperature and elastic shortening of rib.

UNIT – IV

Approximate methods of analysis: Introduction – Analysis of multi – storey frames for lateral loads: Portal Method, Cantilever Method. Analysis of multi storey frames for gravity (vertical) loads. Substitute frame method.

UNIT – V

Matrix Methods of Analysis: Introduction – Static and Kinematic Indeterminacy – Analysis of continuous beams including settlement of supports, using the stiffness method. Analysis of pin-jointed determinate plane frames using the stiffness method – Analysis of single bay single storey frames, including side sway, using the stiffness method. Analysis of continuous beams up to three degrees of the indeterminacy using flexibility method. Shear force and Bending Moment diagrams.

Text books

1. *Structural Analysis Vol –I &II by Vazarani and Ratwani, Khanna Publishers.*
2. *Structural Analysis Vol I & II by G.S. PanditS.P.Gupta Tata McGraw Hill Education Pvt. Ltd.*
3. *Structural Analysis -II by S.S.Bhavikatti, Vikas Publishing House Pvt. Ltd.*

References

1. *Mechanics of Structures Vol –II by H.J.Shah and S.B.Junnarkar, Charotar Publishing House Pvt. Ltd.*
2. *Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Publishers.*
3. *Structural Analysis by Devdas Menon, Narosa Publishing House.*
4. *Advanced Structural Analysis by A.K.Jain, Nem Chand & Bros.*
5. *Structural Analysis Vol I & II by R.Vaidyanathan and P.Perumal, Lakshmi Publications House Pvt. Ltd.*
6. *Examples in structural Analysis by William M.C.McKenzie, Taylor & Francis.*

Vidya Jyothi Institute of Technology
(An Autonomous Institution)
(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)
Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

BUILDING PLANNING & DRAWING (PE1)

L	T	P/D	C
3	1	0	3

Course objectives

- Learn to sketch and take field dimensions
- Learn to take data and transform it into graphic drawings
- Prepare the student for future engineering positions

Course outcomes

On successful completion of this course, it is expected that the students will be able to,

- CO1: Identify various building components, conventional signs and symbols.
- CO2: Illustrate the building bye-laws and the principles of planning.
- CO3: Understand about the building services and safety.
- CO4: Design and Sketch the plans of various types of buildings and detailing of doors, windows, etc.
- CO5: Understand the elements of perspective drawing involving simple problems.

UNIT – I

Basic components of buildings: Design of various elements of building like various types of footing, open foundation, raft, grillage, pile and well foundation, drawing of frames of doors or windows, various types of door, window, and ventilators, lintels and arches, stairs and staircase, trusses, flooring, roofs etc.

Drawing practice: Sketches of various building components, one drawing sheet of various building components like doors, windows, lintels and arches, stairs foundation etc.

UNIT – II

Building planning: provision on national building code, building bye-laws, open area, setbacks, FAR terminology, principles of architectural composition (ie. Unity, contrast etc) , principles of planning orientation.

Drawing practice: one drawing sheet each of services and interiors of buildings.

UNIT – III

Building Services - Introduction of building services like water supply and drainage, electrification, ventilation and lighting and staircases, fire safety, thermal insulation, acoustics of buildings.

Drawing practice: one drawing sheet containing detailed planning of one/ two bedroom residential building

UNIT – IV

Design and Drawing of Building: Design and preparation of detailed drawings of various types of buildings like residential building, institutional buildings and commercial buildings, detailing of doors , windows, ventilators and staircases etc.

Drawing practice: one drawing sheet each of residential building, institutional buildings

UNIT – V

Perspective Drawing: Elements ofPerspective Drawing involving simple problems , one point and two point Perspectives, principles of energy efficient buildings

Drawing practice: One drawing sheet on each one point and two point Perspectives problem.

NOTE

Alternate weeks two periods of drawing class should be conducted. The end examination paper should consist of Part – A and Part – B. Part – A should consist of theory questions on the syllabus while Part – B should consist of 4 questions on drawing out of which 2 to be answered. Weightage for Part – A is 60 % and Part – B is 40 %. In exam drawing board should be provided.

Textbooks

1. *"Building Planning and Drawing", N Kumar swamy and Kameswar Rao, charator pubications, 7th Edition, 2015*
2. *"Building planning, Design and scheduling", Gurucharan Singh Jagdish Singh 2nd edition, (2008).*

References

1. *Civil Engineering Drawing (2nd Editon), (2010).*
2. *"Building drawing with an integrated approach to built environment" , fourth edition,Shah , Kale &Patki,(2002).*
3. *Municipal Administration and Urban Development Department - Model Building Bye-Laws 2016 of GoI – Andhra Pradesh Building Rules, 2017*

Vidya Jyothi Institute of Technology
(An Autonomous Institution)
(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)
Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

AIR POLLUTION AND CONTROL METHODS (PE1)

L	T	P/D	C
3	1	0	3

Course objectives

- To know about the various types of pollutants and their effects
- To introduce about the meteorological behavior of the pollutants
- To acquire the knowledge on different control methods of pollution
- To learn about the control of gaseous emissions

Course outcomes

- CO1: Find the sources, causes & effects of air pollution.
- CO2: Understand the meteorological components and the plume behavior for atmospheric stability conditions.
- CO3: Identify the types of equipments to control the particulates at sources.
- CO4: Miimize the control measures of NOX, SOX and other gaseous emissions.
- CO5: Examine the SPM, SOx, NOx and CO emission standards.

UNIT – I

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. 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 – II

Meteorology: plume Dispersion; properties of the atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity; Influence of Meteorological phenomena on Air Quality-wind rose diagrams. Lapse Rates, Pressure Systems.

UNIT – III

Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control. Equipment's – Settling Chambers, Centrifugal separators, filters Dry and Wet scrubbers.

UNIT – IV

Control of gaseous emissions: 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- adsorption-absorption-combustion.

UNIT – V

Air Quality Management: Monitoring of SPM, SO_x; NO_x and CO Emission Standards- air sampling- sampling techniques- high volume air sampler- stack sampling- analysis of air pollutants- air quality standards air pollution control act.

Textbooks

1. *Air pollution By M.N.Rao and H.V.N.Rao – Tata Mc.Graw Hill Company, july 2017.*
2. *Air pollution by Wark and Warner.- Harper & Row, New York, 1981.*

References

1.An introduction to air pollution by R.K. trivedy and P.K. Goel , B.S publications, 1986.

CAD LAB

L	T	P/D	C
0	0	3	1

Course Objectives

The objective of this lab is to teach the student usage of Auto cad and basic drawing fundamentals in various civil engineering applications, specially in building drawing.

Course Outcomes

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

- CO1: Assess the Software with aiding source.
- CO2: Draft the Plan and Elevation & Sectional views of the buildings.
- CO3: Develop the components of the building.
- CO4: Replicate the detailing of framed and Industrial structures.
- CO5: Interpret the isometric and orthogonal projection of buildings.

List of Experiments

1. Introduction to the basic commands of CADD software .
2. Practice exercises on basic commands of CAD software.
3. Drawing of single line plans Single storey buildings .
4. Drawing of plans of Multi storied buildings with Brick thickeness (Max G+2)
5. Developing sections and elevations of Single storey buildings
6. Detailing of different types (any 2 types) of doors and its components by using CAD
7. Detailing of different types (any 2 types) of windows and its components by using CAD
8. Detailed drawing of Roof trusses by using CAD
9. Exercises on the development of working of building by using CAD
10. Planning of commercial building (School building)
11. Fundamentals of Building Information Modelling (BIM)
12. Demonstrationon workflow in using BIM in the building life cycle

Vidya Jyothi Institute of Technology
(An Autonomous Institution)
(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)
Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

FOUNDATION ENGINEERING

L	T	P/D	C
3	1	0	3

Course objectives

- To introduce to students about the basics of soil exploration
- To develop students the ability to interpret field and laboratory data to get design parameters for foundation analysis
- To prepare students for the effective use of the commonly used formulas, tables, and figures in the design and analysis of shallow and deep foundations

Course outcomes

Upon successful completion of yhis course students will be able to

- CO1: Organize the preparation and programme of soil investigation.
- CO2: Examine the earth pressure theories and stability of retaining walls.
- CO3: Evaluate the bearing capacity of soil and allowable settlement.
- CO4: Analyse the capacity and settlement of pile foundation.
- CO5: Analyse the stability of finite and infinite slopes using various methods.

UNIT – I

Soil Exploration: Need – methods of soil exploration – boring and sampling methods – penetration tests – plate load test – pressure meter – planning of soil exploration programme and preparation of soil investigation report.

UNIT – II

Earth pressure theories: Rankine's theory of earth pressure – earth pressures in layered soils – Coulomb's earth pressure theory

Retaining walls: Types of retaining walls – stability of gravity and cantilever retaining walls against overturning, sliding and, bearing capacity. Drainage from backfill, introduction to reinforced earth walls.

UNIT – III

Bearing capacity and settlement foundation: Types - choice of foundation – location and depth - safe bearing capacity — Terzaghi, Mayerhof, Skempton and IS methods.– Safe bearing pressure based on SPT N – value- Allowable bearing pressure; safe bearing capacity- allowable settlement of structures and plate load test – allowable settlements of structures.

UNIT – IV

pile foundation: Types of piles – load carrying capacity of piles based on static pile formulae – dynamic pile formulae – Pile Capacity through SPT and CPT results - pile load tests - load carrying capacity of pile groups in sands and clays – Settlement of pile groups – negative skin friction

UNIT – V

Slope stability: Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes – stability analysis by Swedish slip circle method, method of slices, Bishop's Simplified method of slices – Taylor's Stability Number- stability of slopes.

Text books

1. *Basic and Applied Soil Mechanics by Gopal Ranjan& ASR Rao, New age International Pvt . Ltd, New Delhi: ,third edition (2016).*
2. *Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork.*

References

1. *Soil Mechanics and Foundation Engineeringby VNS Murthy, CBS Publishers and Distributors.(2016).*
2. *Analysis and Design of Substructures – Swami Saran, Oxford and IBH Publishing company Pvt Ltd (1998).*
3. *Geotechnical Engineering by S. K.Gulhati& Manoj Datta – Tata Mc.Graw Hill Publishing company New Delhi. 2005.*
4. *Soil Mechanics And Foundation Engineering by K.R. Arora(2008). Standard publishers distributers.seventh edition*

Vidya Jyothi Institute of Technology
(An Autonomous Institution)
(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)
Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

DESIGN OF STEEL STRUCTURES

L	T	P/D	C
3	1	0	3

Course objectives

- Ability to perform analysis and design of steel members and connections
- Ability to design steel structural systems with its structural components
- To understand the drawing and detailing of different components of steel structure
- To understand the stability criterion of steel structures

Course outcomes

Upon successful completion of this coursestudentswill be able to do

- CO1: Classify the types of connections and specifications as per IS: 800-2007.
- CO2: Apply the provisions of IS: 800-2007 to design tension members.
- CO3: Analyze and design compression members.
- CO4: Illustrate behaviour of beams and design strengths as per IS code.
- CO5: Adapt IS code procedures to design welded plate girder.

UNIT – I

Theory and introduction: Materials – types of structural steel – mechanical properties of steel – Concepts of plasticity – yield strength. Loads – and combinations local buckling behavior of steel. Concept of limit State Design – Limit States – Design Strengths- deflection limits – serviceability – stability check, Bolted connections – Riveted connections – IS – 800 – 2007 - specifications – Design strength – efficiency of joint – prying action. Welded connections – Types of welded joints – specifications - design requirements.

UNIT – II

Design of tension members: Design strength – Design procedure – Design ofTension member - Design procedure splice - lug angle.

UNIT – III

Design of compression members: Design of compression members – Buckling class – slenderness ratio / strength design – laced – battened columns

UNIT – IV

Design of Beams: Design of Beams – Plastic moment – Bending and shear strength / buckling – Built-up sections – laterally / supported beams –Web Buckling and Web Crippling strength.

UNIT – V

Design of Welded Plate girders – elements – economical depth – design of main section – connections between web and flange – design of end bearing stiffenersand intermediate stiffeners.

Text books

1. *Design of steel structures – N. Subramanian, Oxford University Press – 2009.*
2. *Structural Design and Drawing by N.Krishna Raju, Universities Press, 3rd edition ,(2009).*

References

1. *Design of Steel structures by K.S. Sai Ram, Person Education. (2010)*
2. *Design of Steel Structures Edwin H. Gaylord, Jr. Charles N. Gaylord and James Stallmeyer Tata McGraw-Hill Education pvt. Ltd. (2010)*
3. *Design of steel structures, Structures, S.S. Bhavikatti, IK int Publication House, New Delhi, 2010.*
4. *Limit State Design of steel structures, S.K. Duggal, Tata McGraw-Hill, 2010*
5. *IS:800 – 2007, General Construction in Steel – Code of Practice, 3rd edition*
6. *IS:875 (Part 3): Code of Practice for Design Loads (Other Than Earthquake) For Buildings and Structures. Part 3: Wind Loads (Second Revision)*

IS Codes

1. IS: 800 – 2007
2. IS : 875 Part III 2000

*Note:*IS: 800–2007, IS:875 *are provided duringthe examination*

HYDRAULICS & HYDRAULIC MACHINERY

L	T	P/D	C
3	0	0	3

Course objectives

- To determine different types of flows in channels.
- To make understand the dynamics of fluid flows and the governing non-dimensional parameters.
- Use dimensional analysis to establish a set of similarity requirements for a model to be used to predict the behavior of another similar system (prototype).
- Apply the concepts of modelling and similitude to develop prediction equations.
- To enhance the thinking on the efficiency and design criteria of hydraulic system including power consumption criteria.
- To apply principles of fluid mechanics to the operation, design, and selection of fluid machinery such as pumps, blowers, fans, compressors, and turbines.

Course outcomes

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

- CO1: Explain the concept of different types of flows, designing of most Economical section of open channel & to understand the concept of specific energy.
- CO2: Demonstrate the concept of dimensional quantities and the application of similitude concepts in designing a model and prototype.
- CO3: Understand the concept, working applications of impact of jets with the importance of Constructing velocity triangles.
- CO4: Compare the design concept of Pelton, Francis and Kaplan turbines, Centrifugal pumps along with the most economical designs.
- CO5: Determine the working mechanism of different types of the pumps with their important characteristic curves

UNIT – I

Open channel flow-I

Introduction: Definition of open channel, Comparison between pipe flow and open-channel flow,Types of open channels, Geometric elements and hydraulic properties of an open channel section,Classification of open-channel flows – steady, unsteady, uniform, non-uniform, gradually varied, rapidly varied, spatially varied.

Uniform Flow: through open channel by Chezy's, Manning's, Kutter's, and Bazin formulae; Equivalent roughness – Horton's method; Computation of normal depth and velocity; Determination of normal and critical slopes; hydraulically efficient channel section.

Critical Flow: Energy considerations in open-channels: Specific energy, critical depth, computation of critical depth, specific energy diagram, critical, sub-critical, and super critical flows, alternate depths; Transitions – channel with a hump, and change in width.

UNIT – II

Open channel flow-II

Gradually Varied Flow: Basic assumptions; Derivation of differential equation of GVF; Other forms of GVF; Characteristics and classification of flow profiles for Mild, Critical, Steep, horizontal, and adverse slopes; control sections; Analysis of flow profiles; Computation of GVF by numerical method – Direct-Step method,

Rapidly Varied Flow: Characteristics of RVF; Hydraulic Jump in horizontal rectangular channels – momentum equation formulation for the jump, sequent-depth ratio, energy loss; Classification of jumps according to Froude's number; Basic characteristics of the jump - Height of jump, length of jump, location of jump

UNIT – III

Dimensional Analysis: Philosophy of DA; Principle of Dimensional Homogeneity; Methods used - Rayleigh's method and Buckingham's Pi theorem; Common dimensionless groups in fluid mechanics.

Modelling and Similitude: Geometric, kinematic, and dynamic similarities; Similarity requirements or modelling laws; model and prototype relations; Distorted and non-distorted models.

UNIT – IV

Turbo Machines-I: Turbines: Layout of a typical Hydroelectric power plant; Various heads and head losses; Classification of turbines based on – energy available at inlet, direction of flow of water through runner, position of turbine shaft, availability of head, and specific speed; Efficiencies of a turbine; Working, working proportions, velocity diagram, work done, and efficiencies of a Pelton Wheel and reaction turbine; Performance of turbine – unit head, unit speed, unit power, and unit discharge; Cavitation.

UNIT – V

Turbo Machines-II: Centrifugal Pumps: Components of a centrifugal pump; Selection of Centrifugal pumps based on specific speed; classification of pumps; Priming of a centrifugal pump; Working of a centrifugal pump; Expression for work done on the impeller (also called as fundamental equation of centrifugal pump); Maximum suction lift; Various heads of a pump – Suction head, delivery head, static head, and manometric head; Losses and Efficiencies – Mechanical, manometric, overall, and volumetric; Cavitation in pumps; Multistage pumps - Pumps in series and parallel.

Text books

1. *Subramanya K., "Flow in Open Channels," Tata McGraw Hill Publishing Company Limited, New Delhi.*
2. *Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) ltd., New Delhi 2005*

References

1. *Chow V. T., "Open Channel Hydraulics," McGraw Hill Book Company.*
2. *Elements of Open channel flow by RangaRaju, Tata Mc.Graw Hill, Publications.*
3. *Open Channel flow by V.T.Chow, Mc.Graw Hill book company. 1958*
4. *Hydraulic Machines by Banga& Sharma Khanna Publishers.1996.*
5. *http://nptel.ac.in*

Vidya Jyothi Institute of Technology
(An Autonomous Institution)
(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)
Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

WATER RESOURCES ENGINEERING

L	T	P/D	C
3	1	0	3

Course objectives

- To enable the students to know about the measurement of rainfall
- To provide students with a sound foundation in the mathematical, scientific and engineering fundamentals to formulate and analyze problems
- To enable the students to know the importance of irrigation and its methods
- To know about canal design by different theories

Course outcomes

Upon successful completion of this coursestudentswill be able to do

- Describe the components in the hydrologic cycle and all hydrological processes and methods.
- Analyze the flood analysis and its measurement by means of hydrograph.
- Analyze the phenomenon of Ground water occurrence by means of aquifers.
- Assess the methods of irrigation and its quality with help of duty delta relationship.
- Design the canals by using standard theories.

UNIT I

Introduction to engineering hydrology and its applications: hydrologic cycle, Types and forms of precipitation, Rainfall Measurement, Different types of rain gauges, rainfall measurement, computation of average rainfall over a basin, processing of rainfall data- Adjustment of record – rainfall double mass curve. Runoff- factors affecting runoff- runoff over a catchment – Empirical and rational formulae.

Abstraction from rainfall- evaporation, factors affecting evaporation, measurement of evaporation- evaporatranspiration- penman and balney & creddle methods- infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT II

Flood measurement and analysis: Distribution of runoff – Hydrograph analysis flood hydrograph- effective rainfall- base flow-base flow separation- direct runoff hydrograph-Unit Hydrograph, definition and limitations of applications of unit hydrograph, derivation of unit hydrograph from direct runoff hydrograph and vice versa- S- Hydrograph, Synthetic unit hydrograph.

UNIT III

Ground water occurrence: types of aquifers, Aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, Darcy's law, radial flow to wells in confined and unconfined aquifer. Types of wells – Well construction- well development.

UNIT IV

Necessity and importance of irrigation: Types of irrigation, advantages and ill effects of irrigation , application of irrigation . Indian agricultural soils, methods of improving soil fertility- crop rotation, preparation of land for irrigation, standards of quality for Irrigation water. Duty and delta, factors affecting duty, Water Logging

UNIT V

Canals and its design: Classification of canals, Design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, IS standards for a canal design canal lining.

Design Discharge over a catchment, Computation of design discharge-rational formula SCS curve number method , flood frequency analysis – introductory part only. Stream Gauging – measurement and estimation of stream flow.

Text books

1. *Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House 2014.*
2. *Engineering Hydrology by Jayaram Reddy, Laxmi publications pvt. Ltd., New Delhi2016, third edition.*
3. *Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi 1999*

References

1. *Irrigation Water Management by D.K. Majundar, Printice Hall of India.2002.*
2. *Irrigation and Hydraulic structures by S.K.Grag - Khanna publishers 2009.*
3. *Applied hydrology by Ven Te Chow, David R. Maidment larry W. Mays Tata MC. Graw Hill 2010.*
4. *Water Resources Practice Problems by Timothy J Nelson , Publisher: Engineering Videos; 1 edition (11 March 2013)*
5. *Irrigation Water Resources and Water Power Engineering by P.N. Modi , Publisher: Standard Book House (December 1, 2008)*

Vidya Jyothi Institute of Technology
(An Autonomous Institution)
(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)
Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

CONSTRUCTION ENGINEERING & MANAGEMENT (PE2)

L	T	P/D	C
3	1	0	3

Course Objectives

- To introduce overall planning, coordination and control of projects
- This course gives the students the scientific principles involved in construction, an understanding of the behavior of construction materials and fundamentals of structures.
- To develop basic concepts of PERT and CPM.
- To bring out the knowledge about contracts and bidding.

Course Outcomes

Upon successful completion of this course students will be able to

- CO1: Understand the behavioural aspect of entrepreneurs, various approaches of time management, their strength and weakness.
- CO2: Apply the concepts of project management during the construction phase, project organization, project planning and control using CPM,PERT techniques.
- CO3: Analysis various materials and equipment's for construction work.
- CO4: Examine the on different types of contracts and specifications.
- CO5: Outline the labour regulations and safety in construction.

UNIT – I

Management Techniques: Roles, Management theories, Social responsibilities, Planning and strategic management, Strategy implementation, Decision making tools and techniques – Organizational structure, Human resource management – motivation performance – leadership.

UNIT – II

Management Applications: Classification of Construction projects, Construction stages, Resources – Functions of Construction Management and its Applications. Preliminary Planning – Collection of Data – Contract Planning – Scientific Methods of Management: Network Techniques in construction management – Bar chart, Gant chart, CPM, PERT, Cost & Time optimization.

UNIT – III

Resource Management: Resource planning – planning for manpower, materials, costs, equipment. Labour, Scheduling, Forms of scheduling – Resource allocation, Budget and budgetary control methods

UNIT – IV

Contracts and Tenders: Contract – types of contract, contract document, specification, important conditions of contract – tender and tender document – Deposits by the contractor – Arbitration, Negotiation – M.Book – Muster roll – stores.

UNIT – V

Management Information System: Labour Regulations: Social Security – welfare Legislation – Laws relating to Wages, Bonus and Industrial disputes, Labour Administration – Insurance and Safety Regulations, Workmen's Compensation Act – other labour Laws – Safety in construction, legal and financial aspects of accidents in construction, occupational and safety hazard assessment, Human factors in safety, legal and financial aspects of accidents in construction, Occupational and safety hazard assessment

Textbooks

1. *Ghalot, P.S., Dhir,D.M., Construction Planning and Management, Wiley Eastern Limited,1992.*
2. *Chitkara,K.K., Construction Project Management¸ Tata McGraw Hill Publishing Co, Ltd., New Delhi,1998.*
3. *Punmia,B,C., Project Planning and Control with PERT and CPM, Laxmi Publications, New Delhi,1987.*

References

1. *Construction Management And Planning by: sengupta, b.guha, h.tatamcgraw-hill publications,1995*

GROUND IMPROVEMENT TECHNIQUES (PE2)

L	T	P/D	C
3	1	0	3

Course objectives

- To introduce engineering properties of soft, weak and compressible deposits.
- Principles of treatment for granular and cohesive soils and various stabilization techniques.
- To bring out concepts of reinforced earth.
- To introduce the overall idea of the techniques available for soils

Course outcomes

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

- CO1: Illustrate the several Ground modification mechanisms
- CO2: Illustrate the Ground Improvement Techniques through mechanical approach.
- CO3: Identify the different Hydraulic ground improvement techniques through Dewatering techniques.
- CO4: Explain the quick settlement techniques through chemical and physical modification.
- CO5: Distinguish the inclusion and confinement techniques of ground improvement.

UNIT – I

Introduction to engineering ground modification: Need and objectives, Identification of soil types, In situ and laboratory tests to characterize problematic soils; Mechanical, Hydraulic, Physico-chemical, Electrical, Thermal methods, etc. and their applications.

UNIT – II

Mechanical Modification: Principles of soil densification – Properties of Compacted soil, Compaction control tests, Specification of compaction requirements, Blasting Vibrocompaction, Dynamic Tamping and Compaction piles.

UNIT – III

Hydraulic Modification: Objectives and techniques, traditional dewatering methods and their choice, Design of dewatering system, Electro-osmosis, Filtration, Drainage and seepage control with Geosynthetics, Preloading and vertical drains, Electro-kinetic dewatering.

UNIT – IV

Physical and Chemical Modification: Modification by admixtures, Shotcreting and Guniting Technology, Modification at depth by grouting, Crack Grouting and compaction grouting, Jet grouting, Thermal Modification, Ground freezing

UNIT – V

Modification by Inclusions and Confinement: Soil reinforcement, reinforcement with strip, bar, mesh, sheet and grid reinforced soil. In-situ ground reinforcement, ground anchors, rock bolting and soil nailing.

Text books

1. *Hausmann, M. R. (1990) – Engineering Principles of Ground Modifications, McGraw Hill publications*
2. *Mosley – Ground Improvement, 2nd edition, (2004).*

References

1. *Koerner, R. M (1994) – Designing with Geosynthetics – Prentice Hall, New Jersey*
2. *Jones C. J. F. P. (1985) – Earth Reinforcement and soil structures – Butterworths, London.*
3. *Xianthakos, Abreimson and Bruce - Ground Control and Improvement ,(1994).*

Vidya Jyothi Institute of Technology
(An Autonomous Institution)
(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)
Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

FINITE ELEMENT METHOD (PE2)

L	T	P/D	C
3	1	0	3

Course Objectives

- To explain the basic principles of finite element analysis procedure
- To define the theory and characteristics of finite elements that represent engineering structures
- To illustrate the meshing structure and the importance of meshing in the analysis
- To explain the model of complex geometry problems and solution techniques.

Course Outcome

Upon successful completion of this course students will be able to

- CO1: Explain plane stress-plane strain equations and develop displacement functions.
- CO2: Analyze one-dimensional problems using stiffness matrix.
- CO3: Examine the different elements based on continuity and compatibility.
- CO4: Illustrate quadrilateral elements using nodal points and shape functions.
- CO5: Determine displacements, strains and stresses for static loads.

UNIT – I

Introduction to Finite Element Method: Basic Equations in Elasticity Coordinate system – Natural, Global Coordinate System Coordinates. Stress – Strain equation – concept of plane stress – plane strain advantages and disadvantages of FEM. Element shapes – nodes – nodal degree of freedom— strain displacement relations.

UNIT – II

One dimensional problem: Bar element – Shape functions, stiffness matrix Strain displacement matrix formulation, FEA Beam elements – stiffness matrix – shape function – Analysis of continuous beams – stress strain relation.

UNIT – III

Two dimensional problem: FEA Two dimessional problem – CST – LST element – shape function – stress – strain Relation, Lagrangian – serendipity elements – Hermite polynomials – regular, Irregular 2 D & 3D – Element – shape functions.

UNIT – IV

Isoparametric formulation: Concepts of isoparametric elements for 2D analysis – 4 noded and 8 noded iso- parametric quadrilateral elements.

UNIT – V

Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

Textbook

1. *A first course in Finite Element Method by Daryl L. Logan, 5th Edition, Cengage Learning India Pvt. Ltd. 2011.*
2. *Introduction to finite Elements in Engineering by Tirupathi R. Chandrupatla, and Ashok D. Belegundu, Prentice Hall of India 4th revised, 2012.*

References

1. *Finite Element Aanalysis by P.Seshu, PHI Learning Private Limited , 2012.*
2. *Concepts and applications of Finite Element Analysis by Robert D. Cook et al., Wiley India Pvt. Ltd. 3rd edition , October 1988.*
3. *Applied Finite Element Analysis by G.Ramamurty, I.K.International Publishing House Pvt. Ltd 2010.*

GEOTECHNICAL ENGINEERING LAB

L	T	P/D	C
0	0	3	1

Course Objectives

To obtain index and engineering properties of locally available soils, and to understand the behavior of these soil under various loads.

Course Outcomes

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

- CO1: Demonstrate the engineering properties the soil.
- CO2: Illustrate the field bulk and dry density of cohesive and cohesion less soils.
- CO3: Classify the Coarse grained soils based on sieve analysis test & a grain size distribution curve.
- CO4: Compute the shear strength of cohesive and cohesion less soil.
- CO5: Determine the permeability of coarse grained soil and fine grained soil by constant head permeability test and falling head method.

List of Experiments

1. Atterberg's limits
2. Fileld density- core cutter and sand replacement method
3. Grain size analysis
4. Permeability of soil, constant head test.
5. Permeability of soil variable head test.
6. Compaction test
7. C.B.R test
8. Consolidation test
9. Unconfined compression test
10. Triaxial compression test
11. Direct shear test
12. Vane shear test.

Vidya Jyothi Institute of Technology
(An Autonomous Institution)
(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)
Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

FLUID MECHANICS & HYDRAULIC MACHINERY LAB

L	T	P/D	C
0	0	3	1

Course Objectives

- To identify the behavior of analytical models introduced in lecture to the actual behavior of real fluid flows.
- To explain the standard measurement techniques of fluid mechanics and their applications.
- To illustrate the students with the components and working principles of the Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines.
- To analyze the laboratory measurements and to document the results in an appropriate format.

Course Outcomes

Students who successfully complete this course will have demonstrated ability to:

- CO1: Describe the basic measurement techniques of fluid mechanics and its appropriate application.
- CO2: Interpret the results obtained in the laboratory for various experiments.
- CO3: Discover the practical working of Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines.
- CO4: Compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows and draw correct and sustainable conclusions.
- CO5: Write a technical laboratory report

List of experiments

1. Calibration of venture meter and Orifice meter
2. Determination of coefficient of discharge for a small orifice/mouthpiece by constant head method
3. Calibration of contracted rectangular notch and triangular notch
4. Determination of friction factor of a pipe
5. Determination of coefficient for minor losses.
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. Performance characteristics of a single stage /multi stage centrifugal pump.
12. Performance characteristics of a reciprocating pump

HIGHWAY ENGINEERING

L	T	P/D	C
3	1	0	3

Course objectives

- Ability to mathematically develop and interpret design standards for horizontal and vertical geometry and super elevation
- Familiarity with the design and modelling of roadways/highways
- To know the design of different types of pavement.

Course Outcomes

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

- CO1: Summarize the road developments in India from different periods.
- CO2: Apply the concept of geometric design in real time engineering.
- CO3: Make use of parameters related to traffic studies.
- CO4: Design & model the intersections with specific standards.
- CO5: Evaluate the different pavement design methods using IRC standards.

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 – Highway Project.

UNIT – II

Highway geometric design: 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 - Design of Horizontal Alignment - Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical alignment-Gradients- Vertical curves.

UNIT- III

Traffic engineering & regulations: Basic Parameters of Traffic-Volume, Speed and Density - Traffic Volume Studies - Data Collection and Presentation - Speed studies - Data Collection and Presentation - Origin & Destination studies, Parking Studies – On street& Off street Parking - Road Accidents - Causes and Preventive Measures - Accident Data Recording – Condition Diagram and Collision Diagrams -

Traffic Signs – Types and Specifications – Road Markings - Need for Road Markings-Types of Road Markings - Design of Traffic Signals – Webster Method.

UNIT- IV

Intersection design: Types of Intersections – Conflicts at Intersections – Requirements of At-Grade Intersections - Types of At-Grade Intersections: Channelized and Unchannelized Intersections – Traffic Islands - Types of Grade Separated Intersections - Rotary Intersection – Concept of Rotary – Design Factors of Rotary – Advantages and Limitations of Rotary Intersections.

UNIT -V

Pavement Design: Design of Pavements: Design of Flexible pavement by CBR method as per IRC 37-2012 and theory of empirical mechanistic method. Stresses in rigid pavement by westergards and IRC methods.

Text books

1. *Highway Engineering – S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000).*
2. *Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna Publications – 6th Edition – 1997.*

References

1. *Principles of Traffic and Highway Engineering – Garber & Hoel, Cengage Learning.*
2. *Principles and Practices of Highway Engineering – Dr.L.R.Kadiyali and Dr.N.BLal - Khanna Publications.(2005).*
3. *Highway Engineering-S.P. Bindra,Dhanpat Rai & sons-4th edition(1981).*

IS Codes

1.IRC 37-2012 : Tentative guidelines for design of flexible pavement
2 IRC 58-2011: Guidelines for design of plain jointed rigid pavements.

ESTIMATION & COSTING

L	T	P/D	C
3	1	0	3

Course Objectives

- To produce civil engineering students to have a strong foundation in the estimation of quantities required for roads and buildings
- To introduce the different methods of the estimation
- To explain the detailed procedure of contracts
- To familiarize with the knowledge of preparing bar bending schedules and valuation of buildings

Course Outcome

After completion of the course, student can be able to

- CO1: Summarize the basic principal and standard methods for working out quantities in estimating.
- CO2: Determine the earthwork estimate of buildings, roads and canals.
- CO3: Estimate the rate analysis of the various items of work.
- CO4: Understand the process of contracting for roads and buildings.
- CO5: Evaluate the valuation of buildings and provide practical knowledge of standard specifications of items of building construction.

UNIT – I

Introduction: General items of work in Building, Standard Unit Principles of working out quantities for detailed and abstract estimates – Approximate and Detailed Estimate of Buildings. principles of bar bending (introduction)

UNIT – II

Earthwork Estimation: Methods of estimation of buildings and roads.canals in cutting.

UNIT – III

Rate Analysis: Unit rate analysis for various items of building works.

UNIT – IV

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

UNIT – V

Valuation of buildings: Standard specifications for different items of building construction.

Textbooks

1. *Estimating and Costing by B.N. Dutta, UBS publishers, 27th edition 2016.*
2. *Estimating and Costing by G.S. Birdie, 6th edition-2014.*

Reference books

1. *Standard Schedule of rates and standard data book by public works departmet.*
2. *I. S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S.)*

PRESTRESSED CONCRETE STRUCTURES (PE3)

L	T	P/D	C
3	1	0	3

Course Objectives

To familiarize students with concepts of prestressing.

- To equip student with different systems and devices used in prestressing.
- To understand the different losses of prestress including short and long term losses
- To familiarize students with the analysis and design of prestressed concrete members under flexure, shear and torsion

Course Outcomes

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

- CO1: Classify the concepts, principles, types and methods of PSC structures.
- CO2: Evaluate the losses of PSC structures.
- CO3: Analysis and design of PSC slabs and beams using IS:1343 (2012).
- CO4: Explain transmission of prestressing force, end block analysis by different methods.
- CO5: Analyse the stress distribution of composite beams and asses the deflection of beams.Understand the different methods of prestressing.

UNIT – I

Introduction: Historic development- General principles of prestressing pretensioning and post tensioning- Advantages and limitations of Prestressed concrete- General principles of PSC- Classification and types of prestressing- Materials- high strength concrete and high tensile steel their characteristics.

Methods and Systems of pre stressing: Pretensioning and Post tensioning methodsand systems of prestressing like Hoyer system, MagnelBlaton system, Freyssinet system and Gifford- Udall System- Lee McCall system.

UNIT – II

Losses of Prestress: Loss of prestress in pretensioned and posttesnioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, relaxation of stress in steel, slip in anchorage, frictional losses.

UNIT – III

Flexure: Analysis of sections for flexure- beams prestressed with straight, concentric, eccentric, bent and parabolic tendons- stress diagrams- Elastic design of PSC slabs and beams of rectangular and I sections.

Shear: General Considerations- Principal tension and compression- Improving shear resistance of concrete by horizontal and vertical prestressing and by using inclined or parabolic cables- Analysis of rectangular and I beams for shear – Design of shear reinforcements- IS Code provisions**.**

UNIT – IV

Transfer of Prestress in Pretensioned Members : Transmission of prestressing force by bond – Transmission length – Flexural bond stresses – IS code provisions – Anchorage zone stresses in post tensioned members – stress distribution in End block – Analysis by Guyon, Magnel, Zienlinski and Rowe's methods – Anchorage zone reinforcement- IS Provisions

UNIT – V

Composite Beams: Different Types- Propped and Unpropped- stress distribution- Differential shrinkage- Analysis of composite beams- General design considerations.

Deflections: Importance of control of deflections- Factors influencing deflections – Short term deflections of uncracked beams- prediction of long time deflections- IS code requirements.

Text books

1. *Prestressed concrete by N. Krishna Raju, 5th Edition. Tata Mc Graw Hill Book Education–pvt.ltd,2010.*
2. *Prestressed Concrete by N. RajagopalanNarosa Publishing House,2014.*

References

1. *Design of prestress concrete structures by T.Y. Lin and Burn, John Wiley, New York,2010.*
2. *Prestressed concrete by S. RamamruthamDhanpat Rai & Sons, Delhi,2010.*

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)

Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

EARTHQUAKE ENGINEERING (PE3)

L	T	P/D	C
3	1	0	3

Course Objectives

- To introduce the concepts of seismic loading as a part of the design of buildings
- To introduce the aspects of the earthquake with the view of plate tectonics.
- To develop the understanding of earthquake and its causes through the theory of vibrations
- To develop the concept of sismic analysis of the building

Course Outcomes

Upon successful completion of yhis course students will be able to

- CO1: Quantify mechanical behaviour of earth's surface, seismic hazards and its effects.
- CO2: Identify, formulate and solves engineering problems subjected to dynamic loading conditions.
- CO3: Understand the internal parameters of the structures for seismic design source.
- CO4: Assess the design component or process to meet desired needs within realistic constraints.
- CO5: Analyze and design the members for earthquake resisting parameters.

UNIT – I

Engineering Seismology: Earthquake phenomenon cause of earthquakes – Faults – Plate tectonics – Seismic waves – Terms associated with earthquakes – Magnitude/Intensity of an earthquake – scales – Energy released – Earthquake measuring instruments – Seismoscope, Seismograph, accelerograph – strong ground motions – Seismic zones of India.

UNIT – II

Theory of Vibrations: Elements of a vibratory system – Degrees of Freedom – Continuous system – Lumped mass idealization – Oscillatory motion – Simple Harmonic Motion – Free vibration of single degree of freedom (SDOF) system – undamped and damped – critical damping – Logarithmic decrement – Forced vibrations – Harmonic excitation – Dynamic magnification factor – Excitation by rigid based translation for SDOF system – Earthquake ground motion.

UNIT – III

Conceptual design: Building configurations – Introduction – Functional planning – Continuous load path – Overall form – simplicity and symmetry – elongated shapes – stiffness and strength – Horizontal and Vertical members – Twisting of buildings – Ductility – definition – ductility relationships – flexible buildings – framing systems – choice of construction materials – unconfined concrete – confined concrete – masonry – reinforcing steel.

UNIT – IV

Introduction to earthquake resistant design: Seismic design requirements – regular and irregular configurations – basic assumptions – design earthquake loads – basic load combinations – permissible stresses – seismic methods of analysis – factors in seismic analysis – equivalent lateral force method.

UNIT – V

Seismic Analysis of structures: Principles of earthquake resistant design of RC members – Structural models for frame buildings – Equivalent static analysis of any typical structure.

Text Books

1. *Earthquake Resistant Design of structures – S. K. Duggal, Oxford University Press,(2007).*
2. *Earthquake Resistant Design of structures – Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd,(2006).*

References

1. *Seismic Design of Reinforced Concrete and Masonry Building – T. Paulay and M.J.N. Priestly, John Wiley & Sons (1994).*
2. *Eartquake Resistant Design of Buidling structures by Vinod Hosur, Wiley India Pvt. Ltd (1992).*

IS Codes

1. *IS: 1893 (Part-1) -2002. "Criteria for Earthquake Resistant – Design of structures." B.I.S., New Delhi.*
2. *IS:4326-1993, " Earthquake Resistant Design and Construction of Building", Code of Practice B.I.S., New Delhi.*
3. *IS:13920-1993, " Ductile detailing of concrete structures subjected to seismic force" – Guidelines, B.I.S., New Delhi.*

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)

Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

GREEN BUILDING TECHNOLOGIES (PE4)

L	T	P/D	C
3	1	0	3

Course Objectives

The purpose of this course is

- To have improved awareness among students on issues in areas of Green buildings and sustainability
- To have an insight into Green Building Assessment System
- To establish a clear understanding of the role and impact of various aspects of engineering and engineering decisions on environmental, societal, economic problems and its benefits

Course Outcomes

After successful completion of this course the students should able to

- CO1:Understand the Green building concept and focus on approaches that makes building sustainable.
- CO2: Illustrate Green building assessment and accreditation system.
- CO3: Able to apply low energy building strategies.
- CO4: Designing green building and improve sustainability of infrastructure.
- CO5: Classify the economic benefits of green buildings.

UNIT – I

Introduction: The shifting landscape of Green buildings, The driving forces for sustainable construction, Ethics and sustainability, Basic Concepts and Vocabulary, Major Environmental and resource concerns. International Building Assessment systems.

UNIT – II

The green building assessment system: Structure of the LEED suite of Building rating systems, LEED Credentials, LEED Building Design and construction Rating system, Green Globes Building Rating Tools, Structure of Green Globes for New Construction, Green Globes Assessment and Certification Process, Green Globes Professional Credentials, IGBC Building desingn, Rating system and Professional crentials

UNIT – III

Green building design: Conventional versus Green Building Systems, green materials, material selection criteria, Executing the Green Building Project, Integrated Design Process, Role of the charrette in the design process, Green Building Documentation Requirements.

UNIT – IV

Low – energy building strategies: Building Energy Issues, High – Performance Building Energy Design Strategy, Passive Design Strategy, Building Envelope, Internal Load Reduction, Smart Buildings and Energy Management Systems.

UNIT – V

Green building economics and sustainable construction: General approach, The Business Case for High – Performance Green Buildings, Economics of Green Building, Quantifying Green Building Benefits, Articulating Performance Goals for Future Green Buildings

Text books

1. *Sustainable Construction by CHARLES J. KIBERT published by John Wiley& sons,2016*

2. *Sustainable Construction: Green Building Design and Delivery- 9 Nov 2007 by Charles J. Kibert*

References

1. *IGBC Referece manual 2016*

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)

Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

RAILWAYS, AIRPORTS AND HARBORS ENGINEERING (PE4)

L	T	P/D	C
3	1	0	3

Course Objectives

- To explain various components and their functions in a railway, airport and harbors as a transportation system
- To explain the design parameters for Railway, airport and Harbors
- To explain the planning and maintenance criteria for railways , airports and harbors
- To explain the working of intelligent transportation system.

Course Outcomes

Upon successful completion of this course students will be able to

- CO1: Define and understand the various components of railways.
- CO2: Understand and solve the geometric elements needed for the design of permanent way.
- CO3: Define, understand, and design the various components of the airport.
- CO4: Define, understand the planning and requirements of a harbor.
- CO5: Improve and Visualize the working of intelligent transportation system.

UNIT – I

Introduction to railway : Permanent way components – Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast, Gauge –Creep of Rails- Theories related to Creep – Sleeper density.

UNIT – II

Geometric design of railway track: Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve, Points and Crossing, Rail Joints & Welding of Joints, Railway station& Yards, Signalizing & interlocking.

UNIT – III

Airport engineering:Airport Site selection – Runway Orientation – Basic, Runway Length – Corrections for Elevation – Airport Classification - Runway Geometric design concepts – Factors Controlling Taxiway Layout - Terminal Area – Apron – Hangar – Blast Considerations, Typical Airport Layouts – Wind rose diagram - Runway Lightening system & Marking.

UNIT – IV

Port and harbor engineering: Requirements of Port and Harbour, Classification of Port & Harbour, Features of a Harbour, Planning of Harbour, Breakwaters, Dry docks, Jetties, Aprons, Transit shed and Warehouses, Navigational aids.

UNIT –V

Intelligent transport systems:ITS Definition, Benefits of ITS, user services, Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Introduction to ITS applications, ITS architecture components and standards, Overview of ITS implementations in developed countries.

Textbooks

1. *A Text book of Transportation Engineering – S.P.Chandola – S.Chand & Co. Ltd. – (2001).*
2. *. Highway, railway, Airport and Harbour Engineering – K.P. Subramanian December 2010*
3. *Transportation Engineering and Planning – C.S. Papacostas, P.D.Prevedouros, 3rd edition 2000.*

References

1. *A Text Book of Railway Engineering-S.C.Saxena and S.Arora, Dhanpatrai and Sons, New Delhi. 7th Edition 2013.*
2. *Harbour, Dock and Tunnel Engineering – R. Srinivasan 28th Edition : 2016*
3. *Traffic engineering and transport planning –Dr.L.R.Kadiyali,khanna publishers-2012.*
4. *Intelligent Transport System in smart cities - Rodolfo I.Meneguette, Robson E.De Grande(Springer)*

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)

Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

ADVANCED STRUCTURAL DESIGN (PE4)

L	T	P/D	C
3	1	0	3

Course Objectives

- To introduce the students, design procedure of raft foundations and retaining walls
- To equip students with the concept of design of different types of RCC water tanks
- To introduce the concepts of flat slabs
- To explain the different types of Bunkers, Silos and Chimneys

Course Outcome

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

- CO1: Analyze and design of cantilever retaining wall.
- CO2: Apply the provision of IS : 3370-2009 to design water tank.
- CO3: Apply the provision of IS 456-2000 for designing flat slab.
- CO4: Adapt the provision of IRC 21-1987 to class AA loading to design T beam girder.
- CO5: Summarize the force components and design principles of RCC Chimney.

UNIT – I

Design of Retaining walls: Types of retaining walls, forces on cantilever retaining wall, stability conditions of a cantilever retaining wall, proportioning of cantilever retaining wall, Introduction to counter fort retaining wall

UNIT – II

Design of water tank: Design philosophy and requirements, I.S code recommendations regarding, Detailing in water tank, Design of circular water tank resting on ground (approximate method),I.S code method for design of circular tank, Design of elevated tank with staging

UNIT – III

Design of flat slab: Introduction terminology related with flat slab construction, I.S code provision for flat slab, Analysis and design of flat slab, Shear in flat slab, openings in flat slab

UNIT – IV

Design of concrete bridges: IRC loading, Design of R.C slab culvert, Design of T-beam Girder Bridge

UNIT – V

Chimneys: Different components of Chimney, Design of RCC chimney

Textbooks

1. *Advanced reinforced concrete structures by Varghese, pranties hall of indiapvt ltd, 2005.*
2. *Advanced reinforced concrete structures by Krishna Raju., December 2010.*

References

1. *Reinforced concrete strctueres vol II by B.C. Punmiah, Ashok Kumar Jain and arun Kumar Jain, lakshmi publications Pvt. Ltd, New Delhi, December 2005.*
2. *Essentials of bridge engineering by D.John son Victor, oxford and IBM publication co pvt ltd 6th, 2007*

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)

Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

GROUND WATER HYDROLOGY (PE4)

L	T	P/D	C
3	1	0	3

Course objectives

- To comprehend basic concepts of the water cycle and hydrology
- To be able to perform engineering hydrology computations
- To enable the students to know the ground water occurrence

Course outcomes

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

- CO1: Understand different types of aquifers and their characteristics
- CO2: Analysis the pumping test data for different aquifers
- CO3: Distinguish the surface and subsurface investigation methods of ground water.
- CO4: Discuss the methods of artificial recharging of ground water.
- CO5: Evaluation and control of saline water intrusion.

UNIT - I

Ground Water Occurrence: Ground water hydrologic cycle, origin of ground water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention. Ground Water Movement: Permeability, Darcy's law, storage coefficient. Transmissivity, differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinate system.

UNIT - II

Ground water flow contours their applications: Analysis of Pumping Test Data – I: Steady flow groundwater flow towards a well in confined and unconfined aquifers – Dupit's and Theism's equations, Assumptions, Formation constants, yield of an open well interface and well tests.

UNIT - III

Unsteady flow analysis: Pumping Test Data – II: Unsteady flow towards a well – Non equilibrium

Equations – Thesis solution – Jocob and Chow's simplifications, Leak aquifers. Surface and Subsurface Investigation: Surface methods of exploration – Electrical resistivity and Seismic Refraction methods. Subsurface methods – Geophysical logging and resistivity logging. Aerial Photogrammetry applications along with Case Studies in Subsurface Investigation.

UNIT - IV

Artificial Recharge of Ground Water: Concept of artificial recharge – recharge methods, Relative merits, Applications of GIS and Remote Sensing in Artificial Recharge of Ground Water along with Case studies.

UNIT - V

Saline Water Intrusion in aquifer: Occurrence of saline water intrusions, Ghyben- Herzberg Relation, Shape of interface, control of seawater intrusion. Groundwater Basin Management: Concepts of conjunction use, Case studies.

Text books:

1. Ground water Hydrology by David Keith Todd, John Wiley & Son, New York 2004.

2. Groundwater by H.M.Raghunath, Wiley Eastern Ltd.(1983)

References:

1. Groundwater by Bawvwr, John Wiley & sons.

2. Groundwater System Planning & Management – R.Willes & W.W.G.Yeh, Printice Hall (1987)

CONCRETE & HIGHWAY MATERIALS LAB

L T P/D C

0 0 3 1

Course Outcomes

- CO1: Examine the experimental strength of aggregate materials as per codal provisions.
- CO2: Illustrate the stability & properties of bituminous materials & mixes by conducting tests.
- CO3: Determine the properties of cement by conducting the test.
- CO4: Define the workability of fresh concrete by conducting tests.
- CO5: Estimate the strength of hardened concrete by conducting destructive and non destructive testing.

LIST OF EXPERIMENTS

I. Road Aggregates

1. Aggregate Crushing Value.
2. Aggregate Impact Test.
3. Specific Gravity And Water Absorption.
4. Attrition Test.
5. Abrasion Test.
6. Shape Test.

II. Bituminous Materials

1.Penetration Test.
2.Ductility Test.
3.Softening Point.
4.Flash And Fire Point.

III. Cement and concrete

Tests on cements

1. Fineness of cement.
2. Normal Consistency of cement
3. Initial And Final Setting Time of cement.
4. Specific Gravity and Soundness of cement.
5. Compressive Strength of cement.

Tests On Concrete

6. Workability Test on Concrete By Compaction Factor , Slump cone and Vee- Bee.
7. Compressive Strength and Young's Modulus of Concrete.
8. Bulking of Sand.
9. Non Destructive Testing on Concrete (For Demonstration).

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)

Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

COMPUTATIONAL LAB

L	T	P/D	C
0	0	3	1

Course Outcomes

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

- CO1: Encalcate with the usage of recent softwares and its applications in the field of civil engineering
- CO2: Analysing the Beam and Slab using Staad Pro software.
- CO3: Assess the frame using the STAAD Pro.
- CO4: Model & demonstrating the slope of the soil source using GeoStudio.
- CO5: Analysis the settlement of footing and pile using GeoStudio.

List of Experiments

1. Introduction and practice of the basic functions use in the Python computing
2. To develop the programme for Bending moment, Shear force and Deflection at incremental segments of simply supported beam subjected to eccentric point load and UDL throughout the span.
3. Demonstration and explanation on basic commands used in Staad.pro
4. Analyse of Continuous beam using Staad.pro
5. Analyse of slab using Staad.pro
6. Analyse of 2D frame using Staad.pro
7. Analyse of space frame using Staad.pro
8. Demonstration of administrator settings of GeoStudio
9. Analysis of slope stability with homogeneous and stratified soil condition.
10. Stability of slope with retaining wall
11. Settlement analysis of spread footing
12. Analysis of single pile settlement

List of Software Required

1. Staad.pro - Licenced version.
2. Geostudio - Educational version.
3. Python – Open resource.

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)

Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

INDUSTRIAL ORIENTED MINI PROJECT
(Summer Vacation between III- II and IV-I)

L	T	P/D	C
0	0	5	3

Course Objectives

To make the student

- Develop skills to identify ,define and solve a problem
- Communicate effectively in both oral and written forms for preparing and presenting reports.
- Work individually and in teams effectively and cohesively.
- Correlate the project in lifelong activity
- Understand ethical principles and commit to professional ethics.

Course Outcomes

The student will be able to

- CO1: Interpret the literature and develop solutions for framing problem statement.
- CO2: Select software techniques for identifying problems.
- CO3: Analysis and test the modules of planned project.
- CO4: Design technical report and deliver presentations.
- CO5: Apply engineering and management principles to achieve project goals.

Content

There shall be an industry-oriented Mini-Project, in collaboration with an industry of department specific specialization, to be taken up during the summer vacation after III year II Semester examination. However, the mini-project and its report shall be evaluated along with the project work in IV year I Semester. The industry oriented mini-project shall be submitted in a report form and presented before the committee. The committee consists of an external examiner, Head of the Department, the Supervisor of the Mini-project and a Senior Faculty member of the department. There shall be no internal marks for industry oriented mini-project.

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)

Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

REHABILITATION AND RETROFITTING OF STRUCTURES

L	T	P/D	C
3	1	0	3

Course Objectives

- To Identify the causes of deterioration in structures and suggest suitable remedial measures.
- To understand the types of damages and their mechanisms.
- To learn to inspect and assess the structures using techniques of visual inspection and NDT.
- To identify the latest health monitoring and building instrumentation methods.

Course *Outcomes*

Upon successful completion of yhis course students will be able to

- CO1: Understand the causes and prevention of deterioration in structures.
- CO2: Identify the types of damages and the mechanisms of corrosion in steel reinforcement and fire induced damages.
- CO3: Examine to inspect and assess the structures using techniques of visual inspection and NDT.
- CO4: Estimate the structural damage and recommend suitable repair and strengthening methods.
- CO5: Apply the latest health monitoring and building instrumentation methods.

UNIT – I

Maintenance And Repair Strategies: Maintenance, Repair And Rehabilitation – Facts Of Maintenance – Importance Of Maintenance – Various Aspects Of Inspection – Assessment Procedure For Evaluating a Damaged Structure – Causes Of Deterioration.

UNIT – II

Strength And Durability Of Concrete: Quality Assurance For Concrete – Strength, Durability And Thermal Properties, Of Concrete – Cracks, Different Types, Causes – Effects Due To Climate, Temperature, Sustained Elevated Temperature, Corrosion – Effects Of Cover Thickness.

UNIT – III

Special concretes: Sulphur Infiltrated Concrete, Fibre Reinforced Concrete, High Strength Concrete, High Performance Concrete, Vacuum Concrete, Self Compacting Concrete, Geopolymer Concrete, Reactive Powder Concrete, Concrete Made With Industrial Wastes.

UNIT – IV

Techniques For Repair And Protection Methods: Non-Destructive Testing Techniques, Epoxy Injection, Shoring, Underpinning, Corrosion Protection Techniques – Corrosion Inhibitors, Corrosion Resistant Steels, Coatings To Reinforcement, Cathodic Protection.

UNIT – V

Techniques For Retrofitting of structures: Strengthening Of Structural Elements, Repair of Structures Distressed Due To Corrosion, Fire, Leakage, Earthquake – demolition techniques – Engineered Demolition Methods.

Textbooks

1. *Maintenance and repair of civil structures. B.L. Gupta and Amit Gupta, Standard publications.2009.*
2. *Concrete Technology by A.R. Santa Kumar, Oxford university Press, New Delhi,2006.*

References

1. *Non destructive Evaluation of concrete structures by Bungey – surrey university press,1989.*
2. *Concrete repair and maintenance illustrated, RS Means company inc W.H. Ranso (1981).*

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)

Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

REMOTE SENSING & GIS

L	T	P/D	C
3	1	0	3

Course Objectives

- To understand the principles, applications, trends, and pertinent issues of geographical information systems and sciences, including remote sensing (RS), Photogrammetry, cartography, and global positioning systems (GPS).
- To develop technical skills and competence in data and information acquisition, extraction, management and analysis, spatial and statistical modelling, mapping and visualization.
- To increase awareness of GIS and modelling tools for improving competition and business potential.
- To describe how geographical information is used, managed, and marketed globally.

Course Outcomes

After successful completion of this course the students should able to

- CO1: Understand the concepts of Photogrammetry and compute the heights of the objects using parallax.
- CO2: Understand the principles of aerial Photogrammetry and remote sensing, Able to comprehend the energy interactions with earth surface features, spectral properties of water bodies.
- CO3: Analyze the basic concept of GIS and its applications, able to work with GIS software in various application fields.
- CO4: Illustrate spatial and non-spatial data features in GIS and understand the map projections and coordinate systems.
- CO5: Understand the application of vector and raster data structure to the real world, the importance of source map and learning the on-screen digitization.

UNIT – I

EMR and its interaction with atmosphere & Earth : Definition of remote sensing and its components – Electromagnetic spectrum – wavelength regions important to remote sensing – Wave theory, Particle theory, Stefan – Boltzman and Wein‟s Displacement Law – Atmospheric scattering, absorption – Atmospheric windows – spectral signature concepts – typical spectral reflective characteristics of water, vegetation and soil.

UNIT – II

Platforms and sensors: Types of platforms – orbit types, Sun-synchronous and Geosynchronous – Passive and Active sensors – resolution concept – Pay load description of important Earth Resources and Meteorological satellites – Airborne and spaceborne TIR and microwave sensors.

UNIT – III

Image interpretation and analysis: Types of Data Products – types of image interpretation – basic elements of image interpretation – visual interpretation keys – Digital Image Processing – Pre-processing – image enhancement techniques – multispectral image classification – Supervised and unsupervised.

UNIT – IV

Geographic information system: Introduction – Maps – Definitions – Map projections – types of map projections – map analysis – GIS definition – basic components of GIS – standard GIS softwares – Data type – Spatial and non-spatial (attribute) data – measurement scales – Data Base Management Systems (DBMS).

UNIT – V

Data entry, storage and analysis: Data models – vector and raster data – data compression – data input by digitization and scanning – attribute data analysis – integrated data analysis – Modeling in GIS Highway alignment studies – Land Information System.

Text books

1. *Lillesand,T.M., Kiefer, R.W. and J.W.Chipman. "Remote Sensing and Image Interpretation" 5th Edition., John Willey and Sons Asia Pvt. Ltd., New Delhi, 2004.*
2. *Anji Reddy, M. "Textbook of Remote Sensing and Geographical Information System" 2nd edition. BS Publications, Hyderabad, 2001.*

References

1. *Lo. C.P.andA.K.W.Yeung, "Concepts and Techniques of Geographic Information Systems",Prentice Hall of India Pvt. Ltd., New Delhi, 2002*
2. *Peter A.Burrough, Rachael A. McDonnell, " Principles of GIS", Oxford University Press, 2000*

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)

Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

TECHNICAL SEMINAR

L	T	P/D	C
0	0	2	2

Course Objectives

The student will be able to

- Develop skills in doing literature survey
- Understand and present current research topics
- Understand technical report writing
- Develop time management skills
- Communicate the technical topic effectively

Course Outcomes

The student will be able to

- CO1: Demonstrate the skills in identifying, analysing, and presenting a research topic.
- CO2: Demonstrate the quality of knowledge gained from the literature survey on recent technologies.
- CO3: Demonstrate the skills developed to communicate effectively on engineering activities with the engineering community.
- CO4: Demonstrate ability to effectively manage time in presentation skills.
- CO5: Design a technical report with the principal of ethics.

Content

There shall be a seminar presentation in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding of the topic, and submit it to the department. It shall be evaluated by the departmental committee consisting of the Head of the Department, Seminar Supervisor and a Senior Faculty member.

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)

Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

COMPREHENSIVE VIVA VOCE

L	T	P/D	C
0	0	0	2

Course Objectives

- To assess the understanding of the basic principles and methods of various courses..
- To assess the communication, presentation skills developed during their course of study.
- To estimate the quality of skills developed to be employable

Course Outcomes

The student will be able to

- CO1: Explain comprehensively to answer questions from all the courses.
- CO2: Test Oral Presentation skills by answering questions in a precise and concise manner.
- CO3: Build confidence and interpersonal skills.
- CO4: Support the students to face interview both in the academic and the industrial sector.
- CO5: Improve placements and better performers in their future.

Content

The Comprehensive Viva-Voce will be conducted by a Committee consisting of Head of the Department and two Senior Faculty members of the Department. The Comprehensive VivaVoce is intended to assess the students understanding of the courses he studied during the B. Tech. course of study. There are no internal marks for the Comprehensive Viva-Voce.

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)

Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

MAJOR PROJECT

L	T	P/D	C
0	0	20	10

Course Objectives

To make the student

- Identify, define and solve a problem
- Communicate effectively in both oral and written forms for preparing and presenting reports.
- Develop skills to work as an individual and in teams effectively
- Correlate the project in lifelong activity
- Understand ethical principles and commit to professional ethics.

Course Outcomes

The student will be able to

- CO1: Identity, Analyse and apply suitable current techniques and tools to solve a problem in the civil engineering domain and societal issues.
- CO2: Function effectively in teams to accomplish a common goal.
- CO3: Organise the technical report writing and communication effectively.
- CO4: Extend in lifelong activity.
- CO5: Define and analyse a problem to assess health, safety and legal issues.

Content

The End Semester Examination of the project work shall commence from IV-I conducted by the same committee as appointed for the industry-oriented mini-project. In addition, the Project Supervisor shall also be included in the committee. The topics for industry oriented mini project, seminar and project work shall be different from one another. The evaluation of project work shall be made at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of the project.

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC, Approved By A.I.C.T.E., New Delhi, Permanently Affiliated to JNTU, Hyderabad)(Aziz Nagar, C.B.Post, Hyderabad -500075)

Open Electives for other branches (other than Civil Engineering students)

ELEMENTS OF CIVIL ENGINEERING (OE1)

L	T	P/D	C
3	0	0	3

Course objectives

- To study types of different building materials and its testing
- To understand the soil and its significance in construction techniques as an engineering material
- To study various surveying techniques
- To study the concept of strength characteristics of the building

Course Outcome

Upon successful completion of this corse the students will be able to understand

- CO1: Understand Geological properties and Geotechnical aspect of civil engineering.
- CO2: Plan the concept of different building byelaws and planning principles.
- CO3: Analyse the concept of stress-strain and to identify the properties of the fluid changes treatment process.
- CO4: Apply modern tools of surveying and understand basic concepts of concrete.
- CO5: Evaluate the principles of highway geometric designs and types of pavements as per IRC standards. .

UNIT – I

Basics of Geotechnical engineering and engineering geology: Engineering Geology: Geology - branches of geology - weathering of rocks - mineralogy – definition - importance of study of minerals - classification of minerals - petrology- geological classification of rocks.

Geotechnical engineering: Soil formation- Soil structure - types of soils and its properties-clay mineralogy and its significance.

UNIT – II

Building materials, building components: Stones – Classification, quarrying and methods of quarrying. Bricks – Components of Brick earth. Building Components – Lintels, arches, walls, staircase, floor and roofs, doors and windows, DPC, Building planning and building byelaws

UNIT – III

Strength of materials and fluid mechanics

Strength of materials: Types of stresses and strains- hook's law- definition of the beam - types of beams– types of loads, concept of bending moment and shear for with simply supported beam. **Fluid mechanics:**Dimensions and units - physical properties of fluids – specific gravity - surface tension – viscosity - vapor pressure.

UNIT – IV

Concrete technology and surveying

Cement: Chemical composition- aggregates – classification of aggregates. **Admixtures:** Types of admixtures- water cement ratio.**Surveying:**Definition of surveying – principle- types of surveying- objectives and classification –advanced surveying – GIS-GPS.

UNIT – V

Transportation engineering: Highway Development in India – Necessity for Highway Planning- Different Road Development Plans; Classification of Roads - Road Network Patterns, Super elevation Types of Intersections – Introduction to flexible & rigid pavements – advantages – limitations. Parking studies- road accidents and preventive measures- traffic signs- road markings.

Textbooks

1. *Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd.,10th ed. 2008*
2. *Geotechnical Engineering, (3rd edition) by Venkataramiah, C., New Age International Pvt . Ltd, 2010.*
3. *Engineering Geology by N.Chennakesavulu, Mc-Millan, India Ltd. 2005*
4. *Strength of Materials by S.S.Bhavikatti, Vikas Publishing House Pvt. Ltd.2008*
5. *Text book of surveying by C.Venkataramaiah, Universities Press 2006*
6. *Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi 5th ed 2004.*
7. *Principles and Practices of Highway Engineering – Dr.L.R.Kadiyali and Dr.N.BLal - Khanna Publications.(2005).*

References

1. *Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi 2006*
2. *Highway Engineering – S.K.Khanna&C.E.G.Justo, Nemchand& Bros., 7th edition (2000).*
3. *Basic and Applied Soil Mechanics by Gopal Ranjan& ASR Rao, New age International Pvt . Ltd, New Delhi: ,third edition (2016)*
4. *Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard book house. 3rd ed. 2009.*

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC, Approved By A.I.C.T.E., New Delhi, Permanently Affiliated to JNTU, Hyderabad)(Aziz Nagar, C.B.Post, Hyderabad -500075)

SMART CITY (OE1)

L	T	P/D	C
3	0	0	3

Course Objectives

- To make students aware of Smart Cities and its pressing needs and on the greatest opportunities to improve lives
- To focus range of approaches to make the city sustainable

Course Outcomes

After successful completion of this course the students should able to

- CO1: Understand the necessity of smart infrastructure and to promote cities that provide quality of life to citizens.
- CO2: Explain technology-based solution on smart mobility.
- CO3: Illustrate & introduce the smart and sustainable waste and water management for smart cities.
- CO4: Evaluate economical models for smart infrastructure solution.
- CO5: Create healthy and waste ridden environment.

UNIT – I

Introduction: Smart city, Need for smart city, Potential locations, Physical infrastructure, Social infrastructure, Smart City Characteristics, Ward Plan.

UNIT – II

Smart Mobility: Roads, Vehicles, Public Transport and Modal Split, Smart Electricity Supply, Smart Housing – Green Building.Connected Homes: IT – enabled living and working.

UNIT – III

Smart Water Management: Smart Sanitation- On-Site Sewage Treatment, Smart Solid Waste Management - Municipal Wet Waste Disposal.

UNIT – IV

Zero Pollution: Zero Water Pollution, Zero Air Pollution, Zero Soil Pollution, Zero Noise Pollution.

UNIT – V

Smart City Investment and Economics: Land, Power, Water, and Highway and Road/ Rail Connectivity, Fuel Pipe Lines – Case study

Text books

1. *Smart City by ArunFirodiaVishweshPavnaskar Foreword by Dr. Narayana Murthy, 2016.*
2. *Smart and Human building cities of wisdom by G. R. K Reddy and Srijan Pal Singh, 2015.*

GREEN BUILDING TECHNOLOGIES (OE2)

L	T	P/D	C
3	0	0	3

Course Objectives

The purpose of this course is

- To have improved awareness among students on issues in areas of Green buildings and sustainability
- To have an insight into Green Building Assessment System
- To establish a clear understanding of the role and impact of various aspects of engineering and engineering decisions on environmental, societal, economic problems and its benefits

Course Outcomes

After successful completion of this course the students should able to

- CO1:Understand the Green building concept and focus on approaches that makes building sustainable.
- CO2: Illustrate Green building assessment and accreditation system.
- CO3: Able to apply low energy building strategies.
- CO4: Designing green building and improve sustainability of infrastructure.
- CO5: Classify the economic benefits of green buildings.

UNIT – I

Introduction: The shifting landscape of Green buildings, The driving forces for sustainable construction, Ethics and sustainability, Basic Concepts and Vocabulary, Major Environmental and resource concerns. International Building Assessment systems.

UNIT – II

The green building assessment system: Structure of the LEED suite of Building rating systems, LEED Credentials, LEED Building Design and construction Rating system, Green Globes Building Rating Tools, Structure of Green Globes for New Construction, Green Globes Assessment and Certification Process, Green Globes Professional Credentials, IGBC Building desingn, Rating system and Professional crentials

UNIT – III

Green building design: Conventional versus Green Building Systems, green materials, material selection criteria, Executing the Green Building Project, Integrated Design Process, Role of the charrette in the design process, Green Building Documentation Requirements.

UNIT – IV

Low – energy building strategies: Building Energy Issues, High – Performance Building Energy Design Strategy, Passive Design Strategy, Building Envelope, Internal Load Reduction, Smart Buildings and Energy Management Systems.

UNIT – V

Green building economics and sustainable construction: General approach, The Business Case for High – Performance Green Buildings, Economics of Green Building, Quantifying Green Building Benefits, Articulating Performance Goals for Future Green Buildings

Text books

1. *Sustainable Construction by CHARLES J. KIBERT published by John Wiley& sons,2016*
2. *Sustainable Construction: Green Building Design and Delivery- 9 Nov 2007 by Charles J. Kibert*

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC, Approved By A.I.C.T.E., New Delhi, Permanently Affiliated to JNTU, Hyderabad)(Aziz Nagar, C.B.Post, Hyderabad -500075)

ENVIRONMENTAL POLLUTION AND CONTROL METHODS (OE2)

L	T	P/D	C
3	0	0	3

Course Objectives

- To assess air pollution: sources and effects
- To assess sources and classification of water pollutants
- To assess sources of soil contamination

Course Outcome

After learning this course the students will have

- CO1: Understanding about the various air pollutants and effect on environment.
- CO2: Analyze quality of air in the form of air quality index and dispersion modeling.
- CO3: Determine sampling and measurements of air Pollutants.
- CO4: Analysis and measurement of soil contamination.
- CO5: Predict types of noise and problems arise due to noise pollution.

UNIT – I

Introduction to air pollution: Air and its composition, Air Pollution, Sources of air pollution and its classification, Major air Pollutants and their characteristics, Specific group pollutants such as CFC, GHG etc. Air Pollutants from various industrial sectors.Impact of air pollution on human health and vegetation.

UNIT – II

Pollutant dispersion: Concept of atmospheric stability. Adiabatic and Environmental Lapse rate, Plume behaviour, Effect of topography, terrain and structure on Pollutant dispersion, Effect of wind on Pollutant dispersion, Concept of maximum mixing depth and ventilation coefficient, Plume rise and Effective stack height.

UNIT – III

Air quality: Introduction to Air quality index and Comprehensive Environmental Pollution Index etc. and its application, Sampling and measurement of air pollutants, Introduction to National Ambient Air Quality Standards.

Impacts of Air Pollution: Extreme air Pollution scenarios: Acid Rain, Global Warming, Smog, Ozone layer depletion etc. Various treaties and protocols: Kyoto Protocol and Montreal Protocol etc.

UNIT – IV

Soil pollution : Soil contamination by chemical pollutants, sources, Remediation by plants, bioremediation by microorganisms, contamination by inorganic (including heavy metals) and organic pollutants, factors affecting uptake of contaminants, prevention and elimination of contamination, landfills. Effects of atmospheric deposition on various types of soils, cation exchange capacity (CEC) of soils.

UNIT – V

Introduction to noise: Difference between sound and noise, Pitch and Frequency, Sound Pressure, Sound Pressure level (Decibel), Leq, and sources of noise and harmful effects of noise, noise measurement and noise control measures.

Text Books

1. *Environmental Pollution Control and Engineering, Rao C.S., New Age International (P) Limited, 1st Ed., 1991.*
2. *Air Pollution, Perkin, H.G. McGraw Hill 1974.*
3. *De A.K. (1990) Environmental Chemistry, Wiley Eastern Ltd.*

References

1.Manahan S.E. (2000) Fundamentals of Environmental Chemistry, CRC Press.

2.Air Pollution: Measurement, Modeling and Mitigation, A Tiwari and J Colls, Taylor & Francis, 2010

3.Sources and Control of Air Pollution, R J Heinsohn and R L Kabel, Prentice Hall, 1999

4. *Air Pollution Control Equipment Calulations, L Theodore, John Wiley and Sons, 2008*

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC, Approved By A.I.C.T.E., New Delhi, Permanently Affiliated to JNTU, Hyderabad)(Aziz Nagar, C.B.Post, Hyderabad -500075)

REMOTE SENSING AND GIS (OE3)

L	T	P/D	C
3	0	0	3

Course Objectives

- To understand the principles, applications, trends, and pertinent issues of geographical information systems and sciences, including remote sensing (RS), Photogrammetry, cartography, and global positioning systems (GPS).
- To develop technical skills and competence in data and information acquisition, extraction, management and analysis, spatial and statistical modelling, mapping and visualization.
- To increase awareness of GIS and modelling tools for improving competition and business potential.
- To describe how geographical information is used, managed, and marketed globally.

Course Outcomes

After successful completion of this course the students should able to

- CO1: Select the type of remote sensing technique / data for required purpose.
- CO2: Identify the earth surface features from satellite images.
- CO3: Analyse the energy interactions in the atmosphere and earth surface features.
- CO4: Prepare thematic maps.
- CO5: Interpretations of satellite data for various applications.

UNIT – I

EMR and its interaction with atmosphere & Earth : Definition of remote sensing and its components – Electromagnetic spectrum – wavelength regions important to remote sensing – Wave theory, Particle theory, Stefan – Boltzman and Wein‟s Displacement Law – Atmospheric scattering, absorption – Atmospheric windows – spectral signature concepts – typical spectral reflective characteristics of water, vegetation and soil.

UNIT – II

Platforms and sensors: Types of platforms – orbit types, Sun-synchronous and Geosynchronous – Passive and Active sensors – resolution concept – Pay load description of important Earth Resources and Meteorological satellites – Airborne and spaceborne TIR and microwave sensors.

UNIT – III

Image interpretation and analysis: Types of Data Products – types of image interpretation – basic elements of image interpretation – visual interpretation keys – Digital Image Processing – Pre-processing – image enhancement techniques – multispectral image classification – Supervised and unsupervised.

UNIT – IV

Geographic information system: Introduction – Maps – Definitions – Map projections – types of map projections – map analysis – GIS definition – basic components of GIS – standard GIS softwares – Data type – Spatial and non-spatial (attribute) data – measurement scales – Data Base Management Systems (DBMS).

UNIT – V

Data entry, storage and analysis: Data models – vector and raster data – data compression – data input by digitization and scanning – attribute data analysis – integrated data analysis – Modeling in GIS Highway alignment studies – Land Information System.

Text books

1. *Lillesand,T.M., Kiefer, R.W. and J.W.Chipman. "Remote Sensing and Image Interpretation" 5th Edition., John Willey and Sons Asia Pvt. Ltd., New Delhi, 2004.*
2. *Anji Reddy, M. "Textbook of Remote Sensing and Geographical Information System" 2nd edition. BS Publications, Hyderabad, 2001.*

References

1. *Lo. C.P.andA.K.W.Yeung, "Concepts and Techniques of Geographic Information Systems",Prentice Hall of India Pvt. Ltd., New Delhi, 2002*
2. *Peter A.Burrough, Rachael A. McDonnell, " Principles of GIS", Oxford University Press, 2000*
3. *Ian Heywood "An Introduction to GIS", Pearson Education Asia, 2000*

Vidya Jyothi Institute of Technology

(An Autonomous Institution)

(Accredited by NAAC, Approved By A.I.C.T.E., New Delhi, Permanently Affiliated to JNTU, Hyderabad)(Aziz Nagar, C.B.Post, Hyderabad -500075)

INTRODUCTION TO EARTHQUAKE ENGINEERING (OE3)

L	T	P/D	C
3	0	0	3

Course Objectives

- To introduce the basic knowledge on earthquake engineering
- To introduce the aspects of the earthquake with the view of plate tectonics
- To develop the understanding of earthquake and its causes through the theory of vibrations
- The course introduces the source mechanics of earthquake, hazards and its consequences and also covers earthquake measurement and instrumentation

Course Outcomes

Upon successful completion of this course students will be able to

- CO1: Understand the Interior Earth' surface, fault attenuation, different wave propagation in Earthquake events.
- CO2: Classify different earthquake hazards and its effects.
- CO3: Examine the mechanical behavior of earth surface and its significance.
- CO4: Evaluate the quantification of Hazard effects - approach methods.
- CO5: Predict the vibration motion and how it influences the earth's surface.

UNIT – I

Introduction to Earthquake: Interior of Earth– Big bang theory, Earthquakes phenomenon cause of earthquakes, Nature and Occurrence of earthquakes– effects of earthquakes, Consequences of Earthquake damage– Terms associated with earthquakes.

UNIT – II

Earthquake and Ground Motion: Strong Ground Motion -Stress, Strain, & Seismic Waves Faults-Plate tectonics – Different plate theories, Tectonic plates, fault types, Response of Structure to Earthquake Motion, Earthquake classification, Measurements of earthquakes – Magnitude/Intensity of earthquake-scales.

UNIT – III

Engineering Seismology: Fundamentals of wave motion – seismic wave types. Stress tensor, strain tensor, stress-strain relations, Generalized wave equation. Reflection and refraction of plane waves at a plane boundary- independence of SH and P and of SV waves – boundary conditions, Energy conversions. Focus on Indian earthquakes.

UNIT – IV

Earthquake Measurements: Earthquake measuring, instruments – Seismoscope, Seismograph, Seismic Recording, accelerograph – Interpretation of Seismic Records –Acceleration, Velocity and Displacement – Frequency and Time Domain parameters.

Seismic Zoning: Seismic zones of India - Concept of seismic microzonation – Need for Microzonation.

UNIT – V

Seismic Hazard: Introduction to Seismic Hazard, types of hazard, Time parameters of hazards, Hazard analysis Methods – Deterministic and Probabilistic – Introduction to Site characterization, Concept of site response – Local site effects and evaluation methods.

Concepts of Earthquake resistant building : Building configurations – Introduction – Functional planning – Continuous load path – Characteristics of Buildings.

Textbooks

1. *Earthquake Resistant Design of structures – S. K. Duggal, Oxford University Press,(2007).*
2. *Earthquake Resistant Design of structures – Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd,(2006).*

References

1. *Seismic Design of Reinforced Concrete and Masonry Building – T. Paulay and M.J.N. Priestly, John Wiley & Sons (1994).*
2. *Eartquake Resistant Design of Buidling structures by Vinod Hosur, Wiley India Pvt. Ltd (1992).*
3. *Elements of Mechanical Vibration by R.N.Iyengar, I.K.International Publishing House Pvt. Ltd, (2010).*
4. *Masory and Timber structures including earthquake Resistant Design –AnandS.Arya, Nemchand& Bros,(1992).*
5. *Earthquake Tips – Learning Earthquake Design and Construction C.V.R. Murthy, (2005)*

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY

An Autonomous Institution

Aziznagar Gate, C.B. Post, Hyderabad - 500 075, Telangana.

ACADEMIC REGULATIONS & SYLLABI (R15)

CIVIL ENGINEERING

for

B.TECH FOUR YEAR DEGREE COURSE

(I- IV year syllabus)

(Applicable for the batches admitted from the Academic Year 2015-2016 onwards)

I YEAR I SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	L	T	P/D	Total Credits	Total Hours	Total Marks
A11001	English-I	2	0	0	2	2	100
A11002	Mathematics - I	4	1	0	3	4	100
A11003	Engineering Physics-I	3	1	0	3	4	100
A11501	C Programming	3	1	0	3	4	100
A11301	Engineering Graphics-I	2	0	3	3	5	100
A11302	Engineering Mechanics – I	3	1	0	3	4	100
A11581	C Programming Lab	0	0	3	2	3	75
A11081	English Language Communication Skills Lab-I	0	0	3	2	3	75
A11082	Engineering Physics Lab	0	0	3	2	3	75
A11381	Engineering Workshop	0	0	3	2	3	75
	Total	**17**	**7**	**15**	**25**	**35**	**900**

I YEAR II SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	L	T	P/D	Total Credits	Total Hours	Total Marks
A12005	English – II	2	0	0	2	2	100
A12006	Mathematics – II	4	1	0	3	4	100
A12007	Engineering Physics-II	3	1	0	3	4	100
A12008	Applied Chemistry	3	1	0	3	4	100
A12304	Engineering Mechanics – II	3	1	0	3	4	100
A12305	Engineering Graphics – II	2	0	3	3	5	100
A12085	English Language Communication Skills Lab-II	0	0	3	2	3	75
A12086	Engineering Physics and Chemistry Lab	0	0	3	2	3	75
A12087	IT & Engineering Workshop	0	0	3	2	3	75
	Total	**17**	**7**	**12**	**23**	**32**	**825**

Note: All End Examinations (Theory and Practical) are of three hours duration.

L – Lecture T – Tutorial P – Practical D – Drawing

II YEAR I SEM

S.No	Code	Subject	L	T	P	Credits
1	A13013	Numerical Methods	3	1	0	3
2	A13101	Engineering Geology	3	0	0	3
3	A13102	Strength of Materials – I	4	1	0	4
4	A13103	Surveying	4	1	0	4
5	A13011	Environmental Science	3	0	0	3
6	A13307	Fluid Mechanics	4	1	0	3
7	A13181	Surveying Lab I	0	0	3	2
8	A13182	Engineering Geology Lab	0	0	3	2
	A13MC-I	Mandatory course	2	0	0	0
		Total	**23**	**4**	**6**	**24**

II YEAR II SEM

S.No	Code	Subject	L	T	P	Credits
1	A14015	Probability and Statistics	3	1	0	3
2	A14104	Structural Analysis – I	4	1	0	4
3	A14105	Strength of Materials – II	3	1	0	3
4	A14106	Concrete Technology	3	0	0	3
5	A14107	Hydraulics & Hydraulic Machinery	4	1	0	4
6	A14108	Building Materials, Construction and Planning	3	0	0	3
7	A14183	Surveying Lab II	0	0	3	2
8	A14184	Strength of Materials Lab	0	0	3	2
	A14MC-II	Mandatory Course	2	0	0	0
			22	**4**	**6**	**24**

MC-I Mandatory courses – **i**) Intellectual property rights and cyber

ii) Professional Ethics Human values and self development
iii) Professional communications
iv) Disaster Management

III YEAR B TECH I SEM

S.No.	Code	Subject	L	T	P	Credits
1	A15017	Managerial Economics and Financial Analysis	3	0	0	3
2	A15109	Design of Reinforced Concrete Structures	3	1	0	3
3	A15110	Geotechnical Engineering	3	1	0	3
4	A15111	Water resources engineering - I	3	1	0	3
5	Professional Electives-1	A15112 - Indeterminate Structural Analysis A15113 - Groundwater Hydrology	3	0	0	3
6		**Open Elective 1**	3	0	0	3
7	A15185	Geotechnical Engineering Laboratory	0	0	3	2
8	A15186	Fluid Mechanics And Hydraulic Machinery_laboratory	0	0	3	2
9	A15TP-I	Personality Development & Reasoning Skills	0	0	3	2
		Total Credits	**18**	**3**	**9**	**24**

Note: Open Elective 1- Offered by the Civil engineering department for other branches Except Mechanical Engineering

- Remote Sensing And GIS (A15115)
- Smart City (A15116)

III YEAR B TECH II SEM

S.No.	Code	Subject	L	T	P	Credits
1	A16018	Environmental Engineering	3	0	0	3
2	A16118	Steel Structure Design and	3	1	0	3
3	A16119	Highway Engineering	3	1	0	3
4	A16120	Foundation Engineering	3	1	0	3
5	Professional Electives-2	**A16121** - Ground improvement Techniques **A16122** - Earthquake Engineering **A16123**- Building, Planning,	3	0	0	3
6		**Open Elective – 2**	3	0	0	3
7	A16187	Computer Aided Drafting of Building Lab	0	0	3	2
8	A16188	Advanced English	0	0	3	2
9	A16TP-II	Quantitative Methods & Logical Reasoning	0	0	3	2
		Total Credits	**18**	**3**	**9**	**24**

Note: Open Elective -2: Offered by the Civil engineering department for other branches Except Mechanical Engineering

- Environmental Pollution and Control Methods (A16124)
- Green Building Technologies (A16125)

IV YEAR B TECH I SEM

S.No.	Code	Subject	L	T	P	Credits
1	A17126	Estimating & Costing	3	1	0	3
2	A17127	Water Resources Engineering-II	3	1	0	3
3	A17128	Railways, Airports and Harbors	3	1	0	3

4	Professional Electives- 3 A17129 A17130 A17131	1.Finite Element Methods 2. Advanced Foundation Engineering 3.Solid Waste management 4. Remote sensing & GIS	3	0	0	3
5	Professional Electives- 4 A17133 A17134 A17135 A17136	1.Advanced Structural Design 2. Air Pollution and Control methods 3.Water Resources Systems Analysis 4. Industrial Waste Water Treatment	3	0	0	3
6		**Open Elective 3**	3	0	0	3
7	Lab- 1 A17188	Concrete & Highway Materials Lab	0	0	3	2
8	Lab –II A17189	Environmental Engineering Lab	0	0	3	2
9	MP-1	Industry Oriented Mini Project	3	0	0	2
		Total Credits	**21**	**3**	**6**	**24**

Note: Open Elective -3: Offered by the Civil engineering department for other branches Except Mechanical Engineering

- Elements of Civil Engineering (A17137)
- Introduction to Earthquake Engineering (A17138)

IV YEAR B TECH II SEM

S.No.	Code	Subject	L	T	P	C
1	A18139	Construction Management	3	0	0	3
2	A18140	Rehabilitation and retrofitting of structures	3	0	0	3
3	A18141	Pre- stressed Concrete	3	1	0	3
4	A181TS	Technical Seminar	0	0	6	2
5	A181P2	Major Project	0	0	14	11
6	A181CV	Comprehensive Viva	0	0	0	2
		Total Credits	**9**	**1**	**20**	**24**

FAST TRACK COURSE STRUCTURE

I YEAR I SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	L	T	P/D	Total Credits	Total Hours	Total Marks
A11001	English-I	2	0	0	2	2	100
A11002	Mathematics - I	4	1	0	3	4	100
A11003	Engineering Physics-I	3	1	0	3	4	100
A11501	C Programming	3	1	0	3	4	100
A11301	Engineering Graphics-I	2	0	3	3	5	100
A11302	Engineering Mechanics – I	3	1	0	3	4	100
A11581	C Programming Lab	0	0	3	2	3	75
A11081	English Language Communication Skills Lab-I	0	0	3	2	3	75
A11082	Engineering Physics Lab	0	0	3	2	3	75
A11381	Engineering Workshop	0	0	3	2	3	75
	Total	**17**	**7**	**15**	**25**	**35**	**900**

I YEAR II SEMESTER COURSE STRUCTURE

Subject Code	Subject Name	L	T	P/D	Total Credits	Total Hours	Total Marks
A12005	English – II	2	0	0	2	2	100
A12006	Mathematics – II	4	1	0	3	4	100
A12007	Engineering Physics-II	3	1	0	3	4	100
A12008	Applied Chemistry	3	1	0	3	4	100
A12304	Engineering Mechanics – II	3	1	0	3	4	100
A12305	Engineering Graphics – II	2	0	3	3	5	100
A12085	English Language Communication Skills Lab-II	0	0	3	2	3	75
A12086	Engineering Physics and Chemistry Lab	0	0	3	2	3	75
A12087	IT & Engineering Workshop	0	0	3	2	3	75
	Total	**17**	**7**	**12**	**23**	**32**	**825**

Note: All End Examinations (Theory and Practical) are of three hours duration.

L – Lecture T – Tutorial P – Practical D – Drawing

II YEAR COURSE STRUCTURE

II YEAR B TECH I SEM

S.No	Code	Subject	L	T	P	Credits
1	A13013	Numerical Methods	3	1	0	3
2	A13101	Engineering Geology	3	0	0	3
3	A13102	Strength of Materials – I	4	1	0	4
4	A13103	Surveying	4	1	0	4
5	A13011	Environmental Science	3	0	0	3
6	A13307	Fluid Mechanics	4	1	0	3
7	A13181	Surveying Lab I	0	0	3	2
8	A13182	Engineering Geology Lab	0	0	3	2
	A13MC-I	Mandatory course	2	0	0	0
			23	**4**	**6**	**24**

II YEAR B TECH II SEM

S.No	Code	Subject	L	T	P	Credits
1	A14015	Probability and Statistics	3	1	0	3
2	A14104	Structural Analysis – I	4	1	0	4
3	A14105	Strength of Materials – II	3	1	0	3
4	A14106	Concrete Technology	3	0	0	3
5	A14107	Hydraulics & Hydraulic Machinery	4	1	0	4
6	A14108	Building Materials, Construction and Planning	3	0	0	3
7	A14183	Surveying Lab II	0	0	3	2
8	A14184	Strength of Materials Lab	0	0	3	2
	A14MC-II	Mandatory Course	2	0	0	0
			22	**4**	**6**	**24**

MC-I Mandatory courses – i) Intellectual property rights and cyber laws

ii) Professional Ethics Human values and self development

iiii) Professional communications

iv) Disaster Management

III YEAR B TECH I SEM

S.No.	Code	Subject	L	T	P	Credits
1	A15017	Managerial Economics and Financial Analysis	3	0	0	3
2	A15109	Design of Reinforced Concrete Structures	3	1	0	3
3	A15110	Geotechnical Engineering	3	1	0	3
4	A15111	Water resources engineering - I	3	1	0	3

5	Professional Electives-1	A15112 - Indeterminate Structural Analysis A15113 - Groundwater Hydrology	3	0	0	3
6		**Open Elective 1**	3	0	0	3
7	A15185	Geotechnical Engineering Laboratory	0	0	3	2
8	A15186	Fluid Mechanics And Hydraulic Machinery_laboratory	0	0	3	2
9	A15TP-I	Personality Development & Behavior Skills	0	0	3	2
		Total Credits	**18**	**3**	**9**	**24**

Note: Open Elective 1- Offered by the Civil engineering department for other branches Except Mechanical Engineering

- Remote Sensing And GIS (A15115)
- Smart City (A15116)

III YEAR B TECH II SEM

S.No.	Code	Subject	L	T	P	Credits
1	A16018	Environmental Engineering	3	1	0	3
2	A16118	Steel Structure Design and	3	1	0	3
3	A16119	Highway Engineering	3	0	0	3
4	A16120	Foundation Engineering	3	1	0	3
5	A18140	Rehabilitation and retrofitting of structures	3	0	0	3
6.	A18139	Construction Management	3	0	0	3
5	Professional Electives	**A16121** - Ground improvement Techniques **A16122** - Earthquake Engineering **A16123**- Building, Planning,	3	0	0	3
6		**Open Elective – 2**	3	0	0	3

7	A16187	Computer Aided Drafting of Building Lab	0	0	3	2
8	A16188	Advance English Communication Skills Lab	0	0	3	2
9	A16TP-II	Quantitative Methods & Logical Reasoning	0	0	3	2
		Total Credits	**24**	**3**	**9**	**30**

Note: Open Elective -2: Offered by the Civil engineering department for other branches Except Mechanical Engineering

- Environmental Pollution and Control Methods (A16124)
- Green Building Technologies (A16125)

IV YEAR B TECH I SEM

S.No.	Code	Subject	L	T	P	Credits
1	A17126	Estimating & Costing	3	1	0	3
2	A17127	Water Resources Engineering-II	3	1	0	3
3	A17128	Railways, Airports and	3	1	0	3
4	A18141	Pre- stressed Concrete	3	1	0	3
5	Professional Electives- 3 A17129 A17130 A17131 A17132	1.Finite Element Methods 2. Advanced Foundation Engineering 3.Solid Waste management 4. Remote sensing & GIS	3	0	0	3
6	Professional Electives- 4 A17133 A17134 A17135	1.Advanced Structural Design 2. Air Pollution and Control methods 3.Water Resources Systems Analysis	3	0	0	3
7		**Open Elective 3**	3	0	0	3
8	Lab- 1 A17188	Concrete & Highway Materials Lab	0	0	3	2
9	Lab –II A17189	Environmental Engineering Lab	0	0	3	2

10	MP-1	Industry Oriented Mini Project	3	0	0	2
		Total Credits	**24**	**4**	**6**	**27**

Note: Open Elective -3: Offered by the Civil engineering department for other branches Except Mechanical Engineering

- Elements of Civil Engineering (A17137)
- Introduction to Earthquake Engineering (A17138)

IV YEAR B TECH II SEM

S.No.	Code	Subject	L	T	P	C
1	A181TS	Technical Seminar	0	0	6	2
2	A181P2	Major Project	0	0	14	11
3	A181CV	Comprehensive Viva	0	0	0	2
		Total Credits	**0**	**0**	**20**	**15**

ENGLISH-I
(COMMON TO ALL BRANCHES)

L	T/P/D	C
2	0 0	2

MAIN OBJECTIVES:

- To improve the language proficiency of the students in English with emphasis on LSRW skills.
- To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
- To develop the study skills and communication skills in formal and informal situations.

B Tech I Year I Semester

Unit-I: 'Wit and Humor' from 'Skills Annexe' -Functional English for Success

Objectives:

- To enable students to develop their listening skills to improve their pronunciation

L-Listening For Sounds, Stress and Intonation

- To make students aware of the role of speaking in English and its contribution to their success.

S-Greeting and Taking Leave, Introducing Oneself and Others (Formal and Informal Situations).

- To develop an awareness in the students about the significance of silent reading for subject and theme.

R- Reading for Subject/ Theme

- To equip the students with the components of different forms of writing

W- Writing Paragraphs

Unit –II: 'Mokshagundam Visvesvaraya' from "Epitome of Wisdom

Objectives:

- To enable the students to use phrasal verbs, expressions, idioms, collocations, pre-fixes and suffixes, and linking words.

G-Types of Nouns and Pronouns

V-Homonyms, homophones synonyms, antonyms

Unit-III: 'Cyber Age' from "Skills Annexe -Functional English for Success

Objectives:

- To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

L – Listening for themes and facts

- To enable students to express themselves fluently and appropriately in social and professional contexts

S -Apologizing, Interrupting, requesting and making polite conversation

- To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.

R - For theme and gist.

- To equip them with the components of different forms of writing.

W - Describing People, Places, Objectives, Events,

Unit-IV: 'Three Days to See' from "Epitome of Wisdom

Objective:

- To enable the Students to use a wide range of grammatical structures appropriately and accurately in written and spoken English including vocabulary

G- Verb &Verb forms

V- Adjective and Adverb

Unit-V: Human Values & Professional Ethics from "Skills Annexe

Objective:

- To equip the students with the components of different forms of writing..

W- Note-Making, Note-Taking

TEXTBOOKS PRESCRIBED:

For Detailed study:

First Textbook: *"Skills Annexe -Functional English for Success"*,
Published by Orient Black Swan, Hyderabad

For Non-detailed study:

Second text book *"Epitome of Wisdom",* Published by Maruthi Publications, Guntu

MATHEMATICS-I
(COMMON TO CE, EEE, ME, ECE, CSE & IT)

L	T/P/D	C
4	1	3

UNIT-I: Matrices and System of Linear Equations
Matrices and Systems of Linear Equations: Real matrices Symmetric, Skew symmetric, Orthogonal, Complex matrices: Hermitian, Skew Hermitian and Unitary. Elementary transformations-Rank-Echelon form, Normal form System of Linear equations Direct Methods (Gauss Elimination, Gauss Jordan).

UNIT-II: Eigen Values and Eigen Vectors
Eigen values, Eigen vectors properties, Clayey-Hamilton Theorem (without Proof) Inverse and powers of a matrix by Clayey-Hamilton theorem Diagonolization of matrix. Linear Transformation Orthogonal Transformation, Quadratic forms-Nature, Index and Signature.

UNIT-III: Functions of Single Variable and Functions of several variables
Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – Generalized Mean Value theorem (all theorems without proof) – Geometrical interpretation of Mean value theorems. Functions of several variables – Partial Differentiation and total differentiation (left as an exercise to student) - Functional dependence-Jacobian Determinant- Maxima and Minima of functions of two variables with constraints and without constraints.

UNIT-IV: Improper Integration and Multiple Integrals:
Gamma and Beta Functions-Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions. Multiple integrals - double and triple integrals – change of order of integration- change of variables

UNIT-V: Laplace transform and its applications to Ordinary differential equations:
Laplace transform of standard functions – Inverse transform – first shifting Theorem, Transforms of derivatives and integrals – Unit step function – second shifting theorem – Dirac's delta function – Convolution theorem – Periodic function - Differentiation and integration of transforms – Application of Laplace transforms to ordinary differential equations.

TEXT BOOKS:
1. Grewal B.S (2007), Higher Engineering Mathematics, 40th Edition, New Delhi, Khanna Publishers.

2. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Engineering Mathematics Vol - I, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
3. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Mathematical Methods, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
4. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley.

REFERENCE BOOKS:

1. Srimanta Pal, Subodh C. Bhunia, (2015) ,Engineering Mathematics, 1st Edition, New Delhi, Oxford University Press
2. Jain R. K., and Iyengar S. R. K (2008), Advanced Engineering Mathematics, 3rd Edition, New Delhi, Narosa Publication House
3. Ramana B.V (2010), Engineering Mathematics, New Delhi, Tata McGraw Hill Publishing Co. Limited
4. Mathematical Methods: S.R.K. Iyengar and R.K. Jain, Narosa Publishing House.

OBJECTIVES:

1. This course helps in translating a physical or other problem in mathematical model.
2. The course intends to provide an overview of Matrices which occur in physical and engineering problems.
3. To provide an overview of discovering the experimental aspect of modern applied mathematics.
4. This course creates the ability to model, solve and interpret any physical or engineering problem.
5. To gain knowledge about Laplace Transforms, Double integrals and Triple integrals to apply in engineering and technologies.

ENGINEERING PHYSICS – I

L	T	C
3	1	3

OBJECTIVES:

1. To know about crystals, their structures, properties and applications.
2. Able to understand light and LASER phenomena and their applications.
3. To know the fundamentals of Statistical Mechanics and understand about Dielectric and Magnetic materials.

OUTCOMES:

1. Students analyze and apply the studies for scientific applications of crystal in various fields.
2. Ability to interpret the applications of Dielectric and Magnetic materials in technology and daily life.
3. Able to experiment on nature of light and applications of LASER in various fields.

UNIT- I

Crystal Structures

Inter atomic force – Cohesive energy of diatomic molecule (Qualitative), Space lattice, unit cell and Lattice parameters, Crystal systems – Bravais lattices. Structures, Atomic radius, co-ordination number and packing fractions of Simple Cubic, Body Centered Cubic, Face Centered Cubic lattices, Structure of Diamond.

Crystal directions, planes and X- Ray diffraction

Crystal planes and directions – Miller Indices, Inter planar spacing of orthogonal crystal systems, X-ray Diffraction: Bragg's law, Determination of lattice constant by XRD (Powder method), Crystal defects: Point and Line defects (Qualitative) – Burger's Vector.

UNIT- II

Interference, Diffraction and Polarization

Superposition principle, Interference, Coherence, Interference in thin films, Newton's Rin.gs –Experiment, determination of wavelength of monochromatic source. Diffraction - Fraunhofer and Fresnel diffraction, Diffraction due to single slit, Diffraction grating (Qualitative). Polarization- Double refraction, Nicol's Prism, applications of Polarization.

UNIT – III

Elements of statistical mechanics

Introduction, Phase space, Definition of Ensembles, Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics (Qualitative), Planck's law of black body radiation Deduction of Wien's law and Rayleigh-Jeans law from Planck's law.

Lasers

Characteristics of Lasers, Spontaneous and Stimulated Emission of radiation, meta stable state, Population inversion, lasing action, Einstein's coefficients and relation between them, Ruby Laser, Helium-Neon Laser, applications of Lasers.

UNIT – IV

Magnetism and Magnetic materials

Introduction – Basic definitions, Origin of magnetic moment, Bohr magneton, Dia, Para, Ferro, Antiferro and Ferri magnetism, Domain theory of ferromagnetism, Hysteresis curve – Soft and Hard magnetic materials and their applications.

UNIT- V

Dielectric Properties

Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Ionic and Electronic Polarizabilities, Internal Fields in Solids, Clausius – Mossotti Equation. Piezo, Pyro and Ferro electricity, applications of ferroelectric materials.

TEXT BOOKS:

(1) Engineering Physics by P K Palanisamy: Scietech publication.
(2) Solid State Physics by M Armugam; Anuradha Publications.

REFERENCE BOOKS:

(1) Introduction to Solid State Physics by Charles Kittel : John Wiley & Sons.
(2) Engineering Physics by R.K. Gaur and S.L. Gupta; Dhanpat Rai and Sons.
(3) Engineering Physics by V Rajendran; McGraw hill education private ltd.
(4) A Text book of Engineering Physics by M N Avadhanulu, P G Kshirsagar: S Chand.
(5) Engineering Physics by K Malik, A K Singh: Tata McGraw hill book publishers.
(6) Engineering Physics by M.R. Srinivasan, New Age Publishers.

C PROGRAMMING
(CIVIL, MECH)

L	T/P/D	C
3	1	3

OBJECTIVES:

- To understand the various steps in program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs.
- To learn to write Programs in C to solve programs using structured programming approach.
- To introduce the students the basic concepts as input output statements, loops, functions, arrays.

OUTCOMES:

- Students will demonstrate a depth of knowledge and apply the methods of C Language to solve the mathematical problems.
- Ability to apply and develop logical skills and problem solving using C Programming Language.

UNIT-I

Introduction to Computers: Computer System, Computing Environments, Generations of Computer Languages, Software Development Life Cycle, Algorithms and Flowchart.

Data Representation: Decimal, Binary, Octal, Hexadecimal number systems and Inter-Conversions, ASCII values.

UNIT-II

Introduction to C language: Background, Structure of C program, Creating and Running a C-Program, Input/ Output statements, C tokens, Data types, Operators, Operator Precedence and Associatively, Expression evaluation, Type Casting and Type Conversion, C Programming examples.

UNIT-III

Control Structures: Selection Statements: if and switch statements, Iterative Statements/Loops: while, for, do-while statements, goto, break and continue statements, C Programming examples.

UNIT-IV

Arrays: Introduction to one dimensional and two dimensional Arrays- Declaration, Initialization and Accessing array elements, Array applications, C programming examples.

Strings: Introduction, String Input/output functions, Declaration, Initialization and Accessing Strings, Array of Strings, String Manipulation functions- strlen(), strcat(), strcmp(), strcpy(), strrev(), C programming examples.

UNIT- V

Functions: Introduction to functions, Types of functions, Categories of functions, Recursion, Scope and Extent, Storage classes- auto, register, static, extern, Parameter passing techniques, Preprocessor Directives, C programming examples.

TEXT BOOKS

1. Computer Programming & Data Structures, E.Balagurusamy, 4th edition, TMH.
2. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F.Gilberg, Third Edition, Cengage Learnimng.

REFERENCE BOOKS

1. Let Us C, Yashavant P. Kanetkar, BPB Publications.
2. Computer System & Architecture, M. Marris Mano, 3rd Edition, Pearson Education.
3. Programming in C Reema Thareja, 2 nd Edition Oxford University Press 2015.

ENGINEERING GRAPHICS-1

(Mech & Civil)

L	T/P/D	C
2	3	3

Objectives:

1. To know about different types of Drawing Instruments and about different types of lines.
2. To know about different types of curves and projections.
3. To know projections of points, straight lines, solids etc.

Outcomes:

1. Student gets knowledge on various drawing instruments and its usage.
2. Students capable to draw various curves like conic curves, cycloid curves and involutes.
3. Student can understand about orthographic projection and able to draw points, lines, planes and solids according to orthographic projections.

UNIT – I

Introduction to Engineering Drawing: Drawing Instruments and their uses, types of lines, use of pencils, Lettering, Rules of dimensioning. Construction of polygons Practice only. Curves used in Engineering Practice and their Constructions. Conic Sections: Ellipse, Parabola, Hyperbola including the Rectangular Hyperbola - General method only. Cycloidal curves - Cycloid, Epicycloid and Hypocycloid

UNIT – II

Introduction to Scales: Construction of Plain, Diagonal, and Vernier Scales. Involutes of Circle & Regular Polygons.

UNIT – III

Drawing of Projections or Views (Orthographic Projection in First Angle Projection Only): Principles of Orthographic Projections – Conventions – First and Third Angle Projections, Projection of Points, Projection of Lines - inclined to both planes, True lengths. (**Traces**, **Mid points** can be removed)

UNIT – IV

Projections of Planes: Projections of regular Planes, traces, Projections of Planes on Auxiliary lanes.

UNIT –V

Projections of Solids: Projections of Regular Solids – Regular Polyhedra, solids of revolution, Axis inclined to both planes – Change of position and Auxiliary plane method.

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhatt / Charotar publishers
2. Engineering Drawing, K.L.Narayana and Kannaiah / Scietech publishers.

REFERENCES:

1. Engineering Graphics,P.I. Varghese, TMH
2. Engineering Drawing, N.S. Parthasarathy/Vela Murali, Oxford University Press.
3. Engineering Graphics for Degree,K.C. John,PHI learning.

ENGINEERING MECHANICS – I
(MECH & CIVIL)

L	T/P/D	C
3	1	3

UNIT-I
Introduction to Engineering Mechanics - Basic Concepts
System of Forces: Coplanar Concurrent Forces -Resultant - Moment of Force and its Application - Couples and Resultant of Force Systems, Forces in space.

UNIT-II
Equilibrium of Systems of Forces: Free Body Diagrams, Lami's Theorem, Conditions of Equilibrium of Coplanar forces and Spatial System of forces

UNIT-III
Friction: Basic concepts, Types of Friction, cone of friction,
Applications of Friction: Ladder friction, Wedge friction, and Screw friction

UNIT-IV
Centroid: Centroids of simple figures (from basic principles),Centroids of Composite Figures.

Centre of Gravity: CG of simple bodies (from basic principles), CG of composite bodies, Pappus theorem.

UNIT - V
Area Moment of Inertia: Definition - MI of Plane figures & Composite Figures, Polar Moment of Inertia, Product of Inertia and Transfer Formula for Product of Inertia.

Mass Moment of Inertia: MI of Masses, Transfer Formula for MMI, MMI of composite bodies.

TEXT BOOKS:
1) Engineering Mechanics by Ferdinand. L. Singer
2) Engineering Mechanics by basudeb Bhattacharyya Oxford University Press.

REFERENCE BOOKS:
1) Engineering Mechanics by Timoshenko & Young.
2) Engineering Mechanics by S.S.Bhavikatti J.G. Rajasekharappa.
3) Engineering Mechanics by Pakhirappa
4) Engineering Mechanics by A. K. Tayal.

C PROGRAMMING LAB
(CIVIL, MECH)

L	P	C
0	3	2

OBJECTIVES:

- To provide and understanding the concept of programming Languages.
- To write programs in C to solve the mathematical problems.
- To understand how to use the input output statements, loops, functions, arrays
- To learn debugging concepts.

OUTCOMES:

- Understand and analyze different syntax of C.
- Design a program for a given Problem.
- To analyze and design C Program for a particular problem.

Week 1:
Familiarity with Basic Linux Commands

Week 2:
Using vi editor – Creation of text files

Week 3:
Write simple programs using scanf() and printf() functions and familiarity with format strings.

Week 4:
Write programs to illustrate Operators

Week 5:
Write programs to illustrate If statements

a) To find largest and smallest of given numbers
b) To find the roots of the quadratic equation.

Week 6:

a) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
b) Write a C program to calculate the following Sum:
$Sum=1-x^2/2! + x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$

Week 7:
Write programs on while and do. while loops

a) Program to find the sum of the individual digits of a given positive integer.

b) Program to generate the first n terms of the Fibonacci sequence
c) Program to check the given no is Palindrome or not

Week 8:
Write programs on for loop and nested loops.
a) To generate sum of n natural numbers
b) To generate Pascal triangle
c) To generate all the prime numbers between 1 and n

Week 9 & 10:
a) Program to find the minimum and maximum element of an array.
b) Program to search for given element in an array.
c) Program to convert Binary number to Decimal number and vice-versa.

Week 11:
a) Program to perform Addition of Two Matrices
b) Program to perform Multiplication of Two Matrices

Week 12:
a) Implement string manipulation functions
b) Write a C program to accept a string of any characters and display the number of vowels in that string
c) Display number of words and characters in a string.

Week 13 & 14:
a) Implement categories of user defined functions
b) Implement recursive and non recursive functions
   i. To find the factorial of a given integer.
   ii. To find the GCD (greatest common divisor) of two given integers.

Week 15:
Implementation of parameter passing Techniques
a) Call by value
b) Call by reference

Week 16:
Review and Revision

TEXT BOOKS:
1. C Programming & Data Structures, E. Balagurusamy,4th Edition, TMH.
2. A Structured Programming Approach using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

REFERENCE BOOKS:
1. Let Us C, Yashavant P. Kanetkar, BPB Publications.
2 Computer System & Architecture, M.Morris Mano, 3 rd Edition 2006.
3. Programming in C , Reema Thareja , 2nd Edition Oxford University Press 2015.

English Language Communication Skills Lab-I

L	T	P	C
0	0	3	2

Objectives

1. To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
2. To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency in spoken English and neutralize mother tongue influence
5. To train students to use language appropriately for interviews, group discussion and public speaking.

Learning Outcomes:

1. Better Understanding of nuances of language through audio-visual experience and group activities.
2. Neutralization of accent for intelligibility.
3. Speaking with clarity and confidence thereby enhancing employability skills of the students.

Syllabus: English Language Communication Skills Lab shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab

b. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the English Language Communication Skills Lab:

Exercise-I

CALL Lab: Introduction to Phonetics
Speech Sounds
Vowels and Consonants

Exercise-II

ICS Lab: Ice-Breaking activity and JAM session
Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

Exercise-III

CALL Lab: Structure of Syllables
Past Tense Marker and Plural Marker
Weak Forms and Strong Forms
Consonant Clusters.

Exercise-IV

ICS Lab: Situational Dialogues -Role-Play- Self-introduction and introducing others- Greetings- Apologies- Requests.

Exercise-V

ICS Lab: Social and Professional Etiquette and Telephone Etiquette-Tenses-Non-Verbal Communications.

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. Suresh Kumar, E. & Sreehari, P. 2009. A Handbook for English Language Laboratories. New Delhi: Foundation
2. Speaking English Effectively 2nd Edition by Krishna Mohan and N. P. Singh, 2011.
Macmillan Publishers India Ltd. Delhi.
3. **English Pronouncing Dictionary** Daniel Jones Current Edition with CD.
4. **A textbook of English Phonetics for Indian Students** by T. Balasubramanian (Macmillan)
5. **Lab Manual:** A Manual entitled "**English Language Communication Skills (ELCS) Lab Manual- cum- Work Book**", published by Cengage Learning India Pvt. Ltd, New Delhi. 2013.

ENGINEERING PHYSICS LAB
(Mech, Civil)
I Year B.Tech – I Sem

L	P	C
0	3	2

The following experiments are to be performed during the First Semester.

1. Torsional Pendulum Experiment – Determination of rigidity modulus of material of a wire.
2. Melde's experiment.
3. Newton's Rings.
4. Dispersive Power of the material of a Prism using Spectrometer.
5. Stewart & Gee's experiment.
6. LED Characteristics.
7. Diffraction Grating – Determination of wavelength of monochromatic light.
8. RC Circuit – Decay of Charge.

ENGINEERING WORKSHOP
(Common to MECH, CE

L	P	C
0	3	2

Objective: To impart basic knowledge of various tools and their use in different sections of manufacture such as fitting, carpentry, Tin-smithy and house wiring.

1. TRADES FOR EXERCISES:

At least THREE exercises from each trade:

1. Carpentry
2. Black smithy
3. Foundry
4. Welding

2. TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. Machine shop

TEXT BOOKS:

1. Work shop manual - P.Kannaiah/ K.L Narayana/ scitech publishers.
2. Workshop manual by Venkat Reddy

Part – C

Syllabi of

B.Tech., I Year II Semester

(Civil and Mech.)

English– II

L	T/P/D	C
2	0 0 0	2

(COMMON TO ALL BRANCHES)
Semester II

Unit –I: Last Leaf by O Henry
G –Tense & Aspect
V – Synonyms and Antonyms

Unit-II G: Risk Management from Skills Annex -
Functional English for Success L -Listening for specific details and information
S- Narrating, expressing opinions and telephone interactions R -Reading for specific details and information

W- Writing formal letters and CVs
Unit-III: The Secret of Work by Swami Vivekananda from "Epitome of Wisdom"
G- Prepositions and Concord, Voice and Reported Speech
V-Collocations and Technical Vocabulary

Unit-IV: Sports and Health from "Skills Annex -Functional English for Success
Critical Listening and Listening for speaker's tone/ attitude
S- Group discussion and Making presentations
R- Critical reading, reading for reference
W-Project proposals; Technical Reports, Project Reports and Research Papers

Unit-V: Convocation Speech by Narayan Murthy, from "Epitome of Wisdom"
G- Writing Memos, Minutes of Meeting, Transcription (Translating from the mother tongue to English), V-Vocabulary - idioms and Phrasal verbs, One-Word Substitutes

REFERENCES:

1. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson.
2. Technical Communication, Meenakshi Raman, Oxford University Press
3. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
4. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw –Hill.

MATHEMATICS-II
(COMMON TO CE, EEE, ME, ECE, CSE & IT)

L	T	P	C
4	1	0	3

OBJECTIVES:

1. This course creates the ability to model, solve and interpret any physical or engineering problem
2. To gain knowledge about vector calculus, Fourier series and Fourier transforms to apply in engineering and technologies
3. The course intends to provide an overview of Matrices which occur in physical and engineering problems.
4. This course enhances the conceptual understanding of the learners about the solutions of engineering problems
5. Acquire knowledge about different methods of solution to solve a physical problem.

OUTCOMES:

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

1. Gains the knowledge to tackle the engineering problems using the concepts of Fourier series, various transforms and partial differential equations.
2. Become familiar with the application of ordinary differential equations and vector calculus to engineering problems.
3. Verify the integral theorems.

UNIT-I: Differential Equations of first order and their Applications:

Differential equations of first order and first degree: exact, linear and Bernoulli, Applications to Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

UNIT-II: Higher Order Linear Differential Equations and their Applications:

Linear differential equations of second and higher order with constant coefficients, RHS term of the type f(X)

$= e^{ax}, \sin ax, \cos ax \; and \; x^k, e^{ax}V(x), x^kV(x)$.Method of variation of parameters. Equations reducible to constant coefficients-Cauchy's and Lagrange's differential equations. Applications - Bending of beams, Electrical circuits, simple harmonic motion.

UNIT-III: Fourier series:

Determination of Fourier coefficients – Fourier series – even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

UNIT-IV: Fourier Transforms:
Fourier integral theorem Fourier sine and cosine integrals. Fourier transforms Fourier sine and cosine transform properties inverse transforms Finite Fourier transforms.

UNIT-V: Vector Calculus:
Gradient- Divergence Curl and their related properties Potential function Laplacian and second order operators. Line integral workdone Surface integrals Flux of a vector valued function and Volume integral. Vector integrals theorems: Green's Stoke's and Gauss's Divergence Theorems (Only Statements & their Verifications).

TEXT BOOKS:

1. Grewal B.S (2007), Higher Engineering Mathematics, 40th Edition, New Delhi, Khanna Publishers.
2. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Mathematical Methods, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
3. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Engineering Mathematics Vol - I, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
4. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley.

REFERENCE BOOKS:

1. Srimanta Pal, Subodh C. Bhunia, (2015), Engineering Mathematics, 1st Edition, New Delhi, Oxford University Press.
2. Jain R. K., and Iyengar S. R. K (2008), Advanced Engineering Mathematics, 3rd Edition, New Delhi, Narosa Publication House.
3. Integral Transforms by A.R.Vasista,Krishana Prakashan Private Limited
4. Schaum's outline series on Vector Analysis; Linear Algebra.
5. Larry C. Andrews and Bhimsen K. Shivamoggi, Integral Transforms for Engineers, Prentice Hall of India Private Limited, New Delhi.

ENGINEERING PHYSICS – II
(COMMON TO ALL BRANCHES)

L	T	C
3	1	3

OBJECTIVES:

1. To know fundamentals of Quantum Mechanics, Free Electron Theory of Metals and Band Theory of solids.
2. To know basics of semiconductors and semiconductor devices.
3. To understand superconductivity, applications of optical fibers and fundamentals of Nanoscience.

OUTCOMES:

1. To get an idea to apply Classical and Quantum mechanics in various engineering fields.
2. Able to construct circuits with semiconductor devices and consolidate applications of Nanoscience in the field of Engineering and Technology.
3. To interpret the importance of superconductivity and applications of Optical fiber.

UNIT – I

Free electron theory of metals

Classical Theory– Explanation of Electrical Conductivity and Ohm's Law – Drawbacks, Sommerfeld theory (Qualitative).

Principles of Quantum Mechanics

Waves and Particles, de-Broglie hypothesis Matter waves, Davisson and Germer experiment, Schrodinger Time Independent Wave Equation Wave function and its Physical Significance, Particle in one dimensional potential box (wave functions, probability densities and energy states), Density of States.

UNIT II

Band theory of solids

Electron in a periodic potential Bloch Theorem, Kronig-Penney model (Qualitative), Origin of energy band formation in solids, Classification of materials into Conductors, Semiconductors & Insulators. Concept of effective mass of an electron.

Fiber optics

Basic principle of optical fiber, Acceptance angle, Acceptance cone, Numerical aperture (Quantitative), Types of optical fiber, Applications of Optical Fiber.

UNIT III

Semiconductor Physics

Intrinsic and Extrinsic Semiconductors, Fermi level in Intrinsic and Extrinsic semiconductors, Carrier Concentration in Intrinsic and Extrinsic Semiconductors. Hall effect, P-N junction diode, Tunnel diode, LED and Photodiode.

UNIT - IV

Superconductivity

Introduction, Heat capacity, Isotopic effect, Persistent currents, Critical fields, Meissner effect, Type-I and Type-II superconductors, BCS Theory, Josephson effect SQUIDS, Basics of High Temperature Superconductors, Applications of Superconductors.

UNIT V

Fundamental of Nanoscience:

Introduction Basic definitions: Nanoscale, Nanoscience and Nanotechnology, Types of Nanomaterials, Surface to Volume Ratio, Quantum confinement, Synthesis of Nanomaterials Top down & Bottom up approaches: sol-gel, Ball milling and CVD methods, Applications.

TEXT BOOKS:

(1) Engineering Physics by P K Palanisamy: Scietech publication
(2) Solid State Physics by M Armugam; Anuradha Publications

REFERENCE BOOKS:

(1) Introduction to Solid State Physics by Charles Kittel: John Wiley & Sons
(2) Engineering Physics by R.K.Gaur and S.L.Gupta; Dhanpat Rai and Sons
(3) Engineering Physics by V Rajendran; McGraw hill education private ltd.
(4) A Text book of Engineering Physics by M N Avadhanulu, P G Kshirsagar; S Chand
(5) Engineering Physics by K Malik, A K Singh; Tata Mc Graw hill book publishers
(6) Engineering Physics by M.R.Srinivasan, New Age Publishers

APPLIED CHEMISTRY
(CIVIL & MECH)

L	T/P/D	C
3	0	3

Course objectives:

1. To appraise the students about the importance and role of chemistry in the field of Engineering by explaining the relevant topics.
2. To enable students to apply the knowledge acquired in improving the properties of engineering materials.
3. To provide the students with the necessary knowledge to solve the problems and make decisions with regards to the application of materials in a variety of engineering disciplines.
4. To equip the students with the required fundamentals of engineering chemistry to carry out in the interdisciplinary research such that the findings benefit the common man.
5. After the completion of the course, the student would understand about the important chemistry of water, electrochemistry, batteries and surface chemistry.

Course Outcomes:

1. At the end of the course the students will be able to
2. Perform laboratory experiments related to various functions of chemistry.
3. List the basic materials to be used as engineering materials for various applications in their respective Engineering disciplines.
4. Analyze the results and communicate these results in safe, professional and ethical manner.

UNIT I: ELECTROCHEMISTRY & BATTERIES

Conductance-types (electronic and electrolytic), Types of electrolytic conductance: specific, equivalent and molar conductance. Electrode, electrode potential, galvanic cell, cell reactions and cell notation, cell EMF, electrochemical series & is applications, types of electrodes (Normal Hydrogen Electrode, calomel electrode, glass electrode and quinhydrone electrode), Nernst equation and its applications,. Potentiometric titrations.

Introduction to cell and battery, characteristics of a cell. Primary (lithium cell) and secondary cells, (lead-Acid cell, Ni-Cd cell and Lithium ion cells,). Engineering applications of batteries, Solar battery, Fuel cells – Hydrogen – Oxygen fuel cell, advantages and engineering applications of fuel cells.

UNIT II: CORROSION AND ITS CONTROL:

Corrosion and its types: chemical and electrochemical corrosion, mechanism of chemical and electrochemical corrosion, galvanic, water line and pitting corrosion, factors affecting the rate of corrosion : nature of the metal, galvanic series, purity of metal, nature of corrosion product , nature of environment: effect of temperature, effect of pH, humidity. Corrosion control methods: Cathodic protection: Sacrificial anode method and impressed current cathode method. Protective coatings: metallic coatings (anodic and cathodic), methods of application on metals, hot dipping (galvanizing), cladding, cementation, electroplating(of copper) electro less plating (of nickel).Organic coatings paints, its constituents and their functions.

UNIT III: SURFACE CHEMISTRY

Adsorption, types - physical and chemical adsorption, Langmuir adsorption isotherm, application of adsorption, Colloids, classification of colloids, Electrical, mechanical & optical properties of colloids applications of colloids in industry. Micelles- Introduction, formation, structure, critical micellar concentration, uses. Nano materials: Introduction, basic methods of preparation (co-precipitation method, chemical vapour deposition method and sol gel method) and applications of nano materials.

UNIT IV: FUELS & LUBRICANTS

Classification, Characteristics, Liquid fuels- petroleum-refining of petroleum, Cracking (thermal and catalytic) ,Knocking- octane number and cetane number. Synthetic petrol - (Fischer Tropsch's and Bergius process), Gaseous fuels – LPG and CNG. Calorific value (HCV and LCV).

Lubricants: Classification of lubricants, mechanisms of lubrication, properties of lubricants: Viscosity and viscosity index, cloud point, pour point, flash & fire point,

UNIT V: ADVANCED ENGINEERING MATERIALS

Biodegradable polymers, types, examples: Polyhydroxy butyrate (PHB), Poly-Hydroxybutyrate-co-b-Hydroxy valerate (PHBV), Polyglycolic acid (PGA), Polylactic acid (PLA), Poly (Î-caprolactone) (PCL). Applications of biodegradable polymers.

Composite materials: Constituents of composite materials. Types of composite materials. Advantages and engineering applications of composite material

Biofuels – biodiesel, general methods of preparation and advantages

Text Books:

1. Engineering Chemistry by NYS. Murthy, Pearson, India.
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company.

Reference Books:

1. Text Book of Engineering Chemistry by Shasi Chawla, Dhantpat Rai publishing Company.
2. Engineering Chemistry by C. Daniel Yesudian, Anuradha publications

ENGINEERING MECHANICS – II
(Common to CIVIL & MECH)

L	T	C
3	1	3

UNIT-I

Analysis of perfect frames (Analytical Method) Types of Frames Assumptions for forces in members of a perfect frame, Method of joints, Method of sections, Force table, Cantilever Trusses, Structures with one end hinged and the other freely supported on rollers carrying horizontal or inclined loads.

UNIT-II

Kinematics: Rectilinear and Curvilinear motions Velocity and Acceleration Motion of Rigid Body- Types and their Analysis in Planar Motion.

UNIT-III

Kinetics: Analysis as a Particle and Analysis as a Rigid Body in Translation Central Force Motion Equations of Plane Motion Fixed Axis Rotation Rolling Bodies

UNIT-IV

Work – Energy Method: Equations for Translation, Work-Energy Applications to Particle Motion, Connected System-Fixed Axis Rotation and Plane Motion. Impulse-momentum method.

UNIT-V

Mechanical Vibrations: Definitions and Concepts Simple Harmonic Motion Free vibrations, simple and Compound Pendulums Torsion Pendulum Free vibrations without damping: General cases.

TEXT BOOKS:

1) Engineering Mechanics by Ferdinand. L. Singer
2) Engineering Mechanics by basudeb Bhattacharyya Oxford University Press.

REFERENCE BOOKS:

1) Engineering Mechanics by Timoshenko & Young.
2) Engineering Mechanics by S.S.Bhavikatti J.G.Rajasekharappa.
3) Engineering Mechanics by Pakhirappa
4) Engineering Mechanics by A. K. Tayal.

ENGINEERING GRAPHICS-II
(CIVIL & MECH)

L	T/P/D	C
2	-/ 3	3

Objectives:

1. To know how to draw the solids when they are sectioned and their developments.
2. To understand to draw the solids when they are interpenetrated with each other.
3. To analyze the conversion of isometric projection to orthographic projection and vice versa.
4. To know how to draw the Perspective projections.
5. To know the basics of CAD.

Outcomes:

1. Student able to draw, when the simple solids are sectioned and their developments of surfaces.
2. Student can imagine and construct the interpenetration of simple solids.
3. Student can convert and draw the given orthographic view to isometric view and vice versa.
4. Student can draw the Perspective projections of simple planes and solids.
5. Student can able to draw in CAD.

UNIT – I

Sections of Solids: Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views

Development of Surfaces: Development of Surfaces of Right Regular Solids – Prisms, Cylinders, Pyramids, Cones and their parts.

Intersection of Similar Solids: Line method - Intersection of Prism Vs Prism, Cylinders Vs Cylinder Simple treatment only. **(Dissimilar category- this part can be removed.)**

UNIT – II

Isometric Projections/views: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines.

UNIT –III

Transformation of Projections: Conversion of Orthographic Views to Isometric Views and Isometric views to orthographic views.

UNIT –IV

Perspective Projection: Principle, Perspective elements, Perspective View of Points, Lines, Plane Figures and Simple Solids; Vanishing Point Method, Visual Ray Method.

UNIT –V

Introduction to Computer Aided Drafting: Generation of points, lines, curves, polygons, simple solids, dimensioning. (Simple treatment only) – 2 experiments instead of sheets.

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhatt / Charotar publishers
2. Engineering Drawing, K.L.Narayana and Kannaiah / Scietech publishers.

REFERENCES:

1. Engineering Graphics,P.I. Varghese, TMH
2. Engineering Drawing, N.S. Parthasarathy/Vela Murali, Oxford University Press.
3. Engineering Graphics for Degree,K.C. John,PHI learning.

English Language Communication Skills Lab-II

L	T/P/D	C
0	-/ 3	2

Objectives

1. To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
2. To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency in spoken English and neutralize mother tongue influence.
5. To train students to use language appropriately for interviews, group discussion and public speaking

Learning Outcomes:

1. Better Understanding of nuances of language through audio- visual experience and group activities
2. Neutralization of accent for intelligibility
3. Speaking with clarity and confidence thereby enhancing employability skills of the students

Syllabus: English Language Communication Skills Lab shall have two parts:

1. **Computer Assisted Language Learning (CALL) Lab**
2. **Interactive Communication Skills (ICS) Lab**

The following course content is prescribed for the English Language Communication Skills Lab

Exercise-I

CALL Lab: Minimal Pairs
Word accent and Stress Shifts
Listening Comprehension

Exercise-II

ICS Lab: Descriptions- Narrations- Giving Directions and Guidelines
Question Tags and One-Word Substitutes
Concord (Subject in agreement with verb) and Words often misspelt-confused/misused

Exercise-III

CALL Lab: Intonation and Common Errors in Pronunciation.-Neutralization of Mother Tongue Influence and Conversation Practice.

Exercise-IV

ICS Lab: Extempore- Public Speaking
Active and Passive Voice,

Common Errors in English,
Idioms and Phrases

Exercise-V

ICS Lab: Information Transfer
Oral Presentation Skills
Reading Comprehension
Job Application with Resume preparation.

Books Suggested

1. Suresh Kumar, E. & Sreehari, P. 2009. A Handbook for English Language Laboratories. New Delhi: Foundation
2. Nambiar, K.C. 2011. Speaking Accurately. A Course in International Communication.

ENGINEERING PHYSICS LAB - II
(Mech and Civil)

L	P	C
0	3	2

Any Five Experiments are to be performed.

1. Numerical Aperture of an Optical Fibre
2. Single slit diffraction – Measurement of wavelength of monochromatic light
3. To determine the diameter of a thin wire by interference in a wedge shape air film.
4. Moment of inertia of fly wheel.
5. Frequency of A.C. mains using sonometer.
6. Characteristics of Photodiode
7. LCR circuit – Series and Parallel resonance
8. Energy gap of semiconductor

APPLIED CHEMISTRY LAB
(CIVIL & MECH)

Any Six experiments are to be performed:

1. Fundamentals of volumetric analysis : Determination of strength of an acid (HCl)
2. Estimation of ferrous iron by dichrometry
3. Estimation of HCl by conductometry using standard NaOH solution.
4. Estimation of HCl by potentiometry using standard NaOH solution.
5. Determination of viscosity of sample oil.
6. Determination Surface Tension of lubricants
7. Estimation of copper by colorimetric method.
8. Determination of strength of an acid by pH metry
9. Determination of carbon residue/flash point –fire point of a lubricants
10. Determination of cloud point and pour point of a lubricants

TEXT BOOKS:

1. Vogel's Textbook of Quantitative Chemical Analysis
2. Essentials of experimental engineering chemistry, Shashi Chawla, Dhanpat Rai & Co.
3. Laboratory manual of engineering chemistry, S.K.Bhasin and Sudha Rani, Dhanpat Rai & Co.

IT Workshop & ENGINEERING Workshop
(CIVIL & MECH)

L T P/D C

0 0 3 2

Objective:
The IT Workshop includes training on PC Hardware, Productivity tools including Word, Excel and Power Point.
To Engineering workshop impart basic knowledge of various tools and their use in different sections of manufacture such as Black smithy, Foundry and welding.

IT WORKSHOP:-
Objectives:
PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. **The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.**
Productivity tools module would enable the students in crafting professional word documents, excel spread sheets and power point presentations. (**Recommended to use Microsoft office 2007 in place of MS Office 2003**)

OUTCOMES:
- Getting enough knowledge to assemble a computer and identifying various components.
- Ability to understand the troubleshooting problems.
- To learn the tools PowerPoint, documentation, tabulation and calculations.

PC Hardware
Task 1: Identify the peripherals of a computer, components in a System Cabinet and its functions. Block diagram of the computer along with peripherals.
Task 2: Disassemble and assembling the PC

MS Word
Task 3: Microsoft (MS) word 2007: Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word. Give a task covering to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Inserting table, using Drawing toolbar in word.

MS Excel
Task 4: MS office 2007 Excel as a Spreadsheet tool covering Accessing, overview of toolbars, saving excel files, Using help and resources. Features includes Gridlines, Format Cells, Summation, auto fill, Formatting Text.

MS Power Point

Task 5 : MS power point:- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in Power point.

REFERENCES:

1. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dream tech.
2. The Complete Computer upgrade and repair book, 3rd edition Cheryl A Schmidt, WILEY Dreamtech.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. PC Hardware and A+Handbook – Kate J. Chase PHI (Microsoft).
5. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme–CISCO Press, Pearson Education.

ENGINEERING WORKSHOP – II:

1. **TRADES FOR EXERCISES:**

At least two exercises from each trade:

1. House wiring
2. Fitting
3. Tin-smithy and development of jobs carried out and soldering.

TEXT BOOKS:

1. Work shop manual - P.Kannaiah/K.L Narayana/ Scitech publishers.
2. Workshop manual by Venkat Reddy.

II YEAR I SEMESTER SYLLABUS

NUMERICAL METHODS

L	T	P	C
3	1	0	3

Course Objectives:

1. The objective is to find the relation between the variables x and y out of the given data (x,y).
2. The aim to find such relationships which exactly pass through data or approximately satisfy the data under the condition of least sum of squares of the errors.
3. The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data.
4. This topic deals with methods to find roots of an equation and solving a differential equation.
5. The numerical methods are important because finding an analytical procedure to solve an equation may not be always available.

Course Outcomes:

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

CO1:Develop skills in solving engineering problems involving Algebraic and transcendental equations.

CO2:Acquires the knowledge of interpolation in predicting future outcomes based on the present knowledge

CO3:Evaluating the Numerical Solutions for Integrals and Fitting of different types of curves to the given data

CO4: Understand the various Numerical Methods to solve Initial Value Problems.

CO5: To solve the initial and boundary value problems of differential equations which are essential in engineering applications.

UNIT-I

Solution of Non- Linear Equations and System of Linear Equations: Solution of Algebraic and Transcendental Equations – The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method. Solving system of non-homogeneous equations by L-U

Decomposition method (Crout's Method) Jacobi's and Gauss-Seidel Iteration method.

UNIT-II

Interpolation: Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences –Central differences – Symbolic relations and separation of symbols- Newton's formulae for interpolation – Central difference interpolation Formulae – Gauss Central Difference Formulae –Interpolation with unevenly spaced points-Lagrange's Interpolation formula.

UNIT-III

Numerical Integration & Curve Fitting: Generalized Quadrature (Newton's Cote's formula), Trapezoidal, Simson's and Weddle's rules and problems. Curve fitting: Fitting a straight line – Second degree curve – exponentional curve-power curve by method of least squares.

UNIT – IV

Numerical Solution of Initial Value Problems in Ordinary Differential Equations: Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Methods.

UNIT-V

Boundary Value and Eigen Value Problems: Shooting method, Finite difference method and solving Eigen Value problems-Power method.

TEXT BOOKS:

1. Grewal B.S (2007), Higher Engineering Mathematics, 40th Edition, New Delhi, Khanna Publishers.
2. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Mathematical Methods, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
3. Numerical Methods for Scientific & Engineering computation M.K.Jain, S.R.K.Iyengar, R.K.Jain, New Age Intenational Pvt. Ltd.
4. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley Publications.
5. Introductory Methods of Numerical Analysis. S.S. Sastry, Prentice Hall.

REFERENCES:

1. Srimanta Pal, Subodh C. Bhunia, (2015), Engineering Mathematics, 1st Edition, New Delhi, Oxford University Press.
2. Jain R. K., and Iyengar S. R. K (2008), Advanced Engineering Mathematics, 3rd Edition, New Delhi, Narosa Publication House.
3. Mathematical Methods of Science and Engineering (Aided with Matlab) Kanti B. Datta (2012), Seventh Edition, CENGAGE Learning.
4. Numerical Methods by Singaravelu, Meenakshi Agency - 2008

ENGINEERING GEOLOGY

L	T	P	C
3	0	0	3

Course Objectives:

1. Know case histories of failures of civil engineering constructions due to geological drawbacks and importance of geology from civil engineering point of view.
2. Learn about structural geology, mineralogy and petrology.
3. Know suitable site considerations for construction of dams and reservoirs.

Course Outcomes:

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

CO1: Classify and compare different rocks and minerals across the construction site.

CO2: Identify and build the knowledge on main and most common igneous, sedimentary and metamorphic rocks encountered by foundations and sites

CO3: Define And Interpret The Geological Structures In The Geological Maps And Cross Sections

CO4: Understand the importance of graphical studies and various geophysical methods..

CO5:Illustrate the factors which affect the dams, reservoirs and tunnels.

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 drawbacks. 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 tunnels. Weathering of common rock like "Granite."

UNIT - II

Mineralogy: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical

properties of common rock forming minerals - Feldspar, Quartiz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economic minerals - Pyrite, Hematite, Magnetite, Chromite, Galena, Pyrolusite, Graphite, Magnesite and Bauxite.

Petrology: Definition of rock - Geological classification of rocks into igneous, Sedimentary and metamorphic rocks - Dykes and sills - common structures and textures of igneous. Sedimentary and metamorphic rocks and their distinguishing features. Megascopic and microscopic study of Granite, Dolerite, Basalt, Pegmatite, Laerite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

UNIT - III

Structural Geology: Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults uncomfornities and joints - their important types and case studies – Importances of Insitu and drift soils - common types of soils and their origin, occurrence in India. Stabilisation of soils - Ground water, Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration.

UNIT - IV

Earthquakes: Causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Landslides - causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, earthquakes and landslides.

Importance of Geophysical Studies: Principles of geophysical study by Gravity methods, Magnetic methods, Electrical methods, Seismic methods, Radiometric methods and Geothermal method - Special importance of Electrical resistivity methods and seismic refraction methods. Improvement of competence of sites by grouting etc.., Fundamental aspects of Rock mechanics and Environmental Geology.

UNIT - V

Geology of Dams, Reservoirs and Tunnels: 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 - Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (ie. Tithological, structural and ground water) in tunneling over break and lining in tunnels.

TEXT BOOKS:

1. Engineering Geology by N.Chennakesavulu, Mc-Millan, India Ltd. 2005
2. Engineering Geology for Civil Engineers – P.C. Varghese PHI Learning. 2012
3. Engineering Geology by Parbin Singh, S.K.Kataria & Sons. Reprint 2013
4. Principles of Engineering Geology by K.V.G.K. Gokhale – B.S publications

REFERENCES:

1. F.G. Bell, Fundamental of Engineering Geology Butterworths, Publications, New Delhi, 1992.
2. Krynine& Judd, Principles of Engineering Geology &Geotechnics, CBS Publishers & Distribution
3. Engineering Geology by SubinoyGangopadhyay, Oxford university press.

STRENGTH OF MATERIALS – I

L	T	P	C
4	1	0	4

Course Objectives:

1. To provide basic knowledge in mechanics of materials so that the students can solve real engineering problems and design engineering systems.
2. To develop the theoretical basis and to derive the theories of the strength of materials with sound mathematical principles and to enable students to systematically solve engineering problems regardless of difficulty.
3. Students should be able to develop confidence and competence in solving intermediate to advanced level of strength of materials problems for design purposes.

Course Outcomes:

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

CO1: Examine stress – strain, elastic constants and strain energy.

CO2: Analyse the shear force and bending moment diagrams of beams and relationship between them.

CO3: Evaluate the flexural and shear stresses for various beam cross sections. .

C**O4**Calculate principal stresses and strains using analytical and graphical solutions for the safety using failure theories.

CO5: Determine the deflections of beams with various loadings using different methods.

UNIT – I

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 modulii and the relationship between them - Bars of varying section - composite bars - Temperature stresses. Elastic constants.

Strain Energy: Resilience - Gradual, sudden, impact and shock loadings - simple applications.

UNIT – II

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, uniformly distributed load, uniformly varying loads and combination of these loads - Point of contraflexure - Relation between S.F., B.M and rate of loading at a section of beam.

UNIT – III

Flexural Stresses: Theory of simple bending - Assumptions - Derivation of bending equation: $M/I = f/y = E/R$ - 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.

Shear Stresses: Derivation – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T and Angle sections.

UNIT – IV

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

Theories of Failure: Introduction - Various theories of failure: Maximum Principal Stress Theory, Maximum Principal Strain Theory, Strain Energy Theory and Shear Strain Energy Theory (Von Mises Theory).

UNIT – V

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, Uniformly distributed load, Uniformly varying load - Mohr's theorems - Moment area method - application to simple cases including overhanging beams.

Conjugate Beam Method: Introduction - Concept of conjugate beam method. Difference between a real beam and a conjugate beam. Deflections of determinate beams with constant and different moments of inertia.

TEXT BOOKS:

1. Strength of Materials by R.K.Bansal, Lakshmi Publications House Pvt. Ltd.2010.
2. Strength of Materials by R.K Rajput, S.Chand & Company Ltd - 2007.
3. Mechanics of Materials by Pytel and kiusalaas, Cengage Learning Pvt. Ltd. 2nd ed. 2011.

REFERENCES:

1. Strength of Materials by S.S.Bhavikatti, Vikas Publishing House Pvt. Ltd.2008.
2. Mechanics of Structures Vol –I by H.J.Shah and S.B.Junnarkar, Charotar Publishing House Pvt. 31st Edition : 2014.
3. Strength of Materials by D.S Prakash Rao, Universities Press Pvt. Ltd.1999.
4. Strength of Materials by S.S.Rattan, Tata McGraw Hill Education Pvt. Ltd.2nd ed. 2011.
5. Fundamentals of Solid Mechancis by M.L.Gambhir, PHI Learning Pvt. Ltd 2009.
6. Strength of Materials and Structures by John Case *et al.*, Butterworth-Heinemann. 4nd Ed. 2010.

SURVEYING

L	T	P	C
4	1	0	4

Course Objectives:

1. Have the ability to apply knowledge of mathematics, science, and engineering to understand the measurement techniques and equipment used in land surveying
2. Gain an appreciation of the need for lifelong learning through the discussion of recent changes in survey procedures and equipment.
3. Have the ability to use techniques, skills, and modern engineering tools necessary for engineering practice
4. Ability to function as a member of a team.
5. Understand the importance of professional licensure to protect the public in the practice of land surveying.

Course Outcomes:

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

CO1: Evaluate the basic principles of surveying and its Classification.

CO2: Determine the contour points and their importance.

CO3: Determine various areas and volumes based on regular and irregular boundaries.

CO4: Understand the advancements in surveying.

CO5: Application of Theodolite in surveying and valuation of it with basic surveying

UNIT – I

Introduction: Overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications - Scales, Conventional Symbols, Signals.

Distances and Direction: Distance measurement methods; use of chain, tape and Electronic distance measurements, Meridians, Azimuths and Bearings - declination, computation of angle.

UNIT – II

Leveling and Contouring: Concept and Terminology - Temporary adjustments - method of leveling. Characteristics and Uses of contours - methods of conducting contour surveys and their plotting.

UNIT – III

Computation of Areas and Volumes: Area from field notes, computation of areas along irregular and 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 - IV

Theodolite: Theodolite - description, uses and temporary and permanent adjustments measurement of horizontal and vertical angles. Principles of Electronic Theodolite. Trigonometrical leveling - Traversing.

UNIT – V

Tachometric Surveying: Stadia and tangential methods of Tacheometry. Distance and Elevation formulae for Staff vertical position.

Curves: Types of curves, design and setting out - simple and compound curves.

Advanced Surveying: Total Station and Global positioning system, Introduction to Geographic information system (GIS).

TEXT BOOKS:

1. Chandra A M, "Plane Surveying" and "Higher Surveying" New age International Pvt. Ltd., Publishers, New Delhi, 2002.
2. Duggal S K, "Surveying (Vol – 1 & 2), Tata Mc.Graw Hill Publishing Co. Ltd. New Delhi, 2004.
3. Text book of surveying by C.Venkataramaiah, Universities Press 2006.

REFERENCES:

1. Surveying and Leveling by R. Subramanian, Second Edition Oxford University Press – 2012.

2. Surveying Theory and Practice Seventh edition by James M. and Anderson Edward M. Mikhail TATA McGraw Hill January 1998.
3. Arthur R Benton and Philip J Taety, Elements of Plane Surying, McGraw Hill – 2000.
4. "Advanced Surveying Total Station GIS and Remote Sensing by Satheesh Gopi, R. Sathi Kumar and N.Madhu. Pearson Education India, 2007.

ENVIRONMENTAL SCIENCE

L	T	P	C
3	0	0	3

Course Objectives:

1. Develop an understanding on the importance of environmental protection.
2. Understanding the significance of ecological balance for sustainable development.
3. The ability to apply quantitative reasoning and practical skills to environmental problems.

Course Outcomes:

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

CO1: Understand the importance of Ecosystem and its Resources.

CO2: Be aware on the Variety of Living organism and the need to conserve them.

CO3: Understand the impacts of Developmental Activities.

CO4: Understand the Environmental Policies, Management Plan and Regulations.

CO5: Sensitize on a Sustainable Future.

UNIT I

Ecosystems: Definition, Scope and Importance of ecosystem; Classification of ecosystems, Structure and Functions of ecosystem: Food chains, Food Web and Ecological Pyramids, Flow of energy; Bioaccumulation and Biomagnifications; Ecosystem Value services and Carrying Capacity.

Biodiversity and Biotic Resources: Introduction, Definition, levels of Biodiversity, Value of biodiversity, Hot spots of biodiversity, Threats to biodiversity, conservation of biodiversity: In-Situ and Ex-situ conservation.

UNIT II

Natural Resources: Classification of Resources, **Water resources**: use and over utilization of surface and ground water, Floods and Droughts, Dams: benefits and problems.
Energy resources: growing energy needs, Renewable Energy Sources - Solar, Hydro-Power, Wind, Tidal, Geo-Thermal, Biomass, Bio-fuels, Hydrogen as a fuel and Biogas and Non Renewable Energy - Coal, Petroleum, LPG, Natural Gas, SNG, CNG.
Land resources: land as a resource, land degradation - Landslide and Soil Erosion.
Forest Resources - Uses and Exploitation.

UNIT III
Environmental Pollution and Control: Types of Pollution, Sources, Effects and Control measures and Quality Standards for

1. Air Pollution
2. Water Pollution
3. Soil Pollution
4. Noise Pollution

Solid, Hazardous, Biomedical and e-Waste Management and Handling Rules, Nuclear Hazards – Case Studies.
Waste water treatment methods: Effluent treatment plants (ETP), Sewage treatment plants (STP), Common and combined effluent treatment plants (CETP).

UNIT IV:
Global Environmental Problems and Global Efforts: Green house effect, Green House Gases (GHG), Global Warming, Sea level rise, climate change and their impacts on human environment; Ozone depletion and Ozone depleting substances (ODS); Acid Rains, Deforestation and Desertification.
Environmental Impact Assessment (EIA): Definition of Impact: classification of impacts, Methods of baseline data acquisition. Impacts on different environmental components; Environmental Impact Statement (EIS). Environmental Management Plan (EMP) - Rain Water Harvesting, Water Shed Management and Bioremediation.

UNIT V:
Environmental Policy, Legislation, Rules and Regulations: Environmental Protection act, Legal aspects Air (Prevention and

Control of pollution) Act- 1981, Water (Prevention and Control of pollution) Act-1974, Forest Conservation Act, Wildlife Act 1972.

Towards Sustainable Future: Concept of Sustainable Development, Threats to Sustainability: Population and its explosion, Crazy Consumerism, Over-exploitation of resources; Environmental Education, Role of Civil Societies, Role of IT in Environment, Smart Cities, Concept of Green Building, Low Carbon Lifestyle, Life cycle assessment and Ecological Foot Print.

TEXT BOOKS:

1. Text Book of Environmental Studies by Anubha Kaushik (4th Edition), New age International Publishers.
2. Environmental studies by Erach Bharucha 2005, University Grants Commission, University Press.
3. Environmental studies, From crisis to cure by R.Rajagopalan, 2005.

REFERENCES:

1. Environmental Science: Towards a Sustainable Future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Science by Daniel B. Botkin & Edward A. Keller, Willey INDIA Edition.
3. Text book of Environmental Science and Technology by M.Anji Reddy 2007.

FLUID MECHANICS

L	T	P	C
4	1	0	3

Course objective:

1. To know the various fluid properties and fluid pressure measurement.
2. To study the different equations of fluid motion.
3. To impart the knowledge of boundary layer theory and flow in pipes

Course outcome:

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

CO1: Understand the Concepts of fluid properties and the relationship between them and to obtain the principles of continuity, momentum, and energy as applied to fluid motions.
CO2: Differentiate various flow lines and to formulate the Continuity equation for One dimensional, Two dimensional and three dimensional flows.
CO3: Formulate the Euler's and Bernoulli's equation with practical applications, to determine the discharge over notches and weirs and to apply the Momentum equation for a pipe bend..
CO4: Evaluate the head losses in pipes, flow between parallel plates and to solve the pipe network problems.
CO5: Demonstrate Boundary layer concepts and to explain the separation of the boundary layer.

UNIT – I

Introduction: Dimensions and units - Physical properties of fluids; specific gravity, viscosity, surface tension, vapor pressure and their influences on fluid motion - Pressure at a point, Pascal's law, Hydrostatic law - atmospheric, gauge and vacuum pressure - Measurement of pressure using Pressure gauges, Manometers (differential and Micro Manometers). Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces - Center of pressure - Derivations and problems.

UNIT– II

Fluid Kinematics: Description of fluid flow, Stream line, path line, streak lines and stream tube. Classification of flows: Steady, unsteady, uniform, nonuniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two, three

dimensional flows – stream and velocity potential functions, flownet analysis.

UNIT – III

Fluid Dynamics and Measurement of Flow: Surface and body forces - Euler's and Bernoulli's equations for flow along a stream line for 3-D flow (Navier - Stoke's equations - Explanationary) Momentum equation and its application - forces on pipe bend - Pitot tube - Venturi meter - orifice meter - classification of orifices, flow over rectangular, triangular, trapezoidal and Stepped notches - Broad crested weirs.

UNIT - IV

Closed Conduit Flow: Reynold's experiment - Characteristics of Laminar & Turbulent flows. Laws of Fluid friction - Darcy's equation, variation of friction factor with Reynold's number - Moody's Chart, Minor losses - pipes in series - pipes in parallel -Total energy line and hydraulic gradient line. Pipe network problems, flow between parallel plates, flow through long tubes, flow through inclined tubes.

UNIT – V

Boundary Layer Theory: Reynold's Approximate Solutions of Navier Stoke's Equations - Boundary layer - concepts, Prandtl 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.

TEXT BOOKS:

1. Fluid Mechanics by Modi and Seth, Standard book house. Hydraulics and Fluid Mechanics Including Hydraulics Machines (English) 20 Edition.
2. Introduction to Fluid Machines by S.K.Som & G.Biswas (Tata Mc.Grawhill publishers Pvt. Ltd.) Hydraulics and Fluid Mechanics Including Hydraulics Machines McGraw Hill Education (India) Private Limited; 3 edition (19 August 2011)
3. Introduction to Fluid Machines by Edward J. Shaughnessy, Jr, Ira M. Katz and James P. Schaffer, Oxford University Press, New Delhi Oxford (5 December 2005).

REFERENCES:

1. Fluid Mechanics by J.F.Douglas, J.M. Gaserek and J.A.Swaffirld (Longman) Addison Wesley Longman 1995.
2. Fluid Mechanics by Frank.M. White (Tata Mc.Grawhill Pvt. Ltd.) McGraw-Hill Higher Education; 7 ed. 2010.
3. Fluid Mehanics by A.K. Mohanty ,Prentice Hall of India Pvt. Ltd., New Delhi 2ed,
4. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) ltd., New Delhi 2005.

SURVEYING LAB – I

L	T	P	C
0	0	3	2

Course Outcomes:

Survey of an area using chains and tapes.

CO1: Survey of an area using chains and tapes

CO2: Determine the area of land by using a compass

CO3: Determine the area of a given field of plane table

CO4: Functioning of dumpy level and its applications in leveling.

CO5: Determine the contour points and their importance in surveying

LIST OF EXPERIMENTS:

1. Survey of an area by Chain Survey
2. Chaining across obstacles
3. Determination of two inaccessible points with Compass
4. Surveying of a given area by Prismatic compass
5. Radiation method by Plane Table
6. Intersection method by Plane Table
7. Two point problem in Plane Table
8. Three point problem in Plane Table
9. Traversing by Plane Table
10. Fly Leveling (Differential Leveling)
11. An exercise of L.S & C.S and Plotting
12. Contouring (Two Exercices)

ENGINEERING GEOLOGY LAB

L	T	P	C
0	0	3	2

Course Outcomes:

CO1: To study the physical properties and identification of minerals referred under th

CO2: Describe and identify the rocks referred under the theory.

CO3: Illustrate the Microscopic study of rocks and minerals.

CO4: Illustrate the Microscopic study of rocks and minerals.

CO5: Interpret and draw the sections for geological maps showing tilted beds, faults, unconformities etc.,

LIST OF EXPERIMENTS:

1. Study of physical properties and identification of minerals.
2. Megascopic description and identification of rocks (Igneous Rocks).
3. Megascopic description and identification of rocks (Sedimentary Rocks).
4. Megascopic description and identification of rocks (Metamorphic Rocks).
5. Microscopic study of rocks.
6. Microscopic study of Minerals.
7. Study of Geological Structures like Faults and Folds.
8. Study of Geological Structures like Tilted Beds and unconformities.
9. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.
10. Simple Structural Geology problems.

II YEAR II SEMESTER SYLLABUS

PROBABILITY& STATISTICS

L	T	P	C
3	1	0	3

Course Objectives:

1. To revise elementary concepts and techniques of probability & statistics.
2. To extend and formalize knowledge of the theory of probability and random variables.
3. To introduce new techniques for carrying out probability calculations and identifying probability distributions.
4. To motivate the use of statistical inference in practical data analysis.
5. To study elementary concepts and techniques in statistical methodology.
6. To provide an introduction to subsequent statistics courses.

Course Outcomes:

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

CO1: To differentiate among random variables involved in the probability models which are u all branches of engineering

CO2: Derive the relationship among a variety of performance measures using probability dist

CO3: Acquire elementary knowledge of parametric and non-parametric tests and understand of observing state analysis for predicting future conditions.

CO4: Identify and examine situations that generate using problems and able to solve the test ANOVA for classified data.

CO5: Apply proper measurement, Indicators and techniques of correlation and Regression an

UNIT – I

Random Variables: Random variables - Discrete and continuous - Expectation - Properties, Moment Generating Function and Fitting of Binomial, Poisson & Normal distributions.

UNIT – II

Testing of Hypothesis I: Sampling Distribution - Definition of Sample, Population and Types of Sampling. Estimation - Point estimation, Interval estimation, Testing of Hypothesis - Null hypothesis – Alternative hypothesis, Type I & Type II errors – critical region confidence interval for the mean, testing of hypothesis for single mean and the difference between the means for large samples.

UNIT – III

Testing of Hypothesis II: Confidence interval for the proportions, Tests of hypothesis for the proportions - single and the difference between the proportions for large samples. Small Samples: t-distribution, F-Distribution, χ^2 distribution.

UNIT –IV

Correlation and Regression: Coefficient of correlation – The Rank correlation, Regression Coefficients – Properties of regression coefficients, The two lines of regression, Multi Linear Regression.

UNIT –V

Quality Control: Control Charts-Control lines, determination of control limits, Types of Control Charts-Control Charts for variables (mean chart, Range chart)-charts for attributes (fraction defective, no. of defectives and defects for unit).

Time Series: Components of Time Series - Measurement of Trend.

TEXT BOOKS:

1. Probability & Statistics by Dr. T.K.V.Iyengar, Dr.B.Krishna Gandhi et.al S.Chand Publications.
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers.
3. Probability & Statistics for Engineers by Miller and John E Freund, Prentice Hall of India.
4. R.C.Gupta: Statistical Quality Control.
5. Fundamentals of Applied Statistics by S C Gupta, Sultan Chand and Sons.

REFERENCES:

1. Fundamentals of Mathematical Statistics by S.C. Gupta & V.K. Kapoor, S-Chand & Sons.
2. Srimanta Pal, Subodh C. Bhunia, (2015), Engineering Mathematics, 1st Edition, New Delhi, Oxford University Press.
3. Probability, Statistics and Queueing Theory, 2nd Edition, Trivedi, John Wiley and sons
4. Probability and Statistics by E.Rukmangadachari, Pearson Education; First edition (2012).
5. Probability and Statistics for Engineering and the Sciences, 8th Edition, Jay L Devore, Cengage Learning.
6. Willam Feller: Introduction to Probability theory and its applications. Volume –I, Wiley
7. Statistical Quality Control, M.Mahajan, Dhanpat Rai & Sons.

STRUCTURAL ANALYSIS – I

L	T	P	C
4	1	0	4

Course Objective:

1. To introduce the students to the concept of global structural stability, theory of structural analysis and methods in structural analysis.

Course Outcome:

Students who successfully complete this course will be able to:

CO1: Analyze propped cantilever, fixed beams for external loadings and support settlements..

C**O2:** Understand the concept of Slope deflection, moment distribution method and analysis of continuous beams.

CO3: Calculate the deflection of beams by different methods for determining slope and deflection and understand the concept of three hinged arches

CO4: Analyze the pin-jointed plane frames.

CO5: Draw the influence line diagram for moving loads and calculate critical stress resultants.

UNIT I

Propped Cantilever and Fixed Beams: Determination of static and kinematic indeterminacies for beams - Analysis of Propped cantilever and fixed beams, including the beams with different moments of inertia, subjected to uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads - Shear force and Bending moment diagrams for Propped Cantilever and Fixed Beams-Deflection of Propped cantilever and fixed beams; effect of sinking of support, effect of rotation of a support.

UNIT – II

Continuous Beams: Introduction - Continuous beams, Clapeyron's theorem of three moments- Analysis of continuous beams with constant and variable moments of inertia with one or both ends fixed -

continuous beams with overhang. Effects of sinking of supports. Derivation of slope-deflection equation, application to continuous beams with and without settlement of supports. Analysis of continuous beams with and without settlement of supports using Moment Distribution Method. Shear force and Bending moment diagrams, Elastic curve.

UNIT-III

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 - Unit Load Method. Deflections of simple beams and pin- jointed plane trusses. Deflections of statically determinate bent frames.

Arches: Introduction – Types of Arches – Comparision between Three hinged and Two hinged Arches. Linear Arch. Eddy's theorem. Analysis of Two & Three hinged arches.

UNIT – IV

Analysis of Perfect Frames: Types of frames- Perfect, Imperfect and Redundant pin jointed frames. - Analysis of determinate pin jointed frames using method of joints, method of sections for vertical loads, horizontal loads and inclined loads.

UNIT – V

Moving Loads and Influence Lines: Introduction maximum SF and BM at a given section and absolute maximum S.F., and B.M due to single concentrated load, Uniformly Distributed load longer than the span, Uniformly Distributed load shorter than the span, two point loads with a fixed distance between them and several point loads - Equivalent uniformly distributed load-Focal length. Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section - Load position for maximum BM at a section - Point loads, UDL longer than the span, UDL shorter than the span- Influence lines for forces in members of Pratt and Warren trusses. Equivalent uniformly distributed load. Focal length.

TEXT BOOKS:

1. Structural Analysis, Vol –I & II by V.N.Vazirani and M.M.Ratwani, Khanna Publishers - 2008.

2. Structural Analysis, Vol I & II by G.S.Pandit and S.P.Gupta, Tata McGraw Hill Education Pvt. Ltd. 2 edition (10 April 2008).

REFERENCES:

1. Basic Structural Analysis by K.U.Muthu *et al.,* I.K.International Publishing House Pvt.Ltd - 2011.
2. Structural Analysis by R.C.Hibbeler, Pearson Education 2008.
3. Mechanics of Structures, Vol –II by H.J.Shah and S.B.Junnarkar, Charotar Publishing House Pvt. Ltd - 2007.
4. Structural Analysis by Devdas Menon, Narosa Publishing House - 2008.
5. Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Education Pvt. Ltd 2001.
6. Fundamentals of Structural Analysis by M.L.Gamhir, PHI Learning Pvt. Ltd 2011.
7. Structural Analysis -I by S.S.Bhavikatti, Vikas Publishing House Pvt. Ltd.2009

STRENGTH OF MATERIALS – II

L	T	P	C
3	1	0	3

Course Objective:

1. To provide basic knowledge in analysis of the structure, including tortion and deflections for different structural members like beam struts, springs etc., so that the students can solve real engineering problems and design engineering systems.

Course Outcomes:

CO1: Realize the basic concepts of torsion and locate the bending stress

CO2: Identify the types of columns and calculate the failure load for various end conditions

CO3: Understand the basic concepts of direct and bending stresses and calculate the bending moment

CO4:Differentiate about thin and thick cylinders and calculate the various stresses

CO5: Determine the stresses due to Unsymmetrical bending of beams and locate the shear

UNIT – I

Torsion of Circular Shafts: Theory of pure torsion – Derivation of Torsion equations: $T/J = q/r = N\theta/L$ – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending and torsion and end thrust – Design of shafts according to theories of failure.

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

UNIT – II

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 - III

Direct and Bending Stresses: Stresses under the combined action of direct loading and bending moment, 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 bending moment about both axis.

Beams Curved in Plan: Introduction – circular beams loaded uniformly and supported on symmetrically placed Columns – Semi-circular beam simply-supported on three equally spaced supports.

UNIT – IV

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.

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.

UNIT – V

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.

Shear Centre: Introduction - Shear centre for symmetrical and unsymmetrical (channel, I, T and L) sections.

Text Books:

1. Strength of Materials by R.K.Bansal, Lakshmi Publications House Pvt. Ltd.6th ed. 2015.
2. Strength of Materials by R.K Rajput, S.Chand & Company Ltd.4th revised ed.
3. Strength of Materials by R.Subramanian, Oxford University Press 2nd 2010.

REFERENCES:

1. Fundamentals of Solid Mechancis by M.L.Gambhir, PHI Learning Pvt. Ltd 2009.
2. Introduction to Strength of Materials by U.C.Jindal, Galgotia Publications Pvt. Ltd 2001.
3. Mechanics of Materials by R.C.Hibbeler, Pearson Education 9th ed 2014.
4. Strength of Materials by D.S Prakash Rao, Universities Press Pvt. Ltd.1999.
5. Strength of Materials by S.S.Rattan, Tata McGraw Hill Education Pvt. Ltd 2008.
6. Mechanics of Materials by Ferdinand P. Beer *et al.,* Tata McGraw Hill Education Pvt. Ltd. 5th ed. 2008.

CONCRETE TECHNOLOGY

L	T	P	C
3	0	0	3

Course Objectives:

1. To understand the properties of ingredients of concrete.
2. To study the behavior of concrete at its fresh and hardened state.
3. To study about the concrete design mix.
4. To know about the procedures in concreting.
5. To understand special concrete and their use.

Course Outcomes:

On completion of the course, the students will be able to

CO1: Understanding the properties of cements and admixtures.

CO2: Analyse the properties of aggregates.

CO3: Evaluate the properties of fresh concrete.

CO3: Analyze the behavior of hardened concrete and durability of concrete.

CO4: Design the concrete mix using IS Code and Examine the special concretes.

UNIT I

Cement: Portland cement – chemical composition – Hydration, Setting of cement – Structure of hydrate cement – Test on physical properties – Different grades of cement.

Admixtures: Types of admixtures – mineral and chemical admixtures.

UNIT - II

Aggregates: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregate – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded aggregate – Maximum aggregate size.

UNIT – III

Fresh Concrete: Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of the concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water.

UNIT - IV

Hardened Concrete: Water / Cement ratio – Abram's Law – Gelspaoe ratio – Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength - Curing.

Testing of Hardened Concrete: Compression tests – Tension tests – Factors affecting strength – Flexure tests – Splitting tests – Pull-out test, Non-destructive testing methods: Rebound hammer method and ultrasonic pulse velocity method. – codal provisions for NDT.

ELASTICITY, CREEP & SHRINKAG: Modulus of elasticity – Dynamic modulus of elasticity – Posisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – types of shrinkage.

UNIT – V

Mix Design: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by various methods – BIS method of mix design.

Special Concretes: Introduction to Light weight concrete – Cellular concrete – No-fines concrete – High density concrete – Fibre reinforced concrete – Polymer concrete – High performance concrete – Self compacting concrete.

Text Books:

1. Properties of Concrete by A.M.Neville – 5th edition 2011.
2. Concrete Technology by M.S.Shetty. – S.Chand & Co, 7th edition 2015.

References:

1. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi 5th ed 2004.
2. Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi 2006.

3. Concrete: Micro structure, Properties and Materials – P.K.Mehta and J.M.Monteiro, Mc-Graw Hill Publishers 4th ed. 2014.

HYDRAULICS & HYDRAULIC MACHINERY

L	T	P	C
4	1	0	4

Course Objective:

1. To introduce the students to the concept of hydraulic flow and advance fluid mechanics concept. To enhance the thinking on the efficiency and design criteria of hydraulic system including power consumption criteria.

Course Outcome:

Students who successfully complete this course will be able to:

CO1: Explain the concept of different types of flows, designing of most Economical section of op channel & to understand the concept of specific energy

CO2: Demonstrate the concept of dimensional quantities and the application of similitude conce designing a model and prototype.

CO3: Understand the concept, working applications of impact of jets with the importance of Constructing velocity triangles.

CO4: Compare the design concept of Pelton, Francis and Kaplan turbines, Centrifugal pumps al with the most economical designs..

CO5: Determine the working mechanism of different types of the pumps with their important characteristic curves

UNIT – I

Open Channel Flow: Types of flows - Type of channels – Velocity distribution – Energy and momentum correction factors – Chezy's, Manning's; and Bazin formulae for uniform flow – Most Economical sections. Critical flow: Specific energy-critical depth – computation of critical depth – critical sub-critical and super critical flows. Non uniform flow-Dynamic equation for G.V.F., Mild, Critical, Steep, horizontal and adverse slopes-surface profiles-direct step method – Rapidly varied flow, hydraulic jump, energy dissipation.

UNIT - II

Hydraulic Similitude: Dimensional analysis-Rayleigh's method and Buckingham's pi theorem – study of Hydraulic models – Geometric, kinematic and dynamic similarities – dimensionless numbers – model and prototype relations. Distorted and non-distorted models.

UNIT – III

Hydrodynamic Force on Jets: 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 - IV

Hydraulic Turbines: 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, draft tube – theory and function efficiency. Governing of turbines – surge tanks – unit and specific turbines – unit speed – unit quantity – unit power-specific speed performance characteristics – geometric similarity – cavitation.

Classification of Hydropower plants – Definition of terms – load factor, utilization factor, capacity factor, estimation of hydropower potential.

UNIT – V

Centrifugal Pump: Installation details, classification, types work done – Manometric head –minimum starting speed – losses and efficiencies – specific speed multistage pumps – pumps in parallel – performance of pumps – characteristic curves – NPSH – cavitations.

Text Books:

1. Open Channel flow by K.Subramanya, Tata Mc Grawhill Publishers 3rd ed. 2009.
2. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) ltd., New Delhi 9th ed. 2015.
3. Fluid Mechanics & Fluid Power Engineering by D.S. Kumar Kataria & Sons. 2013.

REFERENCES:

1. Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard book house. 3rd ed. 2009.
2. Elements of Open channel flow by Ranga Raju, Tata Mc.Graw Hill, Publications.

3. Fluid mechanics and fluid machines by Rajput, S.Chand &Co. 2011.
4. Open Channel flow by V.T.Chow, Mc.Graw Hill book company, 1958.
5. Hydraulic Machines by Banga & Sharma Khanna Publishers, 199

BUILDING MATERIALS CONSTRUCTION & PLANNING

L	T	P	C
3	0	0	3

Course objective:

The course is part of the core course requirements. The course will provide you with a thorough understanding of the basic principles of Building Construction. The course will also involve visits to actual Building Construction Sites where you can see what is being taught in the class.

Course outcome:

At the conclusion of the course you should be able to:

CO1: Develop knowledge of material science and behavior of various building materials used construction.

CO2: Provide procedural knowledge of the simple testing methods of cement, lime and Admix

CO3: List the building components and Importance of building services.

CO4: Classify Masonry and finishing work.

CO5: Applications of Building Bye Laws & formwork.

UNIT – I

Stones and Bricks, Tiles: Building stones – classifications and quarrying – properties – structural requirements – dressing Bricks – Composition of Brick earth – manufacture and structural requirements.

Wood, Aluminum, Glass and Paints Wood - structure – types and properties – seasoning – defects; alternate materials for wood – GI / fibre – reinforced glass bricks, steel & aluminum.

UNIT-II

Cement & Admixtures: Ingredients of cement – manufacture – Chemical composition – Hydration - field & lab tests Admixtures – mineral & chemical admixtures – uses.

UNIT-III

Building Components : Lintels, Arches, walls, vaults – stair cases – types of floors, types of roofs – flat, curved, trussed ; foundations – types ; Damp Proof Course ; Joinery – doors – windows – materials – types.

Building Services : Plumbing Services : Water Distribution, Sanitary – Lines & Fittings ; Ventilations : Functional requirements systems of ventilations. Air-conditioning - Essentials and Types; Acoustics – characteristic – absorption – Acoustic design ; Fire protection – Fire Hazards – Classification of fire resistant materials and constructions

UNIT -IV

Masonry and Finishing's Brick masonry – types – bonds ; Stone masonry – types ; Composite masonry – Brick-stone composite ; Concrete, Reinforced brick. Finishers : Plastering, Pointing, Painting, Claddings – Types – Tiles - ACP

UNIT –V

Form work: Requirements- Types of formwork – Standards – Scaffolding – types of formwork ; Shoring, Underpinning

Building Planning: Principles of Building Planning, Classification of buildings and Building by laws.

TEXT BOOKS:

1. Building Materials and Construction – Arora & Bindra, Dhanpat Roy Publications. 2014
2. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd.,10thed. 2008

REFERENCES:

1. Building Materials by Duggal, New Age International.4th revised ed. 2010
2. Building Materials by P.C.Varghese, PHI. 2nd revised ed. 2015
3. Building Construction by PC Varghese PHI. 1st ed. 2007.
4. Construction Technology – Vol – I & II by R. Chuddy, Longman UK. 1987
5. Basics of Civil Engg by Subhash Chander; Jain Brothers 1st ed. 2008
6. Alternate Building materials and Technology, K.S Jagadish, Venkatarama Reddy and others; New Age Publications 1st ed. 2007 reprint 2014

SURVEYING LAB – II

L	T	P	C
0	0	3	2

Course Outcomes:

CO1: Evaluate horizontal and vertical angles by different methods using theodolite

CO2: Assess heights and distances using trigonometric method.

CO3: Develop skills to set out curves.

CO4: Develop skills to setting out works for building & pipe lines.

CO5: Develop skills in using total station.

List of Experiments:

1. Study of theodolite in detail – practice for measurement of horizontal and vertical angles."
2. Measurement of horizontal angles by method of repetition
3. Measurement of horizontal angles by method of reiteration.
4. Trigonometric Leveling – Heights and distance problem (Two Exercises)."
5. Heights and distance using Principles of tachometric surveying (Two Exercises)"
6. Curve setting – different methods. (Two Exercises)
7. Setting out works for buildings & pipe lines.
8. Determination of area using total station.
9. Traversing using total station.
10. Contouring using total station.
11. Determination of remote height using total station.
12 .Distance, gradient, Diff. height between two inaccessible points using total stations."

List of the equipments required:

1. Total Station
2. Transit Theodolite
3. Tachometer
4. Chains, tapes, Ranging rods, cross staff, arrows, Tripods

STRENGTH OF MATERIALS LAB

L	T	P	C
0	0	3	2

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

CO1: Predict the behavior of materials under impact, hardness, tensile and compressiv

CO2: Determine elastic constants by flexural and torsion test.

CO3: Determine the spring constants under various loadings.

CO4: Understand the deflection of materials under bending

CO5: Understand the material properties, stress and strain.

List of Experiments

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

List of Major Equipment:

1. UTM for conducting tension test on rods
2. Steel beam for flexure test
3. Wooden beam for flexure test
4. Torsion testing machine
5. Brinnell's / Rock well's hardness testing machine
6. Spring testing machine
7. Compression testing machine
8. Izod Impact machine
9. Shear testing machine
10. Beam setup for Maxwell's theorem verification.

11. Continuous beam setup
12. Electrical Resistance gauges.

III YEAR I SEMESTER SYLLABUS

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

L	T	P	C
3	0	0	3

Course Objectives:-

1. To enable the student to understand , with a practical insight,
2. the importance of certain basic issues governing the business operations namely demand and supply, production function, cost analysis,
3. analysis of markets, forms of business organizations,
4. Significance of capital budgeting and financial accounting and financial analysis.

Course Outcomes

CO1: Describe the economic activities for profit earning and also understand the significance of demand and its forecasting

CO2: Evaluate the production function through the Cobb Douglas Production Function.

CO3: Design and implement different structures of market coverage how price is determined under different market structures.

CO4: Understand the Ratio analysis to give an idea about financial forecasting, financial planning, controlling the business and decision making.

CO5: Describe and demonstrate the concepts of capital budgeting and allocation of the resources through capital budgeting methods

UNIT –I

Introduction to Managerial Economics& Demand Analysis:

Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

UNIT –II

Production & Cost Analysis:

Production Function – Isoquants and Isocosts, MRTS, Least Cost

Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts (Opportunity cost vs outlay costs, Fixed, variable and semi variable costs, marginal cost vs average cost, out of pocket vs book cost, imputed cost, implicit & explicit cost, incremental and decremental cost, sunk vs future cost, separable and joint costs) Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

UNIT –III

Markets & New Economic Environment:

Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing: Objectives and Policies of Pricing. Methods of Pricing. Business: Features and evaluation of different forms of Business Organization: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, New Economic Environment: Changing Business Environment in Post-liberalization scenario.

UNIT –IV

Introduction to Financial Accounting & Financial Analysis:

Accounting concepts and Conventions - Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).Financial Analysis: Analysis and Interpretation of Liquidity Ratios (current ratio, quick ratio), Activity Ratios(inventory turnover ratio, debtors turnover ratio), and Capital structure Ratios(debt equity ratio, interest coverage ratio) and Profitability ratios(gross profit ratio, net profit ratio, operating profit ratio, P/E ratio, EPS). Du Pont Chart.

UNIT –V

Capital Budgeting

Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital, Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR), Net Present Value Method (simple problems), IRR and PI method.

TEXT BOOKS:

1. Aryasri: Managerial Economics and Financial Analysis, TMH, 2012.

2. Vijay Kumar & Appa Rao, Managerial Economics & Financial Analysis, Cengage 2011.

3. J. V. Prabhakar Rao & P.V. Rao, Managerial Economics & Financial Analysis, Maruthi Publishers, 2011.

REFERENCE BOOKS:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2012.

2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey & Chrystel, Economics, Oxford University Press, 2012
4. Domnick Salvatore: Managerial Economics in a Global Economy, Thomson, 2012.
5. Narayanaswamy: Financial Accounting—A Managerial Perspective, Pearson, 2012.
6. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2012.
7. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2012.
8. Dwivedi: Managerial Economics, Vikas, 2012.
9. Kasi Reddy, Saraswathi, MEFA, PHI Learning, 2012.
10. Shailaja & Usha : MEFA, University Press, 20

DESIGN OF REINFORCED CONCRETE STRUCTURES

L	T	P	C
3	1	0	3

Course objectives

1. To provide the basic concepts of reinforced concrete design
2. To impart the knowledge of various methods of design
3. To provide the design of simple structural elements such as beams, Columns, footings & foundations, slabs and staircase

Course outcome

CO1: Understand the various design concepts and design a beam under flexure and draw the reinforcement details.

CO2: Design the beam under shear and torsion, Calculate the anchorage and development length and check the serviceability requirements for RC structural elements..

CO3: Analyze and solve various RC slabs and draw the reinforcement details

CO4: Classify short, long columns and draw the reinforcement details

CO5: Explore the design concept of footing & staircase.

UNIT I

Concepts of RC design: Working stress method - Ultimate load method - Limit State method - Stress-strain curve for concrete, steel - Partial safety factor - Characteristic values - Stress Block parameters – IS: 456 2000 provisions.

Design and detailing of beams: Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections.

UNIT II

Shear, torsion and bond: Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, IS Code provisions. Design examples in simply supported and continuous beams, detailing. Limit state of serviceability for deflection and cracking – IS Code provisions.

UNIT III

Design and detailing of slabs: Design of one way, two way and continuous slabs using IS Codal provisions and coefficients, Cantilever slab/ Canopy slab. Introduction to Yield line theory.

UNIT IV

Design and detailing of short and long columns: Subjected to axial loads – uniaxial and biaxial bending - IS Code provisions.

UNIT V

Design and detailing of footings and staircase: Different types of footings – Design of isolated, square, rectangular and circular footings - Introduction to combined footings. Design of staircase (doglegged type)

TEXT BOOKS

1. A.K. Jain, Reinforced Concrete – Limit State Design, 7/e Standard book house, 2012.
2. Pillai and Menon, Reinforced Concrete Design, 3/e, Tata McGraw Hill, 2009.
3. P.C. Varghese, Limit State Design of Reinforced Concrete, 2/e, Prentice Hall of India,2013.
4. Reinforced concrete design by N.Krishna Raju & R.N Pranesh, New Age International publishers New Delhi 2003.
5. Reinforced Concrete Design by S. Unnikrishna Pillai & Devdas Menon, Tata McGraw Hill, 2009.

REFERENCE BOOKS

1. Fundamentals of Reinforced Concrete deisign by M.L Ghambhir, Prentice Hall of India,2013.
2. Plain and Reinforced Concrete, Vol. I, Jain & Jaikrishna, Nemchand Brother, 2012.

IS Code

1. IS: 456 2000 Indian Standard PLAIN AND REINFORCED CONCRETE - CODE OF PRACTICE (Fourth Revision) Tenth Reprint APRIL 2007
2. SP16, Design Aids for Reinforced Concrete to IS 456:1978

Note : IS: 456 2000 and SP16 is provided during exam

GEOTECHNICAL ENGINEERING

L	T	P	C
3	1	0	3

Course objectives

1. To provide the basic knowledge of soil formation and the Engineering properties of various soils
2. To provide the knowledge load bearing capacity of various soils and the effect of
    a. seepage and permeability on soils
3. To impart the knowledge of methods of improving the load bearing capacity of the soils

Course outcomes:

On successful completion of this course, it is expected that the students will be abl

CO1: Illustrate the soil formation and classification

CO2: Explain the Hydrostatic effect in soil mass.

CO3: Illustrate the stress distribution mechanism and compaction in soil mass.

CO4: Illustrate the mechanism of consolidation.

CO5: Identify the Shear strength parameters through analytical and experimental approach.

UNIT I

Introduction: Soil formation – soil structure and clay mineralogy – Adsorbed water –Mass, volume relationship – Relative density.

Index properties of soils: Grain size analysis – Sieve and Hydrometer methods –consistency limits and indices – I.S. Classification of soils.

UNIT II

Permeability: Soil water – capillary rise – flow of water through soils – Darcy's law, Permeability

– Factors affecting – laboratory determination of coefficient of permeability – Permeability of layered soils – Insitu permeability tests (Pumping in & pumping out test).

Effective stress & seepage through soils: Total, neutral and effective stresses – principle of effective stress - quick sand condition – Seepage through soils – Flow nets: Characteristics and Uses.

UNIT III

Compaction: Mechanism of compaction – factors affecting compaction – effects of compaction on soil properties. – Field compaction Equipment – compaction quality control.

Stress distribution in soils: Boussinesq's and Westergaard's theories for point load for uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under a point load along the vertical and horizontal plane.

UNIT IV

Consolidation: Types of compressibility – immediate settlement, primary consolidation and Secondary consolidation **-** stress history of clay; e-p and e-log p curves – normal Consolidation soil, over consolidated soil and under consolidated soil – pre-consolidation Pressure and its determination - Terzaghi's 1-D consolidation theory.

UNIT V

Shear strength of soils: Introduction of shear strength **-** Mohr – Coulomb Failure theories-Types of laboratory strength tests – Direct Shear test, Vane shear test - strength tests based on drainage conditions- Tri-Axial test strength envelops – Shear strength of sands – dilatancy Critical void ratio – Liquefaction.

TEXT BOOKS

1. Soil Mechanics and Foundation Engg, (7th edition) by Dr.Arora, K.R., Standard Publishers and Distributors, Delhi, 2010
2. Basic and applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt Ltd., New Delhi 2016, third edition.

3. Soil Mechanics and Foundation Engineering by VNS Murthy, CBS Publishers and Distributors 2016.

REFERENCES

1. Geotechnical Engineering, (3rd edition) by Venkataramiah, C., New Age International Pvt . Ltd, 2010.
2. Soil Mechanics by Lambe and Whitman, T.W., Indian Wiley, 2009.
3. Geotechnical Engineering by Purushotham Raj., McGraw-Hill, New Delhi, 2000.
4. Geotechnical Engineering by Manoj Dutta and Gulati, S.K., Tata McGraw-Hill, New Delhi, 2005.

WATER RESOURCES ENGINEERING –I

L	T	P	C
3	1	0	3

Course objectives

1. To enable the students to know about the measurement of rainfall
2. To provide students with a sound foundation in the mathematical, scientific and engineering fundamentals to formulate and analyze problems
3. To enable the students to know the importance of irrigation and its methods
4. To know about canal design by different theories

Course outcomes

On successful completion of this course the students will be able to:

CO1: Describe the components in the hydrologic cycle and all hydrological processes and methods..

CO2: Analyze the flood analysis and its measurement by means of hydrograph.

CO3: Analyze the phenomenon of Ground water occurrence by means of aquifers

CO4: Assess the methods of irrigation and its quality with help of duty delta relationship.

CO5: Design the canals by using standard theories.

UNIT I

Introduction to engineering hydrology and its applications: hydrologic cycle, Types and forms of precipitation, Rainfall Measurement, Different types of rain gauges, rainfall measurement, computation of average rainfall over a basin, processing of rainfall data- Adjustment of record – rainfall double mass curve. Runoff- factors affecting runoff- runoff over a catchment – Empirical and rational formulae.

Abstraction from rainfall- evaporation, factors affecting evaporation, measurement of evaporation- evaporatranspiration- penman and

balney & creddle methods- infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT II

Flood measurement and analysis: Distribution of runoff – Hydrograph analysis flood hydrograph- effective rainfall- base flow- base flow separation- direct runoff hydrograph-Unit Hydrograph, definition and limitations of applications of unit hydrograph, derivation of unit hydrograph from direct runoff hydrograph and vice versa- S- Hydrograph, Synthetic unit hydrograph.

UNIT III

Ground water occurrence: types of aquifers, Aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, Darcy's law, radial flow to wells in confined and unconfined aquifer. Types of wells – Well construction- well development.

UNIT IV

Necessity and importance of irrigation: Types of irrigation, advantages and ill effects of irrigation , application of irrigation . Indian agricultural soils, methods of improving soil fertility- crop rotation, preparation of land for irrigation, standards of quality for Irrigation water. Duty and delta, factors affecting duty, Water Logging

UNIT V

Canals and its design: Classification of canals, Design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, IS standards for a canal design canal lining.

Design Discharge over a catchment, Computation of design discharge- rational formula SCS curve number method, flood frequency analysis – introductory part only. Stream Gauging – measurement and estimation of stream flow.

TEXT BOOKS:

1. Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House 2014.
2. Engineering Hydrology by Jayaram Reddy, Laxmi publications pvt. Ltd., New Delhi2016, third edition.
3. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi 1999

4.

REFERENCES:

1. Irrigation Water Management by D.K. Majundar, Printice Hall of India.2002.
2. Irrigation and Hydraulic structures by S.K.Grag - Khanna **publishers 2009.**
3. Applied hydrology by Ven Te Chow, David R. Maidment larry W. Mays Tata MC. Graw Hill 2010.
4. Water Resources Practice Problems by Timothy J Nelson , Publisher: Engineering Videos; 1 edition (11 March 2013)
5. Irrigation Water Resources and Water Power Engineering by P.N. Modi , Publisher: Standard Book House (December 1, 2008)

III YEAR B TECH I SEMESTER
PROFESSIONAL ELECETIVE-1

INDETERMINATE STRUCTURAL ANALYSIS (PE-1)

L	T	P	C
3	0	0	3

Course Objectives:

1. To introduce the students to the concept of global structural stability, theory of structural analysis, and methods in structural analysis.
2. To provide the knowledge of Analysis of indeterminate structures
3. To provide the knowledge of conventional methods of structural Analysis

Course Outcomes:

CO1: Apply the methods of slope deflection and moment distribution to carry out the analysis of Continuous beams and Portal frames..

CO2: Analyze the continuous beams, portal frames by Kani's method and pin jointed f Castiglione's second theorem.

CO3: Evaluate the shear forces and bending moments in Two-Hinged arches and to ex secondary stresses due to rise of temperature and Elastic Shortening of rib..

CO4: Analyze the Multi-storey frames by approximate methods for gravity (vertical) horizontal loads.

CO5: Understand the concept of Matrix method for the analysis of continuous beams jointed plane frames.

UNIT I

Introduction to method of analysis - slope deflection and moment distribution methods**-**analysis of continuous beams and portal frames including side sway. Shear force, bending moment and elastic curve diagrams

UNIT II

Kani's method: analysis of continuous beams and portal frames including side sway due to unsymmetrical vertical loading.

Indeterminate Trusses: Determination of Static and Kinematic indeterminacies – Analysis of trusses having single and two degrees of internal and external indeterminacies – Castigliano's second theorem.

UNIT III

Two hinged arches: introduction- classification of two hinged arches- analysis of two hinged parabolic arches, analysis of circular arches,- secondary stresses in two hinged arches due to temperature and elastic shortening of rib.

UNIT IV

Approximate methods of analysis: introduction- Analysis of multi-storey frames for lateral loads: Portal Method, Cantilever Method. Analysis of multi- storey frames for gravity(vertical) loads. Substitute frame method.

UNIT V

Matrix Methods Of Analysis: Introduction- Static and Kinematic indeterminacy- Analysis of continuous beams including settlement of supports, using stiffness method. Analysis of pin- jointed determinate plane frames using stiffness method- Analysis of single bay single storey frames including side sway, using stiffness method. Analysis of continuous beams upto three degree of indeterminacy using flexibility method. Shear force and Bending Moment diagrams. Elastic Curve.

TEXT BOOKS:

1) Structural Analysis Vol –I &II by Vazarani and Ratwani, Khanna Publishers.
2) Structural Analysis Vol I & II by G.S. Pandit S.P.Gupta Tata McGraw Hill Education Pvt. Ltd.

REFERENCES:

1) Mechanics of Structures Vol –II by H.J.Shah and S.B.Junnarkar, Charotar Publishing House Pvt. Ltd.
2) Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Publishers.
3) Structural Analysis -II by S.S.Bhavikatti, Vikas Publishing House Pvt. Ltd.
4) Structural Analysis by Devdas Menon, Narosa Publishing House.
5) Advanced Structural Analysis by A.K.Jain, Nem Chand & Bros.
6) Structural Analysis Vol I & II by R.Vaidyanathan and P.Perumal, Lakshmi Publications House Pvt. Ltd.
7) Examples in structural Analysis by William M.C.McKenzie, Taylor & Francis.

GROUND WATER HYDROLOGY (PE-I)

L	T	P	C
3	0	0	3

Course objectives:

1. 1To comprehend basic concepts of the water cycle and hydrology.
2. To be able to perform engineering hydrology computations.
3. To enable the students to know the ground water occurrence.

Course outcomes:

CO1: Understand different types of aquifers and their characteristics

CO2:Analysis the pumping test data for different aquifers

CO3: Distinguish the surface and subsurface investigation methods of ground water.

C**O4**: Discuss the methods of artificial recharging of ground water.

CO5: Evaluation and control of saline water intrusion.

UNIT I

Ground Water Occurrence: Ground water hydrologic cycle, origin of ground water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention. Ground Water Movement: Permeability, Darcy's law, storage coefficient. Transmissivity, differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinate system.

UNIT II

Ground water flow contours their applications: Analysis of Pumping Test Data – I: Steady

Flow groundwater flow towards a well in confined and unconfined aquifers – Dupit's and
Theism's equations, Assumptions, Formation constants, yield of an open well interface and
Well tests.

UNIT III

Unsteady flow analysis: Pumping Test Data – II: Unsteady flow towards a well – Non equilibrium
Equations – Thesis solution – Jocob and Chow's simplifications, Leak aquifers. Surface and
Subsurface Investigation: Surface methods of exploration – Electrical resistivity and Seismic
Refraction methods. Subsurface methods – Geophysical logging and resistivity logging.
Aerial Photogrammetry applications along with Case Studies in Subsurface Investigation.

UNIT IV

Artificial Recharge of Ground Water: Concept of artificial recharge – recharge methods, Relative merits, Applications of GIS and Remote Sensing in Artificial Recharge of Ground Water along with Case studies.

UNIT V

Saline Water Intrusion in aquifer: Occurrence of saline water intrusions, Ghyben- Herzberg
Relation, Shape of interface, control of seawater intrusion. Groundwater Basin Management:
Concepts of conjunction use, Case studies.

TEXT BOOKS:

1. Ground water Hydrology by David Keith Todd, John Wiley & Son, New York 2004.
2. Groundwater by H.M.Raghunath, Wiley Eastern Ltd.(1983)

REFERENCES:

1. Groundwater by Bawvwr, John Wiley & sons.
2. Groundwater System Planning & Management – R.Willes & W.W.G.Yeh, Printice Hall (1987)

3. Applied Hydrogeology by C.W.Fetta, CBS Publishers & Distributers (2007).
4. Geotechnical Engineering K.R. Arora (2010).

ROCK MECHANICS (PE-I)

L	T	P	C
3	0	0	3

Course objectives

1. Introduce students to the field applications of rock mechanics in Mining, Civil and Petroleum Engineering.
2. Provide students with opportunities to develop basic practical skills with respect to determination of rocks properties.
3. Provide the slope stability analysis and potential effect of water on natural and artificial slopes.
4. Fluent application of engineering techniques, tools and resources.

Course outcomes

CO1: Illustrate the physical properties of rocks.

CO2: Explain the elastic behaviour of rocks.

CO3: Describe the methods of laboratory testing of rocks.

CO4: Analysis the stress distribution matrix insitu and around the rock opening.

CO5: Apply the basic rock design principles in the tunnelling design system.

UNIT I

Introduction: Composition of rocks, Engineering classification and Limitation of Geologic classification of rocks, rocks structure and perespans in rock.

UNIT II

Mechanics of rock: Rock coming, various methods of obtaining rock cores, Engineering Properties of rock, stress - strain relations, elastic theory application to design in rock.

UNIT III

Strength and failure of rocks: Uniaxial and triaxial strength of rocks, other shear tests and application in Civil Engineering problems, failure theories of rocks and propagation of cracks, Griffith Chack theory - Water in rock, Structural feature of mass rocks and their effects on engineering properties.

UNIT IV

Measurement of stresses: rock mass, various types of measuring devices, evaluation of properties of rocks in the field.

UNIT V

Construction in rocks: Design of structure in rocks, Basic design principles of tunnels in rock. Principle of design of rock slopes.

TEXT BOOKS:

1. W. Farmer, Engineering Behavior of Rocks, Chapman and Hall Ltd.
2. R. E. Goodman, Introduction to Rock Mechanics
3. P.R. Sheorey, Empirical Rock Failure Criteria, Balkema, Rotterdam, 1997
4. K.G.Stagg and O.C.Zienkiewicz, Rock Mechanics in Engineering Practice, John Wiley and Sons, London, firdt edition (1968).
5. V.S. Vutukuri and R D Lama, Hand Book on Mechanical Properties of Rock trans Tech Publications, 1978 ,(2009)

REFERENCES:

1. "Comprehensive Rock Mechanics" by J.A. Hudson,(2013).
2. Fundamentals of Rock Mechanics, 4th Edition, april (2007).
3. B.P Verma, Rock Mechanics for Engineers, third edition, (2006).

GEOTECHNICAL ENGINEERING LABORATORY

L	T	P	C
0	0	3	2

Course Outcomes

CO1: Understand the procedure to classify the coarse grained and fine grained soil.
C**O2**: Evaluate the index properties of soil.
CO3: Evaluate the index properties of soil.
CO4: Apply the concept of MDD and OMC to control compaction in the field.
CO5: Compute the shear strength of cohesive and cohesion less soil.

LIST OF EXPERIMENTS

1. Atterberg's limits
2. Fileld density- core cutter and sand replacement method
3. Grain size analysis
4. Permeability of soil, constant head test.
5. Permeability of soil variable head test.
6. Compaction test
7. C.B.R test
8. Consolidation test
9. Unconfined compression test
10. Triaxial compression test
11. Direct shear test
12. Vane shear test

LIST OF EQUIPMENTS

1. Casagrande apparatus
2. Core cutter and sand pouring cylinder.
3. I.S.sieve set
4. Permeability apparatus
5. Proctor's mould
6. C.B.R apparatus
7. Consolidation apparatus
8. Triaxial apparatus

9. Unonfined compression apparatus.
10. Direct shear apparatus
11. Vane shear appara

FLUID MECHANICS AND HYDRAULIC MACHINERY LABORATORY

L	T	P	C
0	0	3	2

Course Outcomes

CO1: Examine the calibration of different flow meters.

CO2: Illustrate flow measuring devices used in pipes, channels and Notches

CO3: Determine major and minor losses in pipes.

CO4: Analyze the energy equation for problems on in pipes flow.

CO5: Examine the performance characteristics of turbines and pumps.

LIST OF EXPERIMENTS

1. Calibration of venture meter and Orifice meter
2. Determination of coefficient of discharge for a small orifice/mouthpiece by constant head method
3. Calibration of contracted rectangular notch and triangular notch
4. Determination of friction factor of a pipe
5. Determination of coefficient for minor losses.
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. Performance characteristics of a single stage /multi stage centrifugal pump.
12. Performance characteristics of a reciprocating pump

LIST OF EQUIPMENTS:

1. Impact of jet vane
2. Calibration of venturi meter/ Orifice meter.

3. Single stage/ multistage centrifugal pump.
4. Hydraulic jump
5. Small orifice / mouth orifice.
6. Rectangular and triangular notch.
7. Reciprocating Pump.
8. Bernoulli's apparatus.
9. Pelton wheel.
10. Francis turbine.
11. Kaplan Turbine.

PERSONALITY DEVELOPMENT AND BEHAVIOURAL SKILLS

L	T	P	C
0	0	3	2

Course Objectives

The course intends to:

1. Enable students to practice optimistic attitude
2. Develop effective non-verbal communication
3. Build team dynamics for professional accomplishments
4. Improve Interpersonal Skills for professional needs
5. Endow students with essential, effective & intelligible correspondence

Course Outcomes

At the end of the course a student is expected:

CO1: Practice optimistic attitude for an efficient socially viable and multi-faceted personality.

CO2: Demonstrate functions of non-verbal **communication in formal context**.

CO3: Build effective individual & team dynamics for professional accomplishments.

CO4: Analyze appropriate strategic Interpersonal Skills for productive workplace relationships.

CO5: Correspond in multiple contexts, for varied audiences, across genres and modalities.

Unit – I

Personality Development:

Definition - Various Aspects of Personality Development - Behavioural Traits.

Importance of Soft Skills for personal and professional development - Success stories.

Unit – II

Non Verbal Communication:

Kinesics,Haptics,Proxemics,Vocalics,Oculesics

Body Language informal contexts such as Group Discussions, Presentations and Interviews.

Unit - III

Team Dynamics:

Different Types of Teams– Role of an individual – Communicating as a group or team leader

Individual Presentations/Team Presentation-Project Presentations- Case Studies

UNIT-IV

Interpersonal Skills:

Time Management- Stress Management- Emotional Intelligence- Conflict Management- Relationship Management

UNIT-V

Digital Correspondence:

Role of Multimedia in Communication - Communication in a Digital Edge (Video Conference Etc.)

Social Networking: Importance and Effects.

Reference Books

1. Barun, K Mitra, Personality Development and Soft Skills, Oxford University Press, 2nd Edition, 2016.
2. Krishna Mohan &Meenakshi Raman, Effective English Communication, Tata McGraw-Hill Publishing Company Ltd, 2008.

OPEN ELECTIVES (Offered By Civil Engineering Department to other branches Except Mechanical Engineering)

(A151115) REMOTE SENSING AND GIS (OE1)

L	T	P	C
3	0	0	3

Course Objectives:

1. To understand the principles, applications, trends, and pertinent issues of geographical information systems and sciences, including remote sensing (RS), Photogrammetry, cartography, and global positioning systems (GPS).
2. To develop technical skills and competence in data and information acquisition, extraction, management and analysis; spatial and statistical modeling; mapping and visualization.
3. To increase awareness of GIS and modeling tools for improving competition and business potential.
4. To describe how geographical information is used, managed, and marketed globally.

Course Outcomes

After successful completion of this course the students should able to

CO1: Select the type of remote sensing technique / data for required purpose.

CO2: Identify the earth surface features from satellite images..

CO3: Analyze the energy interactions in the atmosphere and earth surface features

CO4: Prepare thematic maps.

CO5: Interpretations of satellite data for various applications..

UNIT I

EMR And Its Interaction With Atmosphere & Earth : Definition of remote sensing and its components – Electromagnetic spectrum – wavelength regions important to remote sensing – Wave theory, Particle theory, Stefan-Boltzman and Wein‟s Displacement Law – Atmospheric scattering, absorption – Atmospheric windows – spectral signature concepts – typical spectral reflective characteristics of water, vegetation and soil.

UNIT II

Platforms and sensors: Types of platforms – orbit types, Sun-synchronous and Geosynchronous – Passive and Active sensors – resolution concept – Pay load description of important Earth Resources and Meteorological satellites – Airborne and spaceborne TIR and microwave sensors.

UNIT III

Image interpretation and analysis: Types of Data Products – types of image interpretation – basic elements of image interpretation – visual interpretation keys – Digital Image Processing – Pre-processing – image enhancement techniques – multispectral image classification – Supervised and unsupervised.

UNIT IV

Geographic information system: Introduction – Maps – Definitions – Map projections – types of map projections – map analysis – GIS definition – basic components of GIS – standard GIS softwares – Data type – Spatial and non-spatial (attribute) data – measurement scales – Data Base Management Systems (DBMS).

UNIT V

Data entry, storage and analysis: Data models – vector and raster data – data compression – data input by digitization and scanning – attribute data analysis – integrated data analysis – Modeling in GIS Highway alignment studies – Land Information System.

TEXT BOOKS

1. Lillesand,T.M., Kiefer, R.W. and J.W.Chipman. "Remote Sensing and Image Interpretation" 5th Edition., John Willey and Sons Asia Pvt. Ltd., New Delhi, 2004.

2. Anji Reddy, M. "Textbook of Remote Sensing and Geographical Information System" 2nd edition. BS Publications, Hyderabad, 2001.

REFERENCES

1. Lo. C.P.and A.K.W.Yeung, "Concepts and Techniques of Geographic Information Systems",Prentice Hall of India Pvt. Ltd., New Delhi, 2002

2. Peter A.Burrough, Rachael A. McDonnell, " Principles of GIS", Oxford University Press, 2000

3. Ian Heywood "An Introduction to GIS", Pearson Education Asia, 2000

(A15116) SMART CITY (OE1)

L	T	P	C
3	0	0	3

Objectives

1. To make students aware of Smart Cities and its pressing needs and on the greatest opportunities to improve lives
2. To focus range of approaches to make the city sustainable

Course Outcomes

CO1: To understand the necessity of smart infrastructure and to promote cities that provides quality of life to citizens
CO2: To explain technology-based solution on smart mobility.
CO3: Illustrate & introduce the smart and sustainable waste and water management for smart cities.
CO4: Evaluate economical models for smart infrastructure solution.
CO5: Create healthy and waste ridden environment..

UNIT I

Introduction: Smart city, Need for smart city, Potential locations, Physical infrastructure, Social infrastructure, Smart City Characteristics, Ward Plan.

UNIT II

Smart Mobility: Roads, Vehicles, Public Transport and Modal Split, Smart Electricity Supply,
Smart Housing – Green Building. Connected Homes: IT – enabled living and working.

UNIT – III

Smart Water Management: Smart Sanitation- On-Site Sewage Treatment, Smart Solid Waste Management - Municipal Wet Waste Disposal.

UNIT IV

Zero Pollution: Zero Water Pollution, Zero Air Pollution, Zero Soil Pollution, Zero Noise Pollution.

UNIT V

Smart City Investment and Economics: Land, Power, Water, and Highway and Road/ Rail Connectivity, Fuel Pipe Lines – Case study

TEXT BOOKS:

1. Smart City by Arun Firodia Vishwesh Pavnaskar Foreword by Dr. Narayana Murthy, 2016.
2. Smart and Human building cities of wisdom by G. R. K Reddy and Srijan Pal Singh, 2015.

IV YEAR I SEMESTER SYLLABUS

ENVIRONMENTAL ENGINEERING

L	T	P	C
3	0	0	3

Course Objectives

1. To know the various lab tests involve in knowing the properties of water and sewage.
2. To provide the knowledge of methods of conducting the lab test.
3. To know about the design of septic tank, sludge digestion tank.

Course Outcomes

CO1: Predict the population forecasting and test the quality of water.

C**O2**: Design the filter and apply disinfection practices for water treatment.

CO3: Design water distribution system and examine sewage.

CO4: Analysis and design sewerage system.

CO5: Design different units of sewage treatment plant and trickling filters.

UNIT I

Introduction: Waterborne diseases – protected water supply – Population forecasts, design period – types of water demand – factors affecting – fluctuations – fire demand – water quality and testing – drinking water standards: sources of water - Comparison from quality and quantity and other considerations – intakes – infiltration galleries.

UNIT II

Layout and general outline of water treatment units: sedimentation – principles – design factors – coagulation-flocculation clarifier design – coagulants - feeding arrangements. Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation - comparison of filters – disinfection – theory of

chlorination, chlorine demand - other disinfection practices- Miscellaneous treatment methods.

UNIT III

Water distribution systems: Types of layouts of distribution system- design of distribution system- Hardy Cross and equivalent pipe methods- service reservoirs- determination of storage capacity. Conservancy and water carriage systems- sewage and storm water estimation- time of concentration- storm water overflows combined flow- characteristics of sewage- examination of sewage – B.O.D- C.O.D equations.

UNIT IV

Design of sewers: shapes and materials- sewer appurtenances manholes- inverted siphon- catch basins- flushing tanks- ejectors, pumps and pump houses- house drainage- components requirements- sanitary fitting traps- one pipe and two pipe systems of plumbing.

UNIT V

Design of different units: sedimentation tank-design of screens- grit chambers-principles and design of biological treatment – trickling filters

TEXT BOOKS:

1. Water supply and sanitary Engineering by G.S. Birdi, Dhanpat Rai& Sons Publishers ,8th edition,(2010).
2. B.C.Punmia, "Water Supply Engineering", Vol. 1, "Waste water Engineering Vol. II", 2nd Edition, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi, 2008.
3. Water Supply & Environmental Engineering by A.K. Chatterjee. 8th editon, (2013)

REFERENCE BOOKS:

1. Water and Waste Water Engineering by Fair Geyer and Okun,3rd edition (2011)
2. Text book of Environmental Engineering by P. Venugopal Rao (PHI) (2002).
3. Waste water engineering by Metcalf and Eddy (2002).
4. Unit operations in Environmental Engineering by Robert Noyes,(1994)

STEEL STRUCTURES DESIGN AND DRAWING

L	T	P	C
3	1	0	3

Course objectives

1. Ability to perform analysis and design of steel members and connections
2. Ability to design steel structural systems with its structural components

Course Outcomes

Students can be able to do

CO1: Classify the types of connections and specifications as per IS: 800-2007.

CO2: Apply the provisions of IS: 800-2007 to design tension members.

CO3: Analyze and design compression members.

CO4: Illustrate behaviour of beams and design strengths as per IS code.

CO5: Adapt IS code procedures to design welded plate girder.

UNIT I

Theory and introduction: Materials – types of structural steel – mechanical properties of steel – Concepts of plasticity – yield strength. Loads – and combinations local buckling behavior of steel. Concept of limit State Design – Limit States – Design Strengths-deflection limits – serviceability – stability check, Bolted connections – Riveted connections – IS – 800 – 2007 - specifications – Design strength – efficiency of joint – prying action. Welded connections – Types of welded joints – specifications - design requirements.

Drawing practice: Sketches of Bolt and Nut, Rivets

UNIT II

Design of tension members: Design strength – Design procedure – Design of Tension member - Design procedure splice - lug angle.

Drawing practice: Sketches of Tension members

UNIT III

Design of compression members: Design of compression members – Buckling class – slenderness ratio / strength design – laced – battened columns – splice – column base – slab base.
Drawing practice: Sketches of Compression members

UNIT IV
Design of Beams: Design of Beams – Plastic moment – Bending and shear strength / buckling – Built-up sections – laterally / supported beams – Web Buckling and Web Crippling strength.
Drawing practice: Sketches of Flexural members

UNIT V
Design of Welded Plate girders – elements – economical depth – design of main section – connections between web and flange – design of end bearing stiffeners and intermediate stiffeners.
Drawing practice: Sketches of Plate Girder - sectional and longitudinal views

TEXT BOOKS :
1. Design of steel structures – N. Subramanian, Oxford University Press – 2009.
2. Limit State Design of steel structures, S.K. Duggal, Tata McGraw-Hill, 2010

REFERENCE BOOKS :
1. Design of Steel structures by K.S. Sai Ram, Person Education. (2010)
2. Design of Steel Structures Edwin H. Gaylord, Jr. Charles N. Gaylord and James Stallmeyer Tata McGraw-Hill Education pvt. Ltd. (2010)
3. Design of steel structures, Structures, S.S. Bhavikatti, IK int Publication House, New Delhi, 2010.
4. Structural Design and Drawing by N.Krishna Raju, Universities Press, 3rd edition ,(2009).
5. IS:800 – 2007, General Construction in Steel – Code of Practice, 3rd edition
6. IS:875 (Part 3): Code of Practice for Design Loads (Other Than Earthquake) For Buildings and Structures. Part 3: Wind Loads (Second Revision)

NOTE :

Alternate weeks two periods of drawing class should be conducted. The end examination paper should consist of Part – A and Part – B. Part – A should consist of two questions in design and drawing out of which one question to be answered. Part –B should consist of five questions in design out of which three to be answered. Weightage for Part – A is 40 % and Part – B is 60 %.

IS Code

IS: 800 – 2007

Note: IS: 800 – 2007, IS:875 are provided during examination

HIGHWAY ENGINEERING

L	T	P	C
3	1	0	3

Course objectives

1. Ability to mathematically develop and interpret design standards for horizontal and vertical geometry and super elevation
2. Familiarity with the design and modeling of roadways/highways
3. To know the design of different types of pavement.

Course Outcomes

1. Summarize the road developments in India from different periods.
2. Apply the concept of geometric design in real time engineering.
3. Make use of parameters related to traffic studies.
4. Design & model the intersections with specific standards.
5. Evaluate the different pavement design methods using IRC standards.

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 – Highway Project.

UNIT – II

Highway geometric design: 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 - Design of Horizontal Alignment - Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical alignment-Gradients- Vertical curves.

UNIT III

Traffic engineering & regulations: Basic Parameters of Traffic-Volume, Speed and Density - Traffic Volume Studies - Data Collection

and Presentation - Speed studies - Data Collection and Presentation - Origin & Destination studies, Parking Studies – On street& Off street Parking - Road Accidents - Causes and Preventive Measures - Accident Data Recording – Condition Diagram and Collision Diagrams - Traffic Signs – Types and Specifications – Road Markings - Need for Road Markings-Types of Road Markings - Design of Traffic Signals – Webster Method.

UNIT IV

Intersection design: Types of Intersections – Conflicts at Intersections – Requirements of At-Grade Intersections - Types of At-Grade Intersections: Channelized and Unchannelized Intersections – Traffic Islands - Types of Grade Separated Intersections - Rotary Intersection – Concept of Rotary – Design Factors of Rotary – Advantages and Limitations of Rotary Intersections.

UNIT V

Pavement Design: Design of Pavements: Design of Flexible pavement by CBR method as per IRC 37-2012 and theory of empirical mechanistic method. Stresses in rigid pavement by westergards and IRC methods. Design of overlay by Benkelman beam method.

TEXT BOOKS:

1. Highway Engineering – S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000).
2. Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna Publications – 6th Edition – 1997.

REFERENCES:

1. Principles of Traffic and Highway Engineering – Garber & Hoel, Cengage Learning.
2. Principles and Practices of Highway Engineering – Dr.L.R.Kadiyali and Dr.N.BLal - Khanna Publications.(2005).
3. Highway Engineering – S.P.Bindra , Dhanpat Rai & Sons. – 4th Edition (1981)
4. IRC 37-2012 : Tentative guidelines for design of flexible pavement
5. IRC 58-2011: Guidelines for design of plain jointed rigid pavements.

6. IRC 81-1997 : Guidelines for design of overlay using Benkalman Beam Deflection Technique

FOUNDATION ENGINEERING

L	T	P	C
3	1	0	3

Course objectives

1. To introduce to students about the basics of soil exploration
2. To develop students the ability to interpret field and laboratory data to get design parameters for foundation analysis
3. To prepare students for the effective use of the commonly used formulas, tables, and figures in the design and analysis of shallow and deep foundations

Course Outcomes

CO1: Organize the preparation and programme of soil investigation.

CO2: Examine the earth pressure theories and stability of retaining walls.

CO3: Evaluate the bearing capacity of soil and allowable settlement.

CO4: Analyse the capacity and settlement of pile foundation.

CO5: Analyse the stability of finite and infinite slopes using various methods.

UNIT I

Soil Exploration: Need – methods of soil exploration – boring and sampling methods – penetration tests – plate load test – pressure meter – planning of soil exploration programme and preparation of

UNIT II

Earth pressure theories: Rankine's theory of earth pressure – earth pressures in layered soils – Coulomb's earth pressure theory – Culmann's graphical method.

Retaining walls: Types of retaining walls – stability of gravity and cantilever retaining walls against overturning, sliding and, bearing

capacity. Drainage from backfill, introduction to reinforced earth walls.

UNIT III

Bearing capacity and settlement foundation: Types - choice of foundation – location and depth - safe bearing capacity — Terzaghi', Mayerhof, skempton and IS methods.– Safe bearing pressure based on SPT N – value- Allowable bearing pressure; safe bearing capacity- allowable settlement of structures. and plate load test – allowable settlements of structures.

UNIT IV

Pile foundation: Types of piles – load carrying capacity of piles based on static pile formulae – dynamic pile formulae – Pile Capacity through SPT and CPT results - pile load tests - load carrying capacity of pile groups in sands and clays – Settlement of pile groups – negative skin friction

UNIT V

Slope stability: Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes – stability analysis by Swedish slip circle method, method of slices, Bishop's Simplified method of slices – Taylor's Stability Number- stability of slopes of earth dams under different conditions.

TEXT BOOKS

1. Soil Mechanics And Foundation Engineering by K.R. Arora(2008). Standard publishers distributers.seventh edition

2. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt . Ltd, New Delhi: ,third edition (2016)

REFERENCES

1. Soil Mechanics and Foundation Engineering by VNS Murthy, CBS Publishers and Distributors. (2016).
2. Analysis and Design of Substructures – Swami Saran, Oxford and IBH Publishing company Pvt Ltd (1998).
3. Geotechnical Engineering by S. K.Gulhati & Manoj Datta – Tata Mc.Graw Hill Publishing company New Delhi. 2005.

4. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork.

III YEAR B TECH II SEMESTER
PROFESSIONAL ELECETIVE-2

GROUND IMPROVEMENT TECHNIQUES (PE-2)

L	T	P	C
3	0	0	3

Course objectives:

1. To introduce engineering properties of soft, weak and compressible deposits, principles of treatment for granular and cohesive soils and various stabilization techniques.
2. To bring out concepts of reinforced earth.

Course outcomes:

CO1:Illustrate the several Ground modification mechanisms

CO2: Illustrate the Ground Improvement Techniques through mechanical approach.

CO3: Identify the different Hydraulic ground improvement techniques through dewatering techniques.

CO4: Explain the quick settlement techniques through chemical and physical modification.

CO5: Distinguish the inclusion and confinement techniques of ground improvement.

UNIT I

Introduction to engineering ground modification: Need and objectives, Identification of soil types, In situ and laboratory tests to characterize problematic soils; Mechanical, Hydraulic, Physico-chemical, Electrical, Thermal methods, etc. and their applications.

UNIT II

Mechanical Modification: Principles of soil densification – Properties of Compacted soil, Compaction control tests, Specification of compaction requirements, Blasting Vibro-compaction, Dynamic Tamping and Compaction piles.

UNIT III

Hydraulic Modification: Objectives and techniques, traditional dewatering methods and their choice, Design of dewatering system,

Electro-osmosis, Filtration, Drainage and seepage control with Geosynthetics, Preloading and vertical drains, Electro-kinetic dewatering.

UNIT IV

Physical and Chemical Modification: Modification by admixtures, Shotcreting and Guniting Technology, Modification at depth by grouting, Crack Grouting and compaction grouting, Jet grouting, Thermal Modification, Ground freezing

UNIT V

Modification by Inclusions and Confinement: Soil reinforcement, reinforcement with strip, bar, mesh, sheet and grid reinforced soil. In-situ ground reinforcement, ground anchors, rock bolting and soil nailing.

TEXT BOOKS:

1. Hausmann, M. R. (1990) – Engineering Principles of Ground Modifications, McGraw Hill publications
2. Mosley – Ground Improvement, 2nd edition, (2004).

REFERENCES:

1. Koerner, R. M (1994) – Designing with Geosynthetics – Prentice Hall, New Jersey
2. Jones C. J. F. P. (1985) – Earth Reinforcement and soil structures – Butterworths, London.
3. Xianthakos, Abreimson and Bruce - Ground Control and Improvement ,(1994).

EARTHQUAKE ENGINEERING (PE2)

L	T	P	C
3	0	0	3

Course objectives

1. To train the students so that they can work and contribute to the infrastructure development activities
2. To develop the understanding of earthquake and its causes through the theory of vibrations

Course Outcomes

CO1: Quantify mechanical behaviour of earth's surface, seismic hazards and its effects.

CO2: Identify, formulate and solves engineering problems subjected to dynamic loading conditions.

CO3: Understand the internal parameters of the structures for seismic design source.

CO4: Assess the design component or process to meet desired needs within realistic constraints.

CO5: Analyze and design the mem**b**ers for earthquake resisting parameters

UNIT I

Engineering Seismology: Earthquake phenomenon cause of earthquakes-Faults- Plate tectonics- Seismic waves- Terms associated with earthquakes-Magnitude/Intensity of an earthquake-scales-Energy released-Earthquake measuring instruments-Seismoscope, Seismograph, accelerograph-strong ground motions- Seismic zones of India.

UNIT II

Theory of Vibrations: Elements of a vibratory system- Degrees of Freedom-Continuous system-Lumped mass idealization-Oscillatory motion-Simple Harmonic Motion-Free vibration of single degree of freedom (SDOF) system- undamped and damped-critical damping-

Logarithmic decrement-Forced vibrations-Harmonic excitation-Dynamic magnification factor-Excitation by rigid based translation for SDOF system-Earthquake ground motion.

UNIT III

About configuration

Conceptual design: Introduction-Functional planning-Continuous load path-Overall form-simplicity and symmetry-elongated shapes-stiffness and strength-Horizontal and Vertical members-Twisting of buildings-Ductility-definition-ductility relationships-flexible buildings-framing systems-choice of construction materials-unconfined concrete-confined concrete-masonry-reinforcing steel.

UNIT IV

Introduction to earthquake resistant design: Seismic design requirements-regular and irregular configurations-basic assumptions-design earthquake loads-basic load combinations-permissible stresses-seismic methods of analysis-factors in seismic analysis-equivalent lateral force method.

UNIT V

Seismic Analysis: Principles of earthquake resistant deign of RC members- Structural models for frame buildings- Equivalent static analysis- Seismic deign methods- IS code based methods for seismic design- Vertical irregularities- Plan configuration problems-.

TEXT BOOKS:

1. Earthquake Resistant Design of structures – S. K. Duggal, Oxford University Press,(2007).
2. Earthquake Resistant Design of structures – Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd,(2006).

REFERENCES:

1. Seismic Design of Reinforced Concrete and Masonry Building – T. Paulay and M.J.N. Priestly, John Wiley & Sons (1994).
2. Eartquake Resistant Design of Buidling structures by Vinod Hosur, Wiley India Pvt. Ltd (1992).
3. Elements of Mechanical Vibration by R.N.Iyengar, I.K.International Publishing House Pvt. Ltd, (2010).
4. Masory and Timber structures including earthquake Resistant Design –Anand S.Arya, Nem chand & Bros,(1992).

5. Earthquake Tips – Learning Earthquake Design and Construction C.V.R. Murth, (2005)

REFERENCE CODES:

1. IS: 1893 (Part-1) -2002. "Criteria for Earthquake Resistant – Design of structures." B.I.S., New Delhi.
2. IS:4326-1993, " Earthquake Resistant Design and Construction of Building", Code of Practice B.I.S., New Delhi.
3. IS:13920-1993, " Ductile detailing of concrete structures subjected to seismic force" – Guidelines, B.I.S., New Delhi.

BUILDING, PLANNING, DESIGN AND DRAWING (PE-2)

L	T	P	C
3	0	0	3

Course objectives

1. Learn to sketch and take field dimensions
2. Learn to take data and transform it into graphic drawings
3. Prepare the student for future engineering positions

Course outcomes

CO1: Identify various building components, conventional signs and symbols.

CO2: Illustrate the building bye-laws and the principles of planning.

CO3: Understand about the building services and safety.

CO4: Design and Sketch the plans of various types of buildings and detailing of doors, windows, etc.

CO5: Understand the elements of perspective drawing involving simple problems.

UNIT I

Basic components of buildings: Design of various elements of building like various types of footing, open foundation, raft, grillage, pile and well foundation, drawing of frames of doors or windows, various types of door, window, and ventilators, lintels and arches, stairs and staircase, trusses, flooring, roofs etc.

Drawing practice: Sketches of various building components, one drawing sheet of various building components like doors, windows, lintels and arches, stairs foundation etc.

UNIT II

Building planning: provision on national building code, building bye-laws, open area, setbacks, FAR terminology, principles of architectural composition (ie. Unity, contrast etc) , principles of planning orientation.

Drawing practice: one drawing sheet each of services and interiors of buildings.

UNIT III

Building Services- Introduction of building services like water supply and drainage, electrification, ventilation and lighting and staircases, fire safety, thermal insulation, acoustics of buildings.
Drawing practice: one drawing sheet containing detailed planning of one/ two bedroom residential building

UNIT IV

Design and Drawing of Building: Design and preparation of detailed drawings of various types of buildings like residential building, institutional buildings and commercial buildings, detailing of doors , windows, ventilators and staircases etc.
Drawing practice: one drawing sheet each of residential building, institutional buildings

UNIT V

Perspective Drawing: Elements of Perspective Drawing involving simple problems , one point and two point Perspectives, principles of building
Drawing practice: Use of AutoCAD for preparations of drawings.

NOTE :
Alternate weeks two periods of drawing class should be conducted. The end examination paper should consist of Part – A and Part – B. Part – A should consist of theory questions on the syllabus while Part –B should consist of 4 questions on drawing out of which 2 to be answered. Weightage for Part – A is 60 % and Part – B is 40 %. In exam drawing board should be provided.

TEXTBOOKS:

1. "Building drawing with an integrated approach to built environment" , fourth edition,Shah , Kale & Patki,(2002).
2.

REFERENCES:

1. Civil Engineering Drawing (2nd Editon), (2010).
2. Gurucharan Singh Jagdish Singh building planning, Design and scheduling, 2nd edition, (1992).

COMPUTER AIDED DRAFING OF BUILDING LABORATORY

L	T	P	C
0	0	3	2

Course outcomes:

CO1: Assess the Software with aiding source.

CO2: Draft the Plan and Elevation & Sectional views of the buildings.

CO3: Develop the components of the building.

CO4: Replicate the detailing of framed and Industrial structures.

CO5: Interpret the isometric and orthogonal projection of buildings.

LIST OF EXPERIMENTS

1. Software for CAD-introduction to different software
2. Introduction to computer aided drafting
3. Practice exercises on basic commands of CAD software
4. Drawing of plans of Single storey buildings using software
5. Drawing of plans of Multi storied buildings
6. Developing sections and elevations of Single storey buildings
7. Developing sections and elevations of Multi storey buildings
8. Detailing of different types (any 2 types) of doors and its components by using CAD
9. Detailing of different types (any 2 types) of windows and c its components by using CAD
10. Detailed drawing of Roofs trusses by using CAD
11. Exercises on development of working of building by using CAD
12. Planning of commercial building (School building)

ADVANCED ENGLISH COMMUNICATION SKILLS LAB

L	T	P	C
0	0	3	2

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organize ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.

Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

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

1. **Activities on Fundamentals of inter-personal Communication and Building Vocabulary –** Starting a conversation – responding appropriately and relevantly – using the right body language - Role Play in different situations & Discourse Skills – using visuals – Synonyms and antonyms, word roots, one word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

2. **Activities on Reading Comprehension** – General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.

3. **Activities on Writing Skills –** Structure and presentation of different types of writing – letter writing/ Resume writing/ Statement of purpose - E-correspondence/ Technical report writing / Portfolio writing – planning for writing – improving one's writing.

4. **Activities on Presentation Skills –** Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/e-mails/assignments etc.

5. **Activities on Group Discussion and interview Skills –** Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation. Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video – conference and Mock Interviews.

TEXT BOOKS:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University 2009.
2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D. Pearson Education 2011.

REFERENCES:

1. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
2. Business and Professional Communication: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.
3. The Basics of Communication: A Relational Perspective. Steve Duck & David T. Mc Mahan. Sage South Asia Edition. Sage Publications. 2012.
4. English Vocabulary in Use series, Cambridge University Press. 2009
5. Management Shapers Series by Universities Press (India) Pvt. Ltd. Himayatnagar, Hyderabad. 2008.

6. Handbook for Technical Communication by David A. McMurrey & Joanna Buckley. 2012. Cengage Learning.
7. Communication Skills by Leena Sen.PHI Learning Pvt. Ltd. New Delhi. 2009.
8. Handbook for Technical Writing by David A McMurrey & Joanna Buckley Cengage Learning. 2008.
9. Job Hunting by Colm Downess, Cambridge University Press 2008.
10. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
11. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hill. 2009.
12. Books on TOEFL/GRE/GMAT/ICAT/IELTS by Barron's/DELTA/Cambridge University Press.
13. International English for Call Centres by Barry Tomalin and Suhashini Thomas Macmillan Publishers. 2009.

QUANTITATIVE METHODS & LOGICAL REASONING
(Common for all Branches)

L	T	P	C
0	0	3	2

Course Objectives :

1. The objective of this course is to enhance the problem solving skills in the areas of 'Quantitative Aptitude' and 'Reasoning' which will enable the students to better preparation for Campus Placements and competitive examinations.
2. To improve the logical thinking and mathematical ability of the students.

Course Outcomes :

At the end of the completion of the course a student is expected

CO1: To perform well in various competitive exams and placement drives.

CO2: To solve basic and complex mathematical problems in short time.

CO3: To become strong in Quantitative Aptitude and Reasoning this can be applied for GRE, GATE, GMAT or CAT exam also.

CO4: To develop problem solving skills and analytical abilities, which play a great role in corporate and industry set up.

CO5: To perform well in various competitive exams and placement drives.

Quantitative Aptitude and Reasoning:

Unit – I

Number System: Speed Maths, Numbers, Factors, Prime & Co Primes, LCM & HCF, Divisibility Rules, Finding Unit Place Digit and Last Two Digits of an Expression

Ratio, Proportion and Variations: Definition of Ratio, Ratio of Proportion, Comparison of Ratios, Compound ratio, Direct and Indirect Proportion

Percentages: Converting Fractions and Decimal into Percentages, Successive Percentage, Populations, Expenditure and Savings

Profit and loss: Relation between Cost Price and Selling Price, Discount and Marked Price, Gain or Loss Percentages on Selling Price

Simple and Compound Interest: Problems on Interest (**I**), Amount (**A**), Principal (**P**) and Rate of Interest (**R**) difference between the Simple Interest and Compound Interest for 2 and 3 years.

Unit – II

Partnership: Relation between Partners, Period of Investment and Shares

Averages, Ages and Allegation : Average of Different Groups, Change in Averages by Adding, Deleting and Replacement of Objects, Problems on ages, Allegation Rule, Mean Value of the Mixture, Replacement of Equal Amount of Quantity.

Time and Work: Men and Days, Work and Wages, Pipes and Cisterns, Hours and Work, Alternate Days Concept,

Time and Distance: Difference between the Average and Relative Speeds, Reaching the Destination Late and Early, Stoppage Time Per Hour, Time and Distance between Two Moving Bodies : Train Crossing Man - same and opposite directions, Speed of Boat and Stream,

Unit – III

Progressions and Quadratic Equations : Arithmetic, Geometric and Harmonic Progressions, Arithmetic Mean, Geometric Mean and Harmonic Mean and their Relations. General form of Quadratic Equation, Finding the Roots of Quadratic Equation, Nature of the Roots.

Permutation and Combination: Fundamental Rules, Problems on Permutations & combinations.

Probability: Definition of probability, Notations and Formulae,

Problems on Probability.

Data Interpretation and Data Sufficiency: Tabular and Pie-charts, Bar and Line Graphs, Introduction to Data Sufficiency, Problems on Data Sufficiency.

Unit – IV

Deductions: Statements and conclusions using Venn diagram and Syllogism Method

Series completion: Number series, Alphabet series, Letter Series.

Coding and Decoding: Letter coding, Number coding, Number to letter coding, Matrix Coding, Substitution, Mixed Letter Coding, Mixed Number Coding, Deciphering Individual Letter Codes by Analysis.

Analytical Reasoning Puzzles:

Problems on Linear, Double line-up and Circular Aarrangements, Selections and Comparisons.

Blood Relations:

Defining the various Relations among the Members of a Family, Solving Blood Relation Puzzles by using Symbols and Notations. Problems on Coded Relations.

Unit – V

Direction sense Test: Sort of directions in puzzles distance between two points, problems on shadows, Application of triangular triplets.

Clocks: Relation between Minute-Hour Hands, Angle vs Time, Exceptional Cases in Clocks

Calendars: Definition of a Leap Year, Finding the Odd days, Finding the Day of any Random Calendar Date, repetition of Calendar Years.

Cubes and Dices: Finding the Minimum and Maximum Number of Identical Pieces and Cuts, Painting of Cubes and cuts, Problems on Dice.

Venn Diagrams: Circular Representation of given words, Geometrical Representation of Certain class, Set theory based Problems.

TEXT BOOKS:

1. Verbal Reasoning, GL Barrons, Pinterest, Latest Edition 2019
2. A Modern Approach to Logical Reasoning & Quantitative Aptitude, R S Agarwal, S. Chand, Publications, Revised edition, 2019

REFERENCE BOOKS:

1. Quantitative Aptitude, G.L Barrons, Pinrest 2019
2. Quantitative Aptitude, Abhijit Guha, Mc Graw Hills, Edition 2019
3. Quantitative Aptitude, U. Mohan Rao SCITECH

III YEAR B TECH II SEMESTER OPEN ELECTIVES (Offered by Civil Engineering Department to other branches except Mechanical Engineering)

(A151115) REMOTE SENSING AND GIS (OE1)

L	T	P	C
3	0	0	3

Course Objectives:

1. To understand the principles, applications, trends, and pertinent issues of geographical information systems and sciences, including remote sensing (RS), Photogrammetry, cartography, and global positioning systems (GPS).
2. To develop technical skills and competence in data and information acquisition, extraction, management and analysis; spatial and statistical modeling; mapping and visualization.
3. To increase awareness of GIS and modeling tools for improving competition and business potential.
4. To describe how geographical information is used, managed, and marketed globally.

Course Outcomes

After successful completion of this course the students should able to

CO1: Select the type of remote sensing technique / data for required purpose.

CO2: Identify the earth surface features from satellite images..

CO3: Analyze the energy interactions in the atmosphere and earth surface features

CO4: Prepare thematic maps.

CO5: Interpretations of satellite data for various applications..

UNIT I

EMR And Its Interaction With Atmosphere & Earth : Definition of remote sensing and its components – Electromagnetic spectrum – wavelength regions important to remote sensing – Wave theory, Particle theory, Stefan-Boltzman and Wein‟s Displacement Law – Atmospheric scattering, absorption – Atmospheric windows – spectral signature concepts – typical spectral reflective characteristics of water, vegetation and soil.

UNIT II

Platforms and sensors: Types of platforms – orbit types, Sun-synchronous and Geosynchronous – Passive and Active sensors – resolution concept – Pay load description of important Earth Resources and Meteorological satellites – Airborne and spaceborne TIR and microwave sensors.

UNIT III

Image interpretation and analysis: Types of Data Products – types of image interpretation – basic elements of image interpretation – visual interpretation keys – Digital Image Processing – Pre-processing – image enhancement techniques – multispectral image classification – Supervised and unsupervised.

UNIT IV

Geographic information system: Introduction – Maps – Definitions – Map projections – types of map projections – map analysis – GIS definition – basic components of GIS – standard GIS softwares – Data type – Spatial and non-spatial (attribute) data – measurement scales – Data Base Management Systems (DBMS).

UNIT V

Data entry, storage and analysis: Data models – vector and raster data – data compression – data input by digitization and scanning – attribute data analysis – integrated data analysis – Modeling in GIS Highway alignment studies – Land Information System.

TEXT BOOKS

1. Lillesand,T.M., Kiefer, R.W. and J.W.Chipman. "Remote Sensing and Image Interpretation" 5th Edition., John Willey and Sons Asia Pvt. Ltd., New Delhi, 2004.

2. Anji Reddy, M. "Textbook of Remote Sensing and Geographical Information System" 2nd edition. BS Publications, Hyderabad, 2001.

REFERENCES

1. Lo. C.P.and A.K.W.Yeung, "Concepts and Techniques of Geographic Information Systems",Prentice Hall of India Pvt. Ltd., New Delhi, 2002

2. Peter A.Burrough, Rachael A. McDonnell, " Principles of GIS", Oxford University Press, 2000

3. Ian Heywood "An Introduction to GIS", Pearson Education Asia, 2000

(A15116) SMART CITY (OE1)

L	T	P	C
3	0	0	3

Objectives

1. To make students aware of Smart Cities and its pressing needs and on the greatest opportunities to improve lives
2. To focus range of approaches to make the city sustainable

Course Outcomes

CO1: To understand the necessity of smart infrastructure and to promote cities that provide quality of life to citizens
CO2: To explain technology-based solution on smart mobility.
CO3: Illustrate & introduce the smart and sustainable waste and water management for smart cities.
CO4: Evaluate economical models for smart infrastructure solution.
CO5: Create healthy and waste ridden environment..

UNIT I

Introduction: Smart city, Need for smart city, Potential locations, Physical infrastructure, Social infrastructure, Smart City Characteristics, Ward Plan.

UNIT II

Smart Mobility: Roads, Vehicles, Public Transport and Modal Split, Smart Electricity Supply,
Smart Housing – Green Building. Connected Homes: IT – enabled living and working.

UNIT – III

Smart Water Management: Smart Sanitation- On-Site Sewage Treatment, Smart Solid Waste Management - Municipal Wet Waste Disposal.

UNIT IV

Zero Pollution: Zero Water Pollution, Zero Air Pollution, Zero Soil Pollution, Zero Noise Pollution.

UNIT V

Smart City Investment and Economics: Land, Power, Water, and Highway and Road/ Rail Connectivity, Fuel Pipe Lines – Case study

TEXT BOOKS:

3. Smart City by Arun Firodia Vishwesh Pavnaskar Foreword by Dr. Narayana Murthy, 2016.
4. Smart and Human building cities of wisdom by G. R. K Reddy and Srijan Pal Singh, 2015.

OPEN Electives- 2 (Offered By civil Engineering Department to other branches except Mechanical Engineering)

(A16124) ENVIRONMENTAL POLLUTION AND CONTROL METHODS (OE2)

L	T	P	C
3	0	0	3

Course objectives

1. To assess air pollution: sources and effects
2. To assess sources and classification of water pollutants
3. To assess sources of soil contamination

Course Outcome

After learning this course the students will have

CO1: Understanding about the various air pollutants and effect on environment.

CO2: Analyze quality of air in the form of air quality index and dispersion modeling

CO3: Determine sampling and measurements of air Pollutants.

CO4: Analysis and measurement of soil contamination.

CO5: Predict types of noise and problems arise due to noise pollution.

UNIT I

Introduction to air pollution: Air and its composition, Air Pollution, Sources of air pollution and its classification, Major air Pollutants and their characteristics, Specific group pollutants such as CFC, GHG etc. Air Pollutants from various industrial sectors. Impact of air pollution on human health and vegetation.

UNIT II

Pollutant dispersion: Concept of atmospheric stability. Adiabatic and Environmental Lapse rate. Plume behavior. Effect of topography, terrain and structure on Pollutant dispersion. Effect of wind on Pollutant dispersion. Concept of maximum mixing depth and ventilation coefficient. Plume rise and Effective stack height.

UNIT III

Air quality: Introduction to Air quality index and Comprehensive Environmental Pollution Index etc. and its application. Sampling and measurement of air pollutants. Introduction to National Ambient Air Quality Standards.

Impacts of Air Pollution: Extreme air Pollution scenarios: Acid Rain, Global Warming, Smog, Ozone layer depletion etc. Various treaties and protocols: Kyoto Protocol and Montreal Protocol etc.

UNIT IV

Soil and control: Soil contamination by chemical pollutants, sources. Remediation by plants, bioremediation by microorganisms; contamination by inorganic (including heavy metals) and organic pollutants; factors affecting uptake of contaminants, prevention and elimination of contamination; landfills. Effects of atmospheric deposition on various types of soils cation exchange capacity (CEC) of soils.

UNIT V

Noise pollution- Difference between sound and noise, Pitch and frequency, sound pressure, sound pressure level (Decibel), Level, and sources of noise and harmful effects of noise, noise measurements and noise control measures.

TEXT BOOKS :

1. Environmental Pollution Control and Engineering, Rao C.S., New Age International (P) Limited, 1st Ed., 1991.
2. Air Pollution, Perkin, H.G. McGraw Hill 1974.
3. De A.K. (1990) Environmental Chemistry, Wiley Eastern Ltd.

REFERENCES:

1.Manahan S.E. (2000) Fundamentals of Environmental Chemistry, CRC Press.

2.Air Pollution: Measurement, Modeling and Mitigation, A Tiwari and J Colls, Taylor & Francis, 2010

3.Sources and Control of Air Pollution, R J Heinsohn and R L Kabel, Prentice Hall, 1999

4. Air Pollution Control Equipment Calulations, L Theodore, John Wiley and Sons, 2008

(A16125)GREEN BUILDING TECHNOLOGIES (OE2)

L	T	P	C
3	0	0	3

Course objectives

1. The purpose of this course is
   To have improved awareness among students on issues in areas of Green buildings and sustainability
2. To have an insight into Green Building Assessment System
3. To establish a clear understanding of the role and impact of various aspects of engineering and engineering decisions on environmental, societal, economic problems and its benefits

Course objectives

After successful completion of this course the students should able to

CO1: Understand the Green building concept and focus on approaches that makes building sustainable.
CO2: Illustrate Green building assessment and accreditation system.
CO3: Able to apply low energy building strategies.
CO4: Designing green building and improve sustainability of infrastructure.
CO5: Classify the economic benefits of green buildings.

UNIT I

Introduction: The shifting landscape of Green buildings, The driving forces for sustainable construction, Ethics and sustainability, Basic Concepts and Vocabulary, Major Environmental and resource concerns. Purpose of green building Assessment systems, Major Green building assessment systems used in the United States. International Building Assessment systems.

UNIT II

The green building assessment system: Structure of the LEED suite of Building rating systems, LEED Credentials, LEED Building Design and construction Rating system, Green Globes Building Rating Tools, Structure of Green Globes for New Construction, Green Globes Assessment and Certification Process, Green Globes Professional Credentials.

UNIT III

Green building design: Conventional versus Green Building Systems, Executing the Green Building Project, Integrated Design Process, Role of the charrette in the design process, Green Building Documentation Requirements.

UNIT IV

Low – energy building strategies: Building Energy Issues, High – Performance Building Energy Design Strategy, Passive Design Strategy, Building Envelope, Internal Load Reduction, Smart Buildings and Energy Management Systems.

UNIT V

Green building economics and sustainable construction: General approach, The Business Case for High – Performance Green Buildings, Economics of Green Building, Quantifying Green Building Benefits, Articulating Performance Goals for Future Green Buildings

TEXT BOOKS:

1. Sustainable Construction by CHARLES J. KIBERT 4 th Edition published by John Wiley& sons 2016
2. Sun, Wind & Light- Architectural design strategies by Mark Dekay & G.Z Brown 3 rd Edition by John Wiley & sons 2014

IV YEAR I SEMESTER SYLLABUS

(A17126) ESTIMATING AND COSTING

L	T	P	C
3	1	0	3

Course Objectives

1. To produce civil engineering students to have a strong foundation in the estimation of quantities required for roads and buildings
2. To introduce the different methods of the estimation
3. To explain the detailed procedure of contracts
4. To familiarize with the knowledge of preparing bar bending schedules and valuation of buildings

Course Outcome

At the end of the course Students will be able to

CO1: Summarize the basic principal and standard methods for working out quantities in estimating.

CO2: Determine the earthwork estimate of buildings, roads and canals.

CO3: Estimate the rate analysis of the various items of work.

CO4: Understand the process of contracting for roads and buildings.

CO5: Evaluate the valuation of buildings and provide practical knowledge of standard specifications of items of building construction. Building construction.

UNIT – I

Introduction : General items of work in Building, Standard Unit Principles of working out quantities for detailed and abstract estimates – Approximate and Detailed Estimate of Buildings. principles of bar bending (introduction)

UNIT – II

Earthwork Estimation: Methods of estimation of buildings and roads.canals in cutting.

UNIT – III

Rate Analysis: Unit rate analysis for various items of building works.

UNIT – IV

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

UNIT – V

Valuation of buildings: Standard specifications for different items of building construction.

TEXTBOOKS:

1. Estimating and Costing by B.N. Dutta, UBS publishers, 27th edition 2016.
2. Estimating and Costing by G.S. Birdie, 6th edition-2014.

REFERENCE:

1. Standard Schedule of rates and standard data book by public works departmet.
2. I. S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S.)
3. Estimation, Costing and Specification by M. Chakraborthi; Laxmi publications,2006.
4. National building code,2017
5. Delhi Rate Analysis (CPWD Specifications)

WATER RESOURCES ENGINEERING-II

L	T	P	C
3	1	0	3

Course Objectives

1. To introduce the types of irrigation systems
2. To introduce the concepts of planning and design of irrigation systems
3. To understand design methods and principles of erodible and non-erodible canals
4. To know the concepts for analysis and design principles of storage and diversion head works

Course Objectives

At the end of the course Students will be able to

CO1 Estimate the capacity of reservoir, life of the reservoir and selection of type of dam along with its site..

CO2: Determine the forces on Gravity dam, practical profile, and limiting the height of Gravity dam with galleries.

CO3: Design the Earthen dam and spillways along with measures to control seepage through hydraulic structures.

CO4: Design the Diversion head work and its components along with weir, barrage, silt exclude and silt ejector.

CO5: Design the Canal falls and other regulatory works along with cross drainage work at required site..

UNIT-I

Storage Works: Reservoirs - Types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve- Reservoir Sedimentation – Life of Reservoir.. Types of dams, factors affecting selection of type of dam, factors governing selection of site for a dam.

UNIT-II

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 the height of a low gravity dam, drainage and inspection of galleries.

UNIT-III

Earth dams: types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage.Spillways: types of spillways, Design principles of Ogee spillways.

UNIT-IV

Diversion Head works: Types of Diversion head works- weirs and barrages, layout of diversion head work - components. Causes and failure of Weirs and Barrages on permeable foundations,-Silt Ejectors and Silt Excluders, Weirs on Permeable Foundations, Design principles of weirs .

UNIT-V

Canal Falls : Types of falls and their location, Design principles of Notch Fall and Sarada type Fall. Canal regulation works, principles of design of distributory and head regulators, Canal Cross Regulators -canal outlets, types of canal modules

Cross drainage works:types , selection of site, design principle of the aqueduct, siphon aqueduct and super passage

TEXTBOOKS:

1. Irrigation engineering and hydraulic structures by S.K Garg, Khanna publishers January, 2006

2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi 2016

REFERENCES:

1. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers2018.

2. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta jan 2014.

3. Irrigation engineering by K.R.Arora 2010

4. Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand Publishers2002.

5. Introduction to hydrology by Warren Viessvann, Jr, Garyl. Lewis, PHI 4th edition 19997.

6. Engineering Hydrology by CS Pojha, R. Berndtsson and P. Bhunya, Oxford University Press july 2008.

RAILWAYS, AIRPORTS AND HARBORS ENGINEERING

L	T	P	C
3	1	0	3

Course Objectives

1. To explain various components and their functions in a railway, airport and harbors as a transportation system
2. To explain the design parameters for Railway, airport and Harbors
3. To explain the planning and maintenance criteria for railways , airports and harbors
4. To explain the working of intelligent transportation system.

Course Outcomes

At the end of the course Students will be able to

CO1: Define and understand the various components of railways.

CO2: Understand and solve the geometric elements needed for the design of permanent way.way.

CO3: Define, understand, and design the various components of the airport.

CO4: Define, understand the planning and requirements of a harbor

CO5: Improve and Visualize the working of intelligent transportation system..

UNIT – I

Introduction to railway : Permanent way components – Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast, Gauge –Creep of Rails- Theories related to Creep – Sleeper density.

UNIT – II

Geometric design of railway track: Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve, Points and Crossing, Rail Joints & Welding of Joints, Railway station& Yards, Signalizing & interlocking.

UNIT – III

Airport engineering: Airport Site selection – Runway Orientation – Basic, Runway Length – Corrections for Elevation – Airport Classification - Runway Geometric design concepts – Factors Controlling Taxiway Layout - Terminal Area – Apron – Hangar – Blast Considerations, Typical Airport Layouts – Wind rose diagram - Runway Lightening system & Marking.

UNIT – IV

Port and harbor engineering: Requirements of Port and Harbour, Classification of Port & Harbour, Features of a Harbour, Planning of Harbour, Breakwaters, Dry docks, Jetties, Aprons, Transit shed and Warehouses, Navigational aids.

UNIT –V

Intelligent transport systems:ITS Definition, Benefits of ITS, user services, Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Introduction to ITS applications, ITS architecture components and standards, Overview of ITS implementations in developed countries.

TEXTBOOKS:

1. Satish Chandra and Agarwal, M.M. (2007) "Railway Engineering" Oxford Higher Education, University Press New Delhi.
2. Airport Planning and Design- S.K. Khanna and M.G Arora, Nemchand Bros 2012.
3. A Text book of Transportation Engineering – S.P.Chandola – S.Chand & Co. Ltd. – (2001).
4. Transportation Engineering and Planning – C.S. Papacostas, P.D.Prevedouros, 3rd edition 2000.
5.

REFERENCES:

1. A Text Book of Railway Engineering-S.C.Saxena and S.Arora, Dhanpatrai and Sons, New Delhi. 7th Edition 2013.
2. Highway, railway, Airport and Harbour Engineering – K.P. Subramanian December 2010.
3. Harbour, Dock and Tunnel Engineering – R. Srinivasan 28th Edition : 2016

4. Dock and Harbour Engineering – Hasmukh P Oza, Gutam H Oza 8th Edition 2016.

IV YEAR I SEMESTER Professional Electives- 3

FINITE ELEMENT METHODS (PE-3)

L	T	P	C
3	0	0	3

Course Objectives

1. To explain the basic principles of finite element analysis procedure
2. To define the theory and characteristics of finite elements that represent engineering structures
3. To illustrate the meshing structure and the importance of meshing in the analysis
4. To explain the model of complex geometry problems and solution techniques.

Course Outcomes

At the end of the course Students will be able to

CO1: Explain plane stress-plane strain equations and develop displacement functions..

CO2: Analyze one-dimensional problems using stiffness matrix.

C**O3:** Examine the different elements based on continuity and compatibility.

CO4: Illustrate quadrilateral elements using nodal points and shape functions.

CO5: Determine displacements, strains and stresses for static loads.

UNIT – I

Introduction to Finite Element Method: Basic Equations in Elasticity Stress – Strain equation – concept of plane stress – plane strain advantages and disadvantages of FEM. Element shapes – nodes – nodal degree of freedom Displacement function – Natural Coordinates – strain displacement relations.

UNIT- II

One dimensional problem: Finite Element Analysis (FEA) of – one dimensional problems – Bar element – Shape functions stiffness matrix

FEA Beam elements – stiffness matrix - shape function– Analysis of continuous beams- stress strain relation.

UNIT- III

Two dimensional problem: FEA Two dimessional problem – CST – LST element – shape function – stress – strain.

Lagrangian – Serendipity elements – Hermite polynomials – regular, Irregular 2 D & 3D – Element –shape functions.

UNIT- IV

Isoparametric formulation:– Concepts of, isoparametric elements for 2D analysis - 4 noded and 8 noded iso- parametric quadrilateral elements.

UNIT- V

Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

TEXTBOOKS:

1. A first course in Finite Element Method by Daryl L. Logan, 5th Edition, Cengage Learning India Pvt. Ltd. 2011.
2. Introduction to finite Elements in Engineering by Tirupathi R. Chandrupatla, and Ashok D. Belegundu, Prentice Hall of India 4th revised, 2012.

REFERENCES:

1. Finite Element Aanalysis by P.Seshu, PHI Learning Private Limited , 2012.
2. Concepts and applications of Finite Element Analysis by Robert D. Cook et al., Wiley India Pvt. Ltd. 3rd edition , October 1988.
3. Applied Finite Element Analysis by G.Ramamurty, I.K.International Publishing House Pvt. Ltd 2010.

ADVANCED FOUNDATION ENGINEERING (PE-3)

L	T	P	C
3	0	0	3

Course Objectives

1. To study about various theories related to foundation analyses
2. To introduce the deep foundation like pile foundation and its applications
3. To familiarize with the knowledge of theories related to lateral earth pressure
4. To learn about the design criteria of cantilever sheet piles, foundation in expansive soils

Course Objectives

At the end of the course Students will be able to

CO1: Identify the suitable bearing capacities theories for different foundation analysis.

CO2: Analyze the design of pile foundation.

CO3: Evaluate the of pressure theories in foundation design.

CO4: Analyze and design to sheet pile and cofferdam.

CO5: Examine and discuss the various expansive soil problems.

UNIT – I

Introduction: Bearing capacity of Footings subjected to Eccentric and inclined loading – Meyerhoff's, Hansen's, Vesic theories – Foundations on layered soils.

Elastic settlement of Footings imbedded in sands and clays of Infinite thickness – Footings on soils of Finite thickness-Schmertamaunn's method, Janbu method.

UNIT – II

Pile Foundations: pile groups- settlement of pile groups resting in sands and clays - negative skin friction-under reamed piles-laterally loaded piles – ultimate lateral capacity - Broms Method - Reese and Matlock Approach.

UNIT – III

Lateral earth pressures theories- Rankine's and coloumb's theories-graphical method stability of cantilever and gravity retaining walls.

UNIT-IV

Cantilever sheet piles and anchored bulkheads: earth pressure diagram - determination of the depth of the embedment in sands and clays – braced cuts - earth pressure diagrams – forces in struts.

UNIT-V

Foundations in Expansive Soils: problems in expansive soils – mechanism of swelling – swell pressure and swelling potential – heave – foundation practices – sand cushion – CNS technique – under – reamed pile foundations – granular pile anchor technique, stabilization of expansive soils.

TEXT BOOKS :

1) Das, B.M.,(1999) Principles of Foundation Engineering –4th edition PWS Publishing, Singapore.

2) Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill International.

3) Soil Mechanics and Foundation Engineering by V N S Murthy, CBS Publsihers and Distributors 2014.

REFERENCE BOOKS:

1) Geotechnical Engineering Principles and Practices by Cuduto, PHI Intrernational 2010.

2). Geotechnical Engineering by C. Venkataramah, NewAge International Pvt.Ltd, Publishers (2002).

3) Analysis and Design of Substructures – Swami Saran, Oxford & IBH Publishing Company Pvt.Ltd (1998).

4) Basics and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt.Ltd, Publishers (2002).

SOLID WASTE MANAGEMENT (PE-3)

L	T	P	C
3	0	0	3

Course Objectives

1. To impart the knowledge the methods of collection and optimization of collection routing of municipal solid waste
2. To acquire the principles of treatment of municipal solid waste
3. To know the impact of solid waste on the enviornment.
4. To learn the criterion for selection of the landfill and its design
5. To plan the methods of processing such as composting the municipal organic waste

Course Outcomes

CO1: Illustrate the hierarchical structure in solid waste management and an integrated solution.
CO2: Apply the legal legislation, economical analysis of the solid waste management system.
CO3: Identity route optimization for a solid waste collection and transport system.
CO4: Evaluate the subject from the technical, legal and economical points by learning of all terms related to general solid waste management.
CO5:Plan site selection for a landfill.

UNIT I

Waste Management: Solid waste problem, meaning and definition of solid waste, concept and classification of municipal solid waste, Imacts of solid waste on environment.

UNIT II

solid waste management rules and regulations, Developing a solid waste collection and transfer system, characterizing waste generation, determining public and private collection or transfer options.

UNIT III

Waste management techniques: Solid waste management Hierarchy, waste prevention, definition of source reduction, waste reduction at source using 5R's Technique,

UNIT IV

Waste disposal Techniques: Waste disposal, composting, principles of composting, factors affecting composting, vermi composting, waste to energy techniques, Landfill technique and design and operating procedure of landfill.

UNIT V

Solid waste management of Biomedical waste, plastic and E-waste: Biomedical waste – sources and generation, biomedical waste management, plastic – Dangers of plastic wastes, Recycling and disposal of plastic wastes, E – wastes – Definition, Health hazards, E – waste management and conclusion.

TEXTBOOKS:

1. Solid waste Management by K. Sasi Kumar & S. Gopi Krishna Prentice-Hall Publishers july 2013.
2. Solid waste Management by Jagbir Singh(Author), A.L. Ramanathan(Author) publisher I K International Publishing House Pvt Ltd, January 2009.

REFERENCES:

1. Management of Municipal Solid waste by T.V. Ramachandra publisher The Energy and Resources Institute , TERI, December 2009.
2. Municipal Solid waste Management in India by Subhrabaran Das(Author), Korobi Gogoi(Author) publisher VDM Verlag, 2009.
3. Handbook of Solid Waste Management by George Tchobanoglous and Frank Kreith Publisher McGraw-HILL second edition , 2002.

REMOTE SENSING AND GIS (PE-3)

L	T	P	C
3	0	0	3

Course Objectives

1. To understand about the principles of GIS
2. To study the principles of Remote Sensing, Spatial Systems
3. To understand the applications to Civil Engineering .

Course Objectives

CO1: Understand the concepts of Photogrammetry and compute the heights of the objects using parallax. theorem.

CO2: Understand the principles of aerial Photogrammetry and remote sensing, Able to comprehend the energy interactions with earth surface features, spectral properties of water bodies

CO3: Analyze the basic concept of GIS and its applications, able to work with GIS software in various application fields.

CO4: Illustrate spatial and non-spatial data features in GIS and understand the map projections and coordinate systems.

CO5: Understand the application of vector and raster data structure to the real world, the importance of source map and learning the on-screen digitization.

UNIT-I

Introduction to Photogrammetry : Principles & types of aerial photography, geometry of a vertical aerial photograph, Scale & Height measurement to single vertical aerial photograph, Height measurement based on relief displacement, Fundamentals of stereoscopy, fiducially points, parallax measurement using fiducial line.

UNIT-II

Remote Sensing: Basic concept of Remote sensing,Data and Information, Remote sensing data collection, Remote sensing

advantages & Limitations, Remote Sensing process. Electromagnetic Spectrum, Energy interactions with soil, water and vegetation-,Introduction to digital data, elements of visual interpretation techniques.

UNIT-III

Geographic Information System: Components of a GIS; Geo spatial Data: Spatial Data- Attribute data-Joining Spatial and attribute data; GIS Operations: Spatial Data Input – Attribute data Management -Data display Data Exploration – Data Analysis.

.

UNIT-IV

Vector data model: Representation of simple features – Topology and its importance; coverage and its data structure, Shape fire; Data models for compost feature Object Based Vector Data Model; Geometric representation of Spatial Feature and data structure, Topography rules.

UNIT-V

Raster data model: Elements of the Raster data model, Types of Raster Data, Raster Data Structure,

Data Input: Metadata, on a version of Existing data, creating new data; remote sensing data, filed data.

TEXTBOOKS:

1. Remote sensing of the environment – An earth resources perspective – 2nd edition – by john R.Jensen, Pearson Education, may 2007
2. Introduction to Geographic information system – Kang – Tsurg Charg. Tata McGraw Hill Eduction Private Limited, 2007.

REFERENCES:

1. Remote sensing and Geograperhical information system – by M. Anji Reddy JUNT Hyderabad 2001, B.S. Publications.

2. Principals of Geo physical Information system – Peter A Burragh and Rachael A. Mc Donnnell, Oxford Publications 2004.

3. Basics of remote sensing & GIS by S. Kumar, Laxmi publications, 2016.

PROFESSIONAL ELECTIVE-4

ADVANCED STRUCTURAL DESIGN (PE-4)

L	T	P	C
3	0	0	3

Course Objectives

1. To introduce the students, design procedure of raft foundations and retainng walls.
2. To equip students with the concept of design of different types of RRC water tanks.
3. To introduce the concepts of flat slabs.
4. To explain the different typr of bunkers , silos and chimneys.

Course Outcomes

At the end of the course Students will be able to

CO1: Analyze and design of cantilever retaining wall.

CO2: Apply the provision of IS :3370-2009 to design water tank.

CO3: Apply the provision of IS 456-2000 for designing flat slab.

CO4:Adapt the provision of IRC 21-1987 to class AA loading to design T beam girder.

CO5: Summarize the force components and design principles of RCC Chimney.

UNIT I

Design of cantilever walls : Design and detailing of gravity and cantilever type of retaining walls- stability check. Principles of counterfort retaining walls.

UNIT II

Water tank design: Design of circular water tanks at ground level and elevated with staging.

UNIT III

Design of flat slabs - Definition of flat slab, Design principles.

UNIT IV

Design of concrete bridges – IRC loading , T-beam girder bridge..

UNIT V

Chimneys: Design of RCC chimney .

TEXTBOOKS:

1. Advanced reinforced concrete structures by Varghese, pranties hall of india pvt ltd, 2005.
2. Bridge engineering by s. ponnuswamy , MC graw hill co 2nd edition 2007.
3. Reinforced concrete design by S.A. Pillai and D.Menon, Tata MC graw hill publishing company, july 2017.
4. Advanced reinforced concrete structures by Krishna Raju., December 2010.

REFERENCES:

1. Reinforced concrete strctueres vol II by B.C. Punmiah, Ashok Kumar Jain and arun Kumar Jain, lakshmi publications Pvt. Ltd, New Delhi, December 2005.
2. Essentials of bridge engineering by D.John son Victor, oxford and IBM publication co pvt ltd 6th, 2007

AIR POLLUTION AND CONTROL METHODS (PE-4)

L	T	P	C
3	0	0	3

Course Objectives

1. understand the chemistry of atmosphere, characterize the air pollutants ,know the effects of air pollution, identify the criteria air pollutants
2. apply the knowledge of mathematics ,science and engineering fundamentals to understand the concept of meteorology, air pollution dispersion and Gaussian plume dispersion model
3. select suitable method and design the particulate pollutant control equipment
4. select appropriate method for control of gaseous pollutant by due consideration of sources of emission

5.understand the source of indoor air pollution, effects and control methods as well as to identify the source of noise ,and select suitable method for measuring and control of noise pollution

Course Outcomes

At the end of the course Students will be able to

CO1; Find the sources, causes & effects of air pollution.

CO2: Understand the meteorological components and the plume behaviour for atmospheric stability conditions.

CO3: Identify the types of equipments to control the particulates at sources.

CO4: Minimize the control measures of NOX, SOX and other gaseous emissions.

CO5: Examine the SPM, SOx, NOx and CO emission standards.

UNIT – I

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. 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 – II

Meteorology: plume Dispersion; properties of the atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity; Influence of Meteorological phenomena on Air Quality-wind rose diagrams. Lapse Rates, Pressure Systems.

UNIT – III

Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control. Equipment's – Settling Chambers, Centrifugal separators, filters Dry and Wet scrubbers.

UNIT – IV

Control of gaseous emissions: 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- adsorption- absorption-combustion.

UNIT – V

Air Quality Management: Monitoring of SPM, SO_x; NO_x and CO Emission Standards- air sampling- sampling techniques- high volume air sampler-stack sampling- analysis of air pollutants- air quality standards air pollution control act.

TEXTBOOKS:

1. Air pollution By M.N.Rao and H.V.N.Rao – Tata Mc.Graw Hill Company, july 2017.

2. Air pollution by Wark and Warner.- Harper & Row, New York, 1981.

REFERENCE:

1.An introduction to air pollution by R.K. trivedy and P.K. Goel , B.S publications, 198

WATER RESOURCES SYSTEMS ANALYSIS (PE-4)

L	T	P	C
3	0	0	3

Course Objectives:

1. To study types of systems and systems approach to water resources planning and management
2. To understand the role of optimization in water resource planning, economy and management
3. To study various linear programming models and their applications in water resources
4. To study the concept of dynamic programming and its applications in water resources problems

Course Outcomes:

CO1: Understand the concept of water resource systems and techniques involved in it.

CO2: Formulate the linear programming models and examine their application in water resource.

CO3: Measure the sensitivity of formulated models and revised simplex techniques.

CO4: Apply the dynamic programming for resource allocation.

CO5: Analyze various factors involved in water resource economics and compare the economical analysis.

UNIT – I

Introduction: the definition of system, Type of system, System Approach, Systems analysis and type of systems, Techniques of water resources systems, analysis.System Techniques in water resources: Objective fictions and constraints, Optimization of a function and variable, Optimization of a function of multiple variables, Constrained optimization, Kuhn – Tucker conditions.

UNIT – II

Linear programming -I: Formulation of linear programming models, graphical method, simplex method, application of Linear programming in water resources'

UNIT – III

Linear programming -II : Revised simplex method duality in linear programming, sensitivity and post optimality analysis

UNIT – IV

Dynamic programming: Belman's principles of optimality forward and backward recursive dynamic programming, curse of dimensionality, Applications of dynamic programming for resource allocation'

UNIT V

Water Resources Economics: Basics of Engineering economics, Discount factors, Uniform annual series, Amortization, Comparison of alternate Plans Principles of Economics analysis, Conditions of project optimality, benefit cost analysis socio economic intuition and pricing of water resources

TEXTBOOKS:

1. Water resource System Analysis _ Vedula & Mujumdar _ Tats Mc 1. Craw Hill Company/Ltd.october 2016
2. Water Resources Economics – James & Lee. Oxford publishers 2005,

REFERENCES:

1. Operational Research by Taha, Printice Hall of India publishers.2011
2. Water Resources project Economic by Kuiper.E.july 1971
3. Enineering g optimization: Theory and Practice, Rao, Singiresu S.july-2009.

INDUSTRIAL WASTE WATER TREATMENT (PE-4)

L	T	P	C
3	0	0	3

Course Objectives

1. To understand about the major sources of pollution.
2. To illustrate about pre and primary treatments in various aspects.
3. To introduce about the removal of chemicals from waste water.
4. To demonstrate the manufacturing process of various processing industries.

Course Outcomes

At the end of the course Students will be able to

CO1: Define the Physical, chemical, organic and biological properties of industrial wastes.
CO2: Illustrate the Pre and primary treatment methods of wastewater.
CO3: Explain the various methods for „Oil separation by floatation" while wastewater treatment process..
CO4: Distinguish the different types of Industrial Wastes.
CO5: Summarize the Common effluent treatment plant's location, design, and operation and maintenance problems.

UNIT – I

Sources of pollution: physical, Chemical, Organic, and Biological properties of Industrial wastes – Differences between industrial and municipal waste water effects of industrial effluents on sewers and Natural water Bodies.

UNIT – II

Pre and Primary Treatment : Equalization, Proportioning, Neutralization, Oil Separation by Floatation – Waste Reduction – Volume Reduction ¬ Strength Reduction

UNIT – III

Waste Treatment Methods: Nitrification and De-nitrification – Phosphorous removal – Heavy metal removal – Membrane Separation Process – Air Stripping and Absorption Processes – Special Treatment Methods -Disposal of Treated Waste Water.

UNIT – IV

Industrial waste : Characteristics and Composition of waste water and Manufacturing processes of Industries like Sugar, Characteristics and Composition of Industries like Food Processing Industries, Steel, Petroleum Refineries.

UNIT – V

Industrial waste management: Characteristics and Composition of Industries like Textiles, Tanneries,Atomic Energy plants and other Mineral Processing Industries – Joint Treatment of Raw Industrial waste water and Domestic sewage Common Effluent Treatment Plants (CETP) – Location, Design, Operation and Maintenance Problem – Economical aspects.

TEXTBOOKS:

1. Industrial Waste Water Pollution Control by W' Wesley Eckenfelder – McGraw-Hill',sep-1999

REFERENCES:

1. Industrial Waste Treatment by Rao & Datta' 3-edition 2008

.

OPEN ELECTIVE -3 (Offered by Civil Engineering Department to other branches except Mechanical Engineering)

ELEMENTS OF CIVIL ENGINEERING (OE3)

L	T	P	C
3	0	0	3

Course Objectives

1. To study types of different building materials and its testing
2. To understand the soil and its significance in construction techniques as an engineering material
3. To study various surveying techniques
4. To study the concept of strength characteristics of the building

Course Outcome

CO1: Understand Geological properties and Geotechnical aspect of civil engineering.

CO2: Plan the concept of different building byelaws and planning principles.

CO3: Analyse the concept of stress-strain and to identify the properties of the fluid changes treatment process.

CO4: Apply modern tools of surveying and understand basic concepts of concrete.

CO5: Evaluate the principles of highway geometric designs and types of pavements as per IRC standards.

UNIT – I

Basics of Geotechnical engineering and engineering geology

Engineering Geology: Geology - branches of geology - weathering of rocks - mineralogy – definition - importance of study of minerals - classification of minerals - petrology- geological classification of rocks.

Geotechnical engineering: Soil formation- Soil structure - types of soils and its properties-soil mineralogy and its its significance.

UNIT – II

Building materials, building components:
Stones – Classification, quarrying and methods of quarrying. Bricks – Components of Brick earth. Building Components – Lintels, arches, walls, staircase, floor and roofs, doors and windows, DPC, Building planning and building byelaws

UNIT – III
Basic concepts of strength of materials and fluid mechanics

Strength of materials: Types of stresses and strains - hook's law - definition of the beam - types of beams – types of loads, concept of bending moment and shear for with simply supported beam. **Fluid mechanics:** Dimensions and units - physical properties of fluids – specific gravity - surface tension – viscosity - vapor pressure.

UNIT – IV
Basic concepts of concrete technology and surveying

Cement: Chemical composition - aggregates – classification of aggregates. **Admixtures:** Types of admixtures- water cement ratio. **Surveying:** Definition of surveying – principle - types of surveying - objectives and classification – advanced surveying – GIS - GPS.

UNIT – V
Transportation engineering

Highway Development in India – Necessity for Highway Planning- Different Road Development Plans; Classification of Roads - Road Network Patterns, Types of Intersections – Conflicts at Intersections – Introduction to flexible & rigid pavements – advantages – limitations. Parking studies- road accidents and preventive measures- traffic signs- road markings.

TEXTBOOKS:

5. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd.,10thed. 2008
6. Geotechnical Engineering, (3rd edition) by Venkataramiah, C., New Age International Pvt . Ltd, 2010.
7. Engineering Geology by N.Chennakesavulu, Mc-Millan, India Ltd. 2005

8. Strength of Materials by S.S.Bhavikatti, Vikas Publishing House Pvt. Ltd.2008
9. . Text book of surveying by C.Venkataramaiah, Universities Press 2006
10. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi 5th ed 2004.
11. Principles and Practices of Highway Engineering – Dr.L.R.Kadiyali and Dr.N.BLal - Khanna Publications.(2005).

REFERENCES:

3. Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi 2006
4. Highway Engineering – S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000).
5. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt . Ltd, New Delhi: ,third edition (2016)
6. Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard book house. 3rd ed. 2009.

INTRODUCTION TO EARTHQUAKE ENGINEERING (OE3)

L	T	P	C
3	0	0	3

Course Objectives

- To define the basic terminology on earthquake engineering
- To explain the aspects of the earthquake with the view of plate tectonics
- To illustrate the phenomenon of earthquake and its causes through the theory of vibrations
- The course introduces the source mechanics of earthquake, hazards and its consequences and also covers earthquake measurement and instrumentation

Course Outcomes

At the end of the course Students will be able to

CO1: Understand the Interior Earth' surface, fault attenuation, different wave propagation in Earthquake events.

CO2: Classify different earthquake hazards and its effects.

CO3: Examine the mechanical behavior of earth surface and its significance.

CO4: Evaluate the quantification of Hazard effects - approach methods.

CO5: Predict the vibration motion and how it influences the earth's surface.

UNIT I

Introduction to Earthquakes: Tectonic plates , fault types, earthquake classification, Fundamentals of wave motion- seismic wave types. Reflection and refraction of plane waves at a plane boundary- independence of SH and P and of SV waves- boundary conditions; Energy conversions focus on Indian earthquakes.

UNIT II

Earthquake measurements: Earthquake measuring: instruments- Seismoscope, Seismograph, Seismic Recording, accelerograph-strong ground motions- Interpretation of Seismic Records - acceleration, velocity and

displacement; Frequency and Time Domain parameters:,Seismic zones of India.

UNIT III

Engineering Seismology: Earthquakes phenomenon cause of earthquakes- Stress, Strain, & Seismic Waves Faults- Plate tectonics- Different plate theories-Big bang theory Seismic waves- Terms associated with earthquakes-Magnitude/Intensity of an earthquake-scales-Energy released. Wave equation (1- D propagation)

UNIT IV

Seismic Hazard: Safety of individual site; Concept of seismic microzonation- Need for Microzonation, Introduction to Seismic Hazard, types of hazard, Time parameters of hazards, Hazard analysis Methods- Deterministic and Probabilistic- Introduction to Site characterization; Concept of site response- Local site effects and evaluation methods.

UNIT V

Theory of Vibrations: Elements of a vibratory system- Degrees of Freedom- Continuous system-Lumped mass idealization-Oscillatory motion-Simple Harmonic Motion-Free vibration of single degree of freedom (SDOF) system with and without damping. **Concepts of Earthquake resistant building :** Building configurations-Introduction-Functional planning-Continuous load path- Dynamic Characteristics of Buildings

TEXTBOOKS:

3. Basic Earthquake Engineering: From Seismology to Analysis and Design : Sinan Akkar (2014)
4. Dynamics of Structures: Applications to Earthquake Engineering: A K Chopra (2003)
5. Earthquake Resistant Design of structures – Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd,(2006).

REFERENCES:

6. Seismic Design of Reinforced Concrete and Masonry Building – T. Paulay and M.J.N. Priestly, John Wiley & Sons (1994).
7. Eartquake Resistant Design of Buidling structures by Vinod Hosur, Wiley India Pvt. Ltd (1992).
8. Elements of Mechanical Vibration by R.N.Iyengar, I.K.International Publishing House Pvt. Ltd, (2010).
9. Masory and Timber structures including earthquake Resistant Design – Anand S.Arya, Nem chand & Bros,(1992).

10. Earthquake Tips – Learning Earthquake Design and Construction C.V.R. Murthy, (2005)

INDUSTRY ORIENTED MINI PROJECT

L	T	P	C
3	0	0	2

Course Objectives

To make the student

1. Develop skills to identify ,define and solve a problem
2. Communicate effectively in both oral and written forms for preparing and presenting reports.
3. Work individually and in teams effectively and cohesively.
4. Correlate the project in lifelong activity
5. Understand ethical principles and commit to professional ethics.

Course Outcomes

At the end of the course Students will be able to

CO1: Interpret the literature and develop solutions for framing problem statement.

CO2: Select software techniques for identifying problems.

CO3: Analysis and test the modules of planned project.

CO4: Design technical report and deliver presentations.

CO5: Apply engineering and management principles to achieve project goals.

There shall be an industry-oriented Mini-Project, in collaboration with an industry of department specific specialization, to be taken up during the vacation after III year II Semester examination. However, the mini-project and its report shall be evaluated along with the project work in IV year II Semester. The industry oriented mini-project shall be submitted in a report form and presented before the committee. The committee consists of an external examiner, Head of the Department, the Supervisor of the Mini-project and a Senior Faculty member of the department. There shall be no internal marks for industry oriented mini-project.

IV YEAR B TECH I SEMESTER: LABORATORIES

CONCRETE AND HIGHWAY MATERIALS LAB

L	T	P	C
0	0	3	2

Course Outcomes:

CO1: Examine the experimental strength of aggregate materials as per codal provisions.

CO2: Classify different earthquake hazards and its effects..

CO3: Examine the mechanical behavior of earth surface and its significance.

CO4: Evaluate the quantification of Hazard effects - approach methods.

CO5: Predict the vibration motion and how it influences the earth's surface.

LIST OF EXPERIMENTS

I. Road Aggregates

1. Aggregate Crushing Value.
2. Aggregate Impact Test.
3. Specific Gravity And Water Absorption.
4. Attrition Test.
5. Abrasion Test.
6. Shape Test.

II. Bituminous Materials

1.Penetration Test.
2.Ductility Test.
3.Softening Point.
4.Flash And Fire Point.

III. Cement and Concrete

Tests on cements

1. Fineness of Cement.
2. Normal Consistency of Cement
3. Initial And Final Setting Time of Cement.
4. Specific Gravity and Soundness of Cement.
5. Compressive Strength of Cement.

Tests On Concrete

6. Workability Test on Concrete By Compaction Factor , Slump cone and Vee- Bee.

7. Compressive Strength and Young's Modulus of Concrete.
8. Bulking of Sand.
9. Non Destructive Testing on Concrete (For Demonstration).

List of major equipment

1. Digital compression testing machine 2000 kN capacity.
2. Aggregate impact testing machine.
3. Devals attrition test apparatus.
4. Los angeles abrasion machine.
5. Standard penetrometer.
6. Ductility testing machine.
7. Ring and ball appartus.
8. Pensky martin's apparatus.
9. Vicat's apparatus.
10. Le-chatlier's apparatus.
11. Vee – bee consistometer.
12. Slump cone apparatus.
13. Compaction factor apparatus.
14. Concrete hammer (rebound hammer).

ENVIRONMENTAL ENGINEERING LAB

L	T	P	C
0	0	3	2

Course Outcomes:

CO1: Understand principles and practical application in water treatment.

CO2: Determine physical, chemical and biological characteristics of water and wastewater.

CO3: Determine the optimum dose of coagulant.

CO4: Estimate the chloride, nitrate and iron content in water.

CO5: Summarize the solutions using titration, conductivity meter, pH meter, turbidity meter and DO meter.

List of experiments:

1. Determination of pH and turbidity
2. Determination of Conductivity and total dissolved solids
3. Determination of Alkalinity and Acidity
4. Determination of Chlorides
5. Determination of Iron
6. Determination of Dissolved Oxygen
7. Determination of Nitrates
8. Determination of Optimum dose of Coagulant
9. Determination of Chlorine Demand
10. Determination of B.O.D
11. Determination of C.O.D
12. Presumptive Coliform test

List of major equipment

1. PH meter
2. Turbidity meter
3. Conductivity meter
4. D.O. Meter
5. B.O.D. Incubator
6. C.O.D. Digestor

7. Bacteriological Incubator
8. UV Spector photometer
9. Autoclave
10. Muffle furnace
11. Jar test apparatus
12. Hot air oven

IV YEAR B TECH II SEMESTER SYLLABUS

CONSTRUCTION MANAGEMENT

L	T	P	C
3	0	0	3

Course Objectives

1. To introduce overall planning, coordination and control of projects.
2. This course gives the students the scientific principles involved in construction, an understanding of the behavior of construction materials and fundamentals of structures.
3. To develop basic concepts of PERT and CPM.
4. To bring out the knowledge about contracts and bidding.

Course Outcomes

CO1: Understand the behavioural aspect of entrepreneurs, various approaches of time management, their strength and weakness..
CO2: Apply the concepts of project management during the construction phase, project organization, project planning and control using CPM,PERT techniques.
CO3: Analysis various materials and equipment's for construction work.
CO4: Examine the on different types of contracts and specifications.
CO5: Outline the labour regulations and safety in construction.

UNIT -I

Management Techniques -Roles. Management theories. Social responsibilities. Planning and strategic management. Strategy implementation. Decision making: tools and techniques – Organizational structure. Human resource management- motivation performance-leadership.

UNIT-II

Management Applications-Classification of Construction projects, Construction stages, Resources- Functions of Construction Management and its Applications .Preliminary Planning- Collection of Data-Contract Planning –

Scientific Methods of Management: Network Techniques in construction management - Bar chart, Gant chart, CPM, PERT- Cost & Time optimization.

UNIT-III

Resource Management -Resource planning - planning for manpower, materials, costs, equipment. Labour, -Scheduling. Forms of scheduling - Resource allocation. Budget and budgetary control methods

UNIT-IV

Contracts and Tenders- Contract - types of contract, contract document, specification, important conditions of contract – tender and tender document - Deposits by the contractor - Arbitration. Negotiation - M.Book - Muster roll -stores.

UNIT-V

Management Information System : Labour Regulations: Social Security - welfare Legislation - Laws relating to Wages, Bonus and Industrial disputes, Labour Administration - Insurance and Safety Regulations - Workmen's Compensation Act -other labour Laws - Safety in construction : legal and financial aspects of accidents in construction . occupational and safety hazard assessment. Human factors in safety . legal and financial aspects of accidents in construction . Occupational and safety hazard assessment

TEXTBOOKS:

1. Ghalot, P.S., Dhir,D.M., Construction Planning and Management, Wiley Eastern Limited,1992.

2. Chitkara,K.K., Construction Project Management, Tata McGraw Hill Publishing Co, Ltd., New Delhi,1998.

3. Punmia,B,C., Project Planning and Control with PERT and CPM, Laxmi Publications, New Delhi,1987.

REFERENCES:

1. Construction Management And Planning by: sengupta, b. Guha, h. tata mcgraw-hill publications,1995

REHABILITATION AND RETROFITTING OF STRUCTURES

L	T	P	C
3	0	0	3

Course Objectives

1. To Identify the causes of deterioration in structures and suggest suitable remedial measures.
2. To understand the types of damages and their mechanisms.
3. To learn to inspect and assess the structures using techniques of visual inspection and NDT.
4. To identify the latest health monitoring and building instrumentation methods.

Course Outcomes

CO1: Understand the causes and prevention of deterioration in structures.
CO2: Identify the types of damages and the mechanisms of corrosion in steel reinforcement and fire induced damages.
CO3: Examine the structures using techniques of visual inspection and NDT.
CO4: Estimate the structural damage and recommend suitable strengthening methods.
CO5: Apply the latest health monitoring and building instrumentation methods.

UNIT – I

Introduction: Deterioration of structures – Distress in structures – causes and prevention. Mechanism of Damage – Types of Damage

UNIT – II

Corrosion of steel Reinforcement: Causes – Mechanism and prevention. Damage of structure due to fire–fire rating of structures- Phenomena of Desiccation

UNIT – III

Inspection and Testing: symptoms and diagnosis of distress – Damage assessment – NDT

UNIT – IV

Repair of structure: common types of repairs – repair in concrete structures – repairs in underwater structures- Guniting – short create – Underpinning. Strengthening methods. Retrofitting – jacketing

UNIT – V

Health monitoring: structures and its health – use of sensors – building instrumentation.

TEXTBOOKS:

1. Maintenance and repair of civil structures. B.L. Gupta and Amit Gupta, Standard publications.2009.
2. Concrete Technology by A.R. Santa Kumar, Oxford university Press, New Delhi,2006.

REFERENCES:

1. Defects and deterioration in Buildings, EF & N Spoon, London,2015.
2. Non destructive Evaluation of concrete structures by Bungey – surrey university press,1989.
3. Concrete repair and maintenance illustrated, RS Means company inc W.H. Ranso (1981).
4. Building failures: Diagnosis and Avoidance , EF & N Spoon, London, B.A. Richardson, (1991).

PRESTRESSED CONCRETE STRUCTURES

L	T	P	C
3	0	0	3

Course Objectives

1. To familiarize students with concepts of prestressing.
2. To equip the students with different systems and devices used in prestressing.
3. To understand the different losses of prestress including short and long term losses
4. To familiarize students with the analysis and design of prestressed concrete members under flexure, shear and torsion.

Course Outcomes

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

CO1: Classify the concepts, principles, types and methods of PSC structures.

CO2: Evaluate the losses of PSC structures.

CO3: Analysis and design of PSC slabs and beams using IS:1343 (2012).

CO4: Explain transmission of prestressing force, end block analysis by different methods.

CO5: Analyse the stress distribution of composite beams and asses the deflection of beams.

Content

UNIT I

Introduction: Historic development- General principles of prestressing pretensioning and post tensioning- Advantages and limitations of Prestressed concrete- General principles of PSC- Classification and types of prestressing- Materials- high strength concrete and high tensile steel their characteristics.

Methods and Systems of pre stressing: Pretensioning and Post tensioning methods and systems of prestressing like Hoyer system, Magnel Blaton system, Freyssinet system and Gifford- Udall System- Lee McCall system.

UNIT II

Losses of Prestress: Loss of prestress in pretensioned and posttesnioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, relaxation of stress in steel, slip in anchorage, frictional losses.

UNIT III

Flexure: Analysis of sections for flexure- beams prestressed with straight, concentric, eccentric, bent and parabolic tendons- stress diagrams- Elastic design of PSC slabs and beams of rectangular and I sections.

Shear: General Considerations- Principal tension and compression- Improving shear resistance of concrete by horizontal and vertical prestressing and by using inclined or parabolic cables- Analysis of rectangular and I beams for shear – Design of shear reinforcements- IS Code provisions.

UNIT IV

Transfer of Prestress in Pretensioned Members : Transmission of prestressing force by bond – Transmission length – Flexural bond stresses – IS code provisions – Anchorage zone stresses in post tensioned members – stress distribution in End block – Analysis by Guyon, Magnel, Zienlinski and Rowe's methods – Anchorage zone reinforcement- IS Provisions

UNIT V

Composite Beams: Different Types- Propped and Unpropped- stress distribution- Differential shrinkage- Analysis of composite beams- General design considerations.

Deflections: Importance of control of deflections- Factors influencing deflections – Short term deflections of uncracked beams- prediction of long time deflections- IS code requirements.

TEXTBOOKS:

1. Prestressed concrete by N. Krishna Raju, 5th Edition. Tata Mc Graw Hill Book Education– pvt.ltd,2010.

REFERENCES:

1. Design of prestress concrete structures by T.Y. Lin and Burn, John Wiley, New York,2010.
2. Prestressed concrete by S. Ramamrutham Dhanpat Rai & Sons, Delhi,2010.
3. Prestressed Concrete by N. Rajagopalan Narosa Publishing House,2014.

TECHNICAL SEMINAR

L	T	P	C
0	0	6	2

Course Objectives

The student will be able

1. Develop skills in doing literature survey
2. Understand and present current research topics
3. Understand technical report writing
4. Develop time management skills
5. Communicate the technical topic effectively

Course Outcomes

The student will be able to

CO1: Demonstrate the skills in identifying, analysing, and presenting a research topic.
CO2: Demonstrate the quality of knowledge gained from the literature survey on recent technologies.
CO3: Demonstrate the skills developed to communicate effectively on engineering activities with the engineering community.
CO4: Demonstrate ability to effectively manage time in presentation skills.
CO5: Design a technical report with the principal of ethics.

Content

There shall be a seminar presentation in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding of the topic, and submit it to the department. It shall be evaluated by the departmental committee consisting of the Head of the Department, Seminar Supervisor and a Senior Faculty member. There shall be no external examination for the seminar.

MAJOR PROJECT

L	T	P	C
0	0	14	11

Course Objectives

To make the student

1. Identify, define and solve a problem
2. Communicate effectively in both oral and written forms for preparing and presenting reports.
3. Develop skills to work as an individual and in teams effectively
4. Correlate the project in lifelong activity
5. Understand ethical principles and commit to professional ethics.

Course Outcomes

The student will be able to

CO1: Identity, Analyse and apply suitable current techniques and tools to solve a problem in the civil engineering domain and societal issues.
CO2: Function effectively in teams to accomplish a common goal.
CO3: Organise the technical report writing and communication effectively.
CO4: Extend in lifelong activity.
CO5: Define and analyse a problem to assess health, safety and legal issues.

Content

The End Semester Examination of the project work shall be conducted by the same committee as appointed for the industry-oriented mini-project. In addition, the Project Supervisor shall also be included in the committee. The

topics for industry oriented mini project, seminar and project work shall be different from one another. The evaluation of project work shall be made at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his project.

COMPREHENSIVE VIVA

L	T	P	C
0	0	0	2

Course Objectives

1. To assess the understanding of the basic principles and methods of various courses..
2. To assess the communication, presentation skills developed during their course of study.
3. To estimate the quality of skills developed to be employable

Course Outcomes

The student will be able to

CO1: Explain comprehensively to answer questions from all the courses.
CO2: Test Oral Presentation skills by answering questions in a precise and concise manner
CO3: Build confidence and interpersonal skills
CO4: Support the students to face interview both in the academic and the industrial sector
CO5: Improve placements and better performers in their future.

Content

The Comprehensive Viva-Voce will be conducted by a Committee consisting of Head of the Department and two Senior Faculty members of the Department. The Comprehensive VivaVoce is intended to assess the students understanding of the courses he studied during the B. Tech. Course of study. There are no internal marks for the Comprehensive Viva-Voce.

OPEN ELECTIVE SUBJECTS OFFERED BY OTHER BRANEHS TO CIVIL ENGINEERING

III-I

S. No	Branch	Name of the subject
1	ECE	1.Introduction to Microcontroller & Applications 2.Basic Electronics & Instrumentation
2.	EEE	1.Non Conventional Energy Sources 2.Energy Management
3	CSE & IT	1. Java Programming 2. Operating Systems
4	Mechanical Engineering	1. Elements of Mechanical Engineering 2.Product Engineering
5.	MBA	1.Total Quality Management

III-II

S. No	Branch	Name of the subject
1	ECE	1.Fundamentals of Embedded Systems 2.Principles of Communications
2.	EEE	1.Principles of Electrical Power Utilization 2.Energy Auditing and Conservation
3	CSE & IT	1.Database management Systems 2.Software Engineering
4	Mechanical Engineering	1.Basic Automobile Engineering 2.Material Science and Engineering
5	MBA	1. Financial Institutions and Markets
6.	H&S	1.Fundamentals of Nanoscience and Technology 2.Nutritional and Biological Chemistry

IV-I

S. No	Branch	Name of the subject
1	ECE	1.Introduction to MATLAB 2.Circuit Simulation using PSpice.
2.	EEE	1.Electrical and Hybrid Vehicle 2.Energy Storage Systems
3	CSE & IT	1.Information Systems for Engineers 2.Web design
4	Mechanical Engineering	1.Optimization Techniques 2.Maintenance and Safety Engineering
5.	MBA	1. Fundamentals of Entrepreneurship

Note: The above open elective courses are available in respective branches curriculum.

ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

01

CIVIL ENGINEERING

For

B.TECH. FOUR YEAR DEGREE COURSE

(Applicable for the batches admitted from 2013-14)

(I - IV Years Syllabus)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
KUKATPALLY, HYDERABAD - 500 085.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD.

B. TECH. CIVIL ENGINEERING

I YEAR

Code	Subject	L	T/P/D	C
A10001	English	2	-	4
A10002	Mathematics – I	3	1	6
A10302	Engineering Mechanics	3	-	6
A10004	Engineering Physics	3	-	6
A10005	Engineering Chemistry	3	-	6
A10501	Computer Programming	3	-	6
A10301	Engineering Drawing	2	3	6
A10581	Computer Programming Lab.	-	3	4
A10081	Engineering Physics & Engineering Chemistry Lab.	-	3	4
A10083	English Language Communication Skills Lab.	-	3	4
A10082	IT Workshop / Engineering Workshop	-	3	4
	Total	**19**	**16**	**56**

II YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A30006	Mathematics – II	4	-	4
A30203	Electrical & Electronics Engineering	4	-	4
A30107	Strength of Materials –I	4	-	4
A30108	Surveying	4	-	4
A30101	Fluid Mechanics	4	-	4
A30010	Managerial Economics and Financial Analysis	4	-	4
A30185	Surveying Lab- I	-	3	2
A30183	Strength of Materials Lab	-	3	2
	Total	**24**	**6**	**28**

II YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A40008	Probability & Statistics	4	-	4
A40114	Strength of Materials - II	4	-	4
A40111	Hydraulics & Hydraulic Machinery	4	-	4
A40009	Environmental Studies	4	-	4
A40115	Structural Analysis –I	4	-	4
A40109	Building Materials, Construction & Planning	4	-	4
A40186	Computer Aided Drafting of Buildings	-	3	2
A40190	Surveying Lab- II	-	3	2
	Total	**24**	**6**	**28**

III YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A50116	Concrete Technology	4	-	4
A50121	Reinforced Concrete Structures Design and Drawing	4	-	4
A50118	Engineering Geology	4	-	4
A50120	Geotechnical Engineering	4	-	4
A50122	Water Resources Engineering-I	4	-	4
	Open Elective	4	-	4
A50117	Disaster Management			
A50017	Intellectual Property Rights			
A50018	Human Values and Professional Ethics			
A50181	Fluid Mechanics & Hydraulic Machinery Lab	-	3	2
A50191	Engineering Geology Lab	-	3	2
	Total	**24**	**6**	**28**

III YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A60130	Steel Structures Design and Drawing	3	2	4
A60119	Environmental Engineering	4		4
A60132	Transportation Engineering -I	4		4
A60126	Foundation Engineering	4		4
A60131	Structural Analysis -II	4		4
	Elective -I	4	-	4
A60123	Elements of Earthquake Engineering			
A60127	Ground Improvement Techniques			
A60128	Ground Water Hydrology			
A60124	Environmental Impact Assessment			
A60129	Principles of Entrepreneurship			
A60194	Geotechnical Engineering Lab	-	3	2
A60086	Advanced Communication Skills Lab	-	3	2
	Total	**23**	**8**	**28**

IV YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A70140	Remote Sensing & GIS	4	-	4
A70143	Transportation Engineering -II	4	-	4
A70138	Estimating & Costing	4	-	4
A70133	Water Resources Engineering-II	4	-	4
	Elective-II	4	-	4
A70330	Finite Element Methods			
A70134	Advanced Foundation Engineering			
A70145	Watershed Management			
A70136	Air Pollution and Control			
	Elective-III	4	-	4
A70135	Advanced Structural Design			
A70137	Earth and Rock fill Dams and Slope Stability			
A70144	Water Resources Systems Analysis			
A70139	Industrial Waste Water Treatment			
A70195	Concrete & Highway Materials Lab	-	3	2
A70192	Environmental Engineering Lab	-	3	2
	Total	**24**	**6**	**28**

IV YEAR II SEMESTER

Code	Subject	L	T/P/D	C
	Elective-IV	4	-	4
A80151	Rehabilitation and Retrofitting of Structures			
A80148	Geo-Environmental Engineering			
A80147	Design and Drawing of Irrigation Structures			
A80141	Solid Waste Management			
A80150	Prestressed Concrete Structures	4	-	4
A80146	Construction Management	4	-	4
A80087	Industry Oriented Mini project	-	-	2
A80089	Seminar	-	6	2
A80088	Project Work	-	15	10
A80090	Comprehensive viva	-	-	2
	Total	**12**	**21**	**28**

Note: All End Examinations (Theory and Practical) are of three hours duration.
T-Tutorial L – Theory P – Practical D-Drawing C – Credits

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech. CE	**L**	**T/P/D**	**C**
	2	**-/-/-**	**4**

(A10001) ENGLISH

Introduction:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

Objectives:

- To improve the language proficiency of the students in English with emphasis on LSRW skills.
- To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
- To develop the study skills and communication skills in formal and informal situations.

SYLLABUS:

Listening Skills:

Objectives

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation.

2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions.

Students should be given practice in listening to the sounds of the language to be able to recognise them, to distinguish between them to mark stress and recognise and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:

Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities (Using exercises from the five units of the prescribed text: **Skills Annexe -Functional English for Success)**
- Just A Minute(JAM) Sessions.

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.

- Skimming the text
- Understanding the gist of an argument
- Identifying the topic sentence
- Inferring lexical and contextual meaning
- Understanding discourse features
- Scanning
- Recognizing coherence/sequencing of sentences

NOTE : The students will be trained in reading skills using the prescribed text for detailed study.

They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/ newspaper articles.

Writing Skills :

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill.
2. To equip them with the components of different forms of writing, beginning with the lower order ones.

- Writing sentences
- Use of appropriate vocabulary
- Paragraph writing
- Coherence and cohesiveness
- Narration / description
- Note Making
- Formal and informal letter writing
- Describing graphs using expressions of comparison

TEXTBOOKS PRESCRIBED:

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into Five Units, are prescribed:

For Detailed study: First Textbook: "Skills Annexe -Functional English for Success", Published by Orient Black Swan, Hyderabad

For Non-detailed study

1. **Second text book "Epitome of Wisdom",** Published by Maruthi Publications, Guntur
   - The course content and study material is divided into Five Units.

Unit –I:

1. Chapter entitled **'Wit and Humour**' from **'Skills Annexe'** -Functional English for Success, Published by Orient Black Swan, Hyderabad
2. Chapter entitled **'Mokshagundam Visvesvaraya'** from **"Epitome of Wisdom**", Published by Maruthi Publications, Hyderabad.

L- Listening For Sounds, Stress and Intonation

S- Greeting and Taking Leave, Introducing Oneself and Others (Formal

and Informal Situations)

R- Reading for Subject/ Theme

W- Writing Paragraphs

G- Types of Nouns and Pronouns

V- Homonyms, homophones synonyms, antonyms

Unit –II

1. Chapter entitled **"Cyber Age"** from **"Skills Annexe -Functional English for Success"** Published by Orient Black Swan, Hyderabad.
2. Chapter entitled **'Three Days To See'** from **"Epitome of Wisdom"**, Published by Maruthi Publications, Hyderabad.

L – Listening for themes and facts

S – Apologizing, interrupting, requesting and making polite conversation

R- for theme and gist

W- Describing people, places, objects, events

G- Verb forms

V- noun, verb, adjective and adverb

Unit –III

1. Chapter entitled **'Risk Management'** from **"Skills Annexe - Functional English for Success"** Published by Orient Black Swan, Hyderabad
2. Chapter entitled **'Leela's Friend'** by R.K. Narayan from **"Epitome of Wisdom"**, Published by Maruthi Publications, Hyderabad

L – for main points and sub-points for note taking

S – giving instructions and directions; Speaking of hypothetical situations

R – reading for details

W – note-making, information transfer, punctuation

G – present tense

V – synonyms and antonyms

Unit –IV

1. Chapter entitled **'Human Values and Professional Ethics'** from **"Skills Annexe -Functional English for Success"** Published by Orient Black Swan, Hyderabad
2. Chapter entitled **'The Last Leaf'** from **"Epitome of Wisdom"**, Published by Maruthi Publications, Hyderabad

L - Listening for specific details and information

S- narrating, expressing opinions and telephone interactions

R - Reading for specific details and information

W- Writing formal letters and CVs

G- Past and future tenses

V- Vocabulary - idioms and Phrasal verbs

Unit –V

1. Chapter entitled **'Sports and Health'** from **"Skills Annexe - Functional English for Success"** Published by Orient Black Swan, Hyderabad
2. Chapter entitled **'The Convocation Speech'** by N.R. Narayanmurthy' from **"Epitome of Wisdom"**, Published by Maruthi Publications, Hyderabad

L- Critical Listening and Listening for speaker's tone/ attitude

S- Group discussion and Making presentations

R- Critical reading, reading for reference

W- Project proposals; Technical reports, Project Reports and Research Papers

G- Adjectives, prepositions and concord

V- Collocations and Technical vocabulary

Using words appropriately

* Exercises from the texts not prescribed shall also be used for classroom tasks.

REFERENCES :

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson
6. Handbook of English Grammar& Usage, Mark Lester and Larry Beason, Tata Mc Graw –Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press

9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.
11. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
12. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt Ltd.,
13. ABC of Common Errors Nigel D Turton, Mac Millan Publishers.
14. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
15. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw – Hill.
16. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO
17. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education
18. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,
19. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers

Outcomes:

- Usage of English Language, written and spoken.
- Enrichment of comprehension and fluency
- Gaining confidence in using language in verbal situations.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech. CE	**L**	**T/P/D**	**C**
	3	**1/-/-**	**6**

(A10002) MATHEMATICS -I

Objectives: To learn

- The types of Matrices and their properties.
- Concept of rank of a matrix and applying the concept of rank to know the consistency of linear equations and to find all possible solutions, if exist.
- The concept of eigenvalues and eigenvectors of a matrix is to reduce a quadratic form into a canonical form through a linear transformation.
- The mean value theorems and to understand the concepts geometrically.
- The functions of several variables and optimization of these functions.
- The evaluation of improper integrals, Beta and Gamma functions.
- Multiple integration and its applications.
- Methods of solving the differential equations of 1st and higher order
- The applications of the differential equations to Newton's law of cooling, Natural growth and decay, Bending of beams etc.
- The definition of integral transforms and Laplace Transform.
- Properties of Laplace transform.
- Inverse Laplace Transform.
- Convolution theorem.
- Solution of Differential equations using Laplace transform.

UNIT-I

Theory of Matrices: Real matrices – Symmetric, skew – symmetric, orthogonal. Complex matrices: Hermitian, Skew-Hermitian and Unitary Matrices. Idempotent matrix, Elementary row and column transformations-Elementary matrix, Finding rank of a matrix by reducing to Echelon and normal forms. Finding the inverse of a non-singular square matrix using row/ column transformations (Gauss- Jordan method). Consistency of system of linear equations (homogeneous and non- homogeneous) using the rank of a matrix. Solving m x n and n x n linear system of equations by Gauss elimination.

Cayley-Hamilton Theorem (without proof) – Verification. Finding inverse of a matrix and powers of a matrix by Cayley-Hamilton theorem, Linear dependence and Independence of Vectors. Linear Transformation –

Orthogonal Transformation. Eigen values and eigen vectors of a matrix. Properties of eigen values and eigen vectors of real and complex matrices. Finding linearly independent eigen vectors of a matrix when the eigen values of the matrix are repeated.

Diagonalization of matrix – Quadratic forms up to three variables. Rank – Positive definite, negative definite, semi definite, index, signature of quadratic forms. Reduction of a quadratic form to canonical form.

UNIT – II

Differential calculus methods: Rolle's Mean value Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – (all theorems without proof but with geometrical interpretations), verification of the Theorems and testing the applicability of these theorem to the given function.

Functions of several variables: Functional dependence- Jacobian- Maxima and Minima of functions of two variables without constraints and with constraints-Method of Lagrange multipliers.

UNIT – III

Improper integration, Multiple integration & applications: Gamma and Beta Functions –Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions.

Multiple integrals – double and triple integrals – change of order of integration-change of variables (polar, cylindrical and spherical) Finding the area of a region using double integration and volume of a region using triple integration.

UNIT – IV

Differential equations and applications : Overview of differential equations-exact, linear and Bernoulli (NOT TO BE EXAMINED). Applications of first order differential equations – Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories.

Linear differential equations of second and higher order with constant coefficients, Non-homogeneous term of the type $f(X) = e^{ax}$, Sin ax, Cos ax, and x^n, $e^{ax} V(x)$, $x^n V(x)$, method of variation of parameters. Applications to bending of beams, Electrical circuits and simple harmonic motion.

UNIT – V

Laplace transform and its applications to Ordinary differential equations Definition of Integral transform, Domain of the function and Kernel for the Laplace transforms. Existence of Laplace transform. Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied or divided by "t". Laplace transforms of derivatives and integrals of functions. – Unit step function – second shifting theorem – Dirac's delta function, Periodic function – Inverse Laplace transform by

Partial fractions(Heaviside method) Inverse Laplace transforms of functions when they are multiplied or divided by "s", Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem –- Solving ordinary differential equations by Laplace transforms.

TEXT BOOKS:

1. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.

REFERENCES:

1. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.
2. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
3. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.
4. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
5. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, CRC Press Taylor & Francis Group.
6. Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edi, 2013, Chapman & Hall/ CRC.
7. Advanced Engineering Mathematics, Michael Greenberg, Second Edition, Pearson Education.

Outcome:

- After learning the contents of this Unit the student is able to write the matrix representation of a set of linear equations and to analyze solutions of system of equations.
- The student will be able to understand the methods of differential calculus to optimize single and multivariable functions.
- The student is able to evaluate the multiple integrals and can apply the concepts to find the Areas, Volumes, Moment of Inertia etc., of regions on a plane or in space.
- The student is able to identify the type of differential equation and uses the right method to solve the differential equation. Also able to apply the theory of differential equations to the real world problems.
- The student is able to solve certain differential equations using Laplace Transform. Also able to transform functions on time domain to frequency domain using Laplace transforms.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech. CE	**L**	**T/P/D**	**C**
	3	**-/-/-**	**6**

(A10302) ENGINEERING MECHANICS

UNIT – I

Introduction to Engineering Mechanics – Basic Concepts. **Resultants of Force System:** Parallelogram law **–**Forces and components- Resultant of coplanar Concurrent Forces – Components of forces in Space – Moment of Force - principle of moments – Coplanar Applications – Couples - Resultant of any Force System.

Equilibrium of Force Systems : Free Body Diagrams, Equations of Equilibrium - Equilibrium of planar Systems - Equilibrium of Spatial Systems.

UNIT – II

FRICTION: Introduction **–** Theory of Friction – Angle of friction - Laws of Friction – Static and Dynamic Frictions – Motion of Bodies: Wedge, Screw, Screw-jack, and Differential Screw-jack.

Transmission of Power: Flat Belt Drives - Types of Flat Belt Drives – Length of Belt, tensions, Tight side, Slack Side, Initial and Centrifugal – Power Transmitted and Condition for Max. Power.

UNIT – III

Centroids and Centers of Gravity: Introduction – Centroids and Centre of gravity of simple figures (from basic principles) – Centroids of Composite Figures - Theorem of Pappus – Center of gravity of bodies and centroids of volumes.

Moments of Inertia : Definition – Polar Moment of Inertia –Radius of gyration - Transfer formula for moment of inertia - Moments of Inertia for Composite areas - Products of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia : Moment of Inertia of Masses- Transfer Formula for Mass Moments of Inertia - mass moment of inertia of composite bodies.

UNIT – IV

Kinematics of a Particle: Motion of a particle – Rectilinear motion – motion curves – Rectangular components of curvilinear motion– Kinematics of Rigid Body - Types of rigid body motion -Angular motion - Fixed Axis Rotation

Kinetics of particles: Translation -Analysis as a Particle and Analysis as a Rigid Body in Translation – Equations of plane motion - Angular motion - Fixed Axis Rotation – Rolling Bodies.

UNIT – V

Work - Energy Method : Work energy Equations for Translation - Work-Energy Applications to Particle Motion – Work energy applied to Connected Systems - Work energy applied to Fixed Axis Rotation and Plane Motion. Impulse and momentum.

Mechanical Vibrations : Definitions and Concepts – Simple Harmonic Motion – Free vibrations, simple and Compound Pendulums – Torsion Pendulum – Free vibrations without damping: General cases.

TEXT BOOKS:

1. Engineering Mechanics - Statics and Dynamics by Ferdinand.L. Singer / Harper International Edition.
2. Engineering Mechanics/ S. Timoshenko and D.H. Young, Mc Graw Hill Book Compan.

REFERENCES:

1. Engineering Mechanics / Irving Shames / Prentice Hall.
2. A text of Engineering Mechanics /YVD Rao/ K. Govinda Rajulu/ M. Manzoor Hussain, Academic Publishing Company.
3. Engg. Mechanics / M.V. Seshagiri Rao & D Rama Durgaiah/ Universities Press.
4. Engineering Mechanics, Umesh Regl / Tayal.
5. Engg. Mechanics / KL Kumar / Tata McGraw Hill.
6. Engg. Mechanics / S.S. Bhavikati & K.G. Rajasekharappa.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech. CE	**L**	**T/P/D**	**C**
	3	**-/-/-**	**6**

(A10004) ENGINEERING PHYSICS

Objectives:

It gives

- to the students basic understanding of bonding in solids, crystal structures and techniques to characterize crystals.
- to understand the behavior of electron in a solid and thereby one can determine the conductivity and specific heat values of the solids.
- to study applications in Engineering like memory devices, transformer core and Electromagnetic machinery.
- to help the student to design powerful light sources for various Engineering Applications and also enable them to develop communication systems using Fiber Technology.
- to understand the working of Electronic devices, how to design acoustic proof halls and understand the behavior of the materials at Nano scale.

UNIT-I

Crystallography: Ionic Bond, Covalent Bond, Metallic Bond, Hydrogen Bond, Vander-Waal's Bond, Calculation of Cohesive Energy of diatomic molecule-Space Lattice**,** Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems, Structure of Diamond and NaCl.

X-ray Diffraction & Defects in Crystals: Bragg's Law, X-Ray diffraction methods: Laue Method, Powder Method**:** Point Defects: Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects, line defects (Qualitative) & Burger's Vector.

UNIT-II

Principles of Quantum Mechanics: Waves and Particles, de Broglie Hypothesis , Matter Waves, Davisson and Germer' Experiment, Heisenberg's Uncertainty Principle, Schrödinger's Time Independent Wave Equation - Physical Significance of the Wave Function – Infinite square well potential, extension to three dimensions

Elements of Statistical Mechanics & Electron theory of Solids: Phase space, Ensembles, Micro Canonical , Canonical and Grand Canonical Ensembles **-** Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics (Qualitative Treatment), Concept of Electron Gas, , Density of States, Fermi

Energy- Electron in a periodic Potential, Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), E-K curve, Origin of Energy Band Formation in Solids, Concept of Effective Mass of an Electron, Classification of Materials into Conductors, Semi Conductors & Insulators.

UNIT-III

Dielectric Properties: Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities: Ionic and Electronic - Internal Fields in Solids, Clausius - Mossotti Equation, Piezo - electricity and Ferro- electricity.

Magnetic Properties & Superconducting Properties: Permeability, Field Intensity, Magnetic Field Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro Magnetism on the basis of Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials and their Applications, Superconductivity, Meissner Effect, Effect of Magnetic field, Type-I & Type-II Superconductors, Applications of Superconductors.

UNIT-IV

Optics: Interference-Interference in thin films (Reflected light), Newton rings experiment- Fraunhofer diffraction due to single slit, N-slits, Diffraction grating experiment , Double refraction-construction and working of Nicol's Prism

Lasers & Fiber Optics: Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Einstein's Coefficients and Relation between them, Population Inversion, Lasing Action, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers- Principle of Optical Fiber, Construction of fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers: Step Index and Graded Index Fibers, Attenuation in Optical Fibers, Application of Optical Fiber in communication systems.

UNIT-V:

Semiconductor Physics: Fermi Level in Intrinsic and Extrinsic Semiconductors, Calculation of carrier concentration in Intrinsic &, Extrinsic Semiconductors, Direct and Indirect Band gap semiconductors, Hall Effect-Formation of PN Junction, Open Circuit PN Junction, Energy Diagram of PN Diode, Diode Equation, I-V Characteristics of PN Junction diode, Solar cell, LED & Photo Diodes. **Acoustics of Buildings & Acoustic Quieting** Reverberation and Time of Reverberation, Sabine's Formula for Reverberation Time, Measurement of Absorption Coefficient of a Material, factors affecting the Architectural Acoustics and their Remedies

Nanotechnology: Origin of Nanotechnology, Nano Scale, Surface to Volume

Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Top-down Fabrication: Chemical Vapour Deposition, Characterization by TEM.

TEXT BOOKS:

1. Engineering Physics,K. Malik, A. K. Singh, Tata Mc Graw Hill Book Publishers.
2. Engineering Physics, V. Rajendran, Tata Mc Graw Hill Book Publishers.

REFERENCES:

1. Fundamentals of Physics, David Halliday, Robert Resnick, Jearl Walker by John Wiley & Sons.
2. Sears and Zemansky's University Physics (10th Edition) by Hugh D. Young Roger A. Freedman, T. R. Sandin, A. Lewis FordAddison-Wesley Publishers.
3. Applied Physics for Engineers – P. Madhusudana Rao (Academic Publishing company, 2013).
4. Solid State Physics – M. Armugam (Anuradha Publications).
5. Modern Physics – R. Murugeshan & K. Siva Prasath – S. Chand & Co. (for Statistical Mechanics).
6. A Text Book of Engg Physics – M. N. Avadhanulu & P. G. Khsirsagar– S. Chand & Co. (for acoustics).
7. Modern Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co.Ltd.
8. Nanotechnology – M.Ratner & D. Ratner (Pearson Ed.).
9. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
10. Solid State Physics – A.J. Dekker (Macmillan).
11. Applied Physics – Mani Naidu Pearson Education.

Outcomes:

- The student would be able to learn the fundamental concepts on behavior of crystalline solids.
- The knowledge on Fundamentals of Quantum Mechanics, Statistical Mechanics enables the student to apply to various systems like Communications Solar Cells, Photo Cells and so on.
- Design, Characterization and study of properties of materials help the student to prepare new materials for various Engineering applications.
- This course also helps the student exposed to non-destructive testing methods.
- Finally, Engineering Physics Course helps the student to develop problem solving skills and analytical skills.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech. CE	**L**	**T/P/D**	**C**
	3	**-/-/-**	**6**

(A10005) ENGINEERING CHEMISTRY

Objective:

An engineer is as someone who uses scientific, natural and physical principles to design something of use for people or other living creatures. Much of what any engineer does involves chemistry because everything in our environment has a molecular make up. Engineering requires the concepts of applied chemistry and the more chemistry an engineer understands, the more beneficial it is. In the future, global problems and issues will require an in-depth understanding of chemistry to have a global solution. This syllabus aims at bridging the concepts and theory of chemistry with examples from fields of practical application, thus reinforcing the connection between science and engineering. It deals with the basic principles of various branches of chemistry which are fundamental tools necessary for an accomplished engineer.

UNIT I:

Electrochemistry & Corrosion: Electro Chemistry – Conductance - Specific, Equivalent and Molar conductance and their Units; Applications of Conductance (Conductometric titrations). **EMF:** Galvanic Cells, types of Electrodes – (Calomel, Quinhydrone and glass electrodes); Nernst equation and its applications ; concept of concentration cells, electro chemical series, Potentiometric titrations, determination of P^H using glass electrode-Numerical problems.

Batteries: Primary cells (dry cells) and secondary cells (lead-Acid cell, Ni-Cd cell, Lithium cells). Applications of batteries. **Fuel cells** – Hydrogen – Oxygen fuel cell; methanol – oxygen fuel cell ; Advantages and Applications.

Corrosion and its control: Causes and effects of corrosion; Theories of corrosion – Chemical & Electrochemical corrosion; Types of corrosion (Galvanic, Water line, Pitting and Intergranular); Factors affecting rate of corrosion – Nature of metal and Nature of Environment – Corrosion control methods – Cathodic protection (sacrificial anodic and impressed current). Surface coatings: Metallic coatings & methods of application of metallic coatings - hot dipping (galvanization & tinning), Cementation, cladding, electroplating (copper plating) Electroless plating (Ni plating) - Organic coatings – Paints - constituents and their functions.

UNIT II:

Engineering Materials: Polymers: Types of Polymerization (Chain & Step growth).**Plastics:** Thermoplastic & Thermo setting resins; Compounding &

fabrication of plastics (Compression and injection moulding).Preparation, properties, engineering applications of PVC, Teflon and Bakelite.

Fibers- Charcterstics of fibers – preparation, properties and uses of Nylon – 6,6 and Dacron – Fiber Reinforced Plastics (FRP) – applications. **Rubbers** – Natural rubber and its vulcanization. Elastomers – Buna-s, Butyl rubber and Thiokol rubber.

Conducting polymers: Polyacetylene, Polyaniline, Mechanism of Conduction, doping; applications of Conducting polymers. **Bio-degradable Polymers**- preparation and Applications of Poly vinyl acetate and Poly lactic acid - **Cement:** composition of Portland cement, setting & hardening of cement (reactions), **Lubricants:** Classification with examples- Characterstics of a good lubricant & mechanism of lubrication (thick film, thin film and extreme pressure) – properties of lubricants: viscosity, Cloud point, flash and fire points. **Refractories:** Classification, characteristics of a good refractory and applications.

Nanomaterials: Introduction, preparation by sol-gel & chemical vapour deposition methods. Applications of nanomaterials.

UNIT III:

Water and its Treatment: Hardness of Water: Causes of hardness, expression of hardness – units – types of hardness, estimation of temporary & permanent hardness of water by EDTA method - numerical problems. Boiler troubles – Scale & sludges, Priming and foaming, caustic enbrittlement and boiler corrosion; Treatment of boiler feed water – Internal treatment (Phosphate, Colloidal and calgon conditioning) – External treatment – Lime Soda process, Zeolite process and ion exchange process. Numerical Problems. **Potable Water**- Its Specifications – Steps involved in treatment of potable water – Disinfection of water by chlorination and ozonisation. Reverse osmosis & its significance.

Unit – IV :

Fuels & Combustion: Fuels – Classification – soild fuels : coal – analysis of coal - proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining – cracking – types – fixed bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol, Bergius and Fischer-Tropsch's process: Gaseous fuels - constituents, characteristics and applications of natural gas, LPG and CNG. Analysis of flue gas by Orsat's apparatus – Numerical Problems.

Combustion – Definition, Calorific value of fuel – HCV , LCV; Determination of calorific value by Junker's gas calorimeter – theoretical calculation of Calorific value by Dulong's formula – Numerical problems on combustion.

UNIT V:

Phase Rule & Surface Chemistry : **Phase Rule:** Definition of terms: Phase,

component, degree of freedom, phase rule equation. Phase diagrams – one component system- water system. Two component system Lead- Silver, cooling curves, heat treatment based on iron-carbon phase diagram - hardening, annealing and normalization.

Surface Chemistry: **Adsorption –** Types of Adsorption, Isotherms – Freundlich and Langmuir adsorption isotherm, applications of adsorption; **Colloids**: Classification of Colloids; Electrical & optical properties, micelles, applications of colloids in industry.

TEXT BOOKS:

1. Engineering Chemistry by R.P. Mani,K.N. Mishra, B. Rama Devi / CENGAGE learning.
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).

REFERENCE BOOKS

1. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited, New Delhi (2006).
2. Engineering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills Publishing Company Limited, New Delhi (2004).
3. Text Book of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co Publishers, New Delhi (2006).
4. Chemistry of Engineering Materials by CV Agarwal,C.P Murthy, A.Naidu, BS Publications.

Outcome:

- Students will demonstrate a depth of knowledge and apply the methods of inquiry in a discipline of their choosing, and they will demonstrate a breadth of knowledge across their choice of varied disciplines.
- Students will demonstrate the ability to access and interpret information, respond and adapt to changing situations, make complex decisions, solve problems, and evaluate actions.
- Students will demonstrate awareness and understanding of the skills necessary to live and work in a diverse engineering world.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech. CE	**L**	**T/P/D**	**C**
	3	**-/-/-**	**6**

(A10501) COMPUTER PROGRAMMING

Objectives:

- To understand the various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs.
- To learn to write programs (using structured programming approach) in C to solve problems.
- To introduce the students to basic data structures such as lists, stacks and queues.
- To make the student understand simple sorting and searching methods.

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development.

Introduction to the C Language – Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Operators (Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements- Selection Statements (making decisions) – if and switch statements, Repetition statements (loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Program examples.

UNIT - II

Functions-Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Limitations of recursion, example C programs, Preprocessor commands.

Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C program examples.

UNIT - III

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and arrays, Passing an array to a function,

memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

UNIT - IV

Enumerated, Structure, and Union Types– The Type Definition (typedef), Enumerated types, Structures –Declaration, initialization, accessing structures, operations on structures, Complex structures, structures and functions, Passing structures through pointers, self referential structures, unions, bit fields, C programming examples, command –line arguments.

Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling),Positioning functions, C program examples.

UNIT – V

Searching and Sorting – Sorting- selection sort, bubble sort, Searching-linear and binary search methods.

Lists- Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Push and Pop Operations, Queues- Enqueue and Dequeue operations.

TEXT BOOKS:

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh , Oxford University Press.

REFERENCE BOOKS:

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. C for All, S. Thamarai Selvi, R.Murugesan, Anuradha Publications.
3. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7th Edition, Pearson education.
4. Programming in C, Ajay Mittal, Pearson.
5. Programming with C, B.Gottfried, 3rd edition, Schaum's outlines, TMH.
6. Problem solving with C, M.T.Somasekhara, PHI
7. Programming with C, R.S.Bickar, Universities Press.
8. Computer Programming & Data Structures, E.Balagurusamy, 4th edition, TMH.
9. Programming in C – Stephen G. Kochan, III Edition, Pearson

Education.

10. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
11. C Programming with problem solving, J.A. Jones & K. Harrow,Dreamtech Press.

Outcomes:

- Demonstrate the basic knowledge of computer hardware and software.
- Ability to apply solving and logical skills to programming in C language and also in other languages.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech. CE	**L**	**T/P/D**	**C**
	2	**-/-/3**	**6**

(A10301) ENGINEERING DRAWING

UNIT – I

Introduction to Engineering Drawing: Principles of Engineering Drawing/ Graphics – Various Drawing Instruments – Conventions in Drawing – **Lettering practice** – BIS Conventions.

Curves: Constructions of Curves used in Engineering Practice:

a) Conic Sections including the Rectangular Hyperbola – General method only.

b) Cycloid, Epicycloid and Hypocycloid

c) Involute.

Scales: Construction of different types of Scales, Plain, Diagonal, Vernier scale.

UNIT – II

Orthographic Projections in First Angle

Projection: Principles of Orthographic Projections – Conventions – First and Third Angle projections.

Projections of Points : including Points in all four quadrants.

Projections of Lines : Parallel, perpendicular, inclined to one plane and inclined to both planes. True length and true angle of a line. Traces of a line.

Projections of Planes: Plane parallel, perpendicular and inclined to one reference plane. Plane inclined to both the reference planes.

UNIT – III

Projections of Solids: Projections of regular solids, cube, prisms, pyramids, tetrahedran, cylinder and cone, axis inclined to both planes.

Sections and Sectional Views: Right Regular Solids – Prism, Cylinder, Pyramid, Cone – use of Auxiliary views.

UNIT – IV

Development of Surfaces: Development of Surfaces of Right, Regular Solids – Prisms, Cylinder, Pyramids, Cone and their parts. frustum of solids.

Intersection of Solids:- Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

UNIT – V

Isometric Projections : Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Plane Figures, Simple and Compound

Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of parts with Spherical surface.

Transformation of Projections : Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects.

Perspective Projections : Perspective View : Points, Lines and Plane Figures, Vanishing Point Methods (General Method only).

TEXT BOOKS

1. Engineering Drawing – Basant, Agrawal, TMH
2. Engineering Drawing, N.D. Bhatt

REFERENCES :

1. Engineering Graphics. P I Varghese Tata McGraw Hill Education Pvt. Ltd.
2. Engineering drawing – P.J. Shah .S.Chand Publishers.
3. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers.
4. Engineering Drawing – M.B. Shah and B.C. Rana, Pearson.
5 . Engineering Drawing by K.Venu Gopal & V.Prabu Raja New Age Publications.
6. Engineering Drawing by John. PHI Learning Publisher.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech. CE	**L**	**T/P/D**	**C**
	-	**-/3/-**	**4**

(A10581) COMPUTER PROGRAMMING LAB

Objectives:

- To write programs in C to solve the problems.
- To implement linear data structures such as lists, stacks, queues.
- To implement simple searching and sorting methods.

Recommended Systems/Software Requirements:

- Intel based desktop PC
- ANSI C Compiler with Supporting Editors

Week I

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

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

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

Week 2

a) Write a C program to calculate the following Sum:

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

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

Week 3

a) The total distance travelled by vehicle in 't' seconds is given by distance s = $ut+1/2at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

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

Week 4

a) Write C programs that use both recursive and non-recursive functions

i) To find the factorial of a given integer.

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

Week 5

a) Write a C program to find the largest integer in a list of integers.

b) Write a C program that uses functions to perform the following:

i) Addition of Two Matrices

ii) Multiplication of Two Matrices

Week 6

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

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

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

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

Week 7

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

b) Write a C program to count the lines, words and characters in a given text.

Week 8

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

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

Week 9

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

$1+x+x^2+x^3+\ldots\ldots\ldots\ldots+x^n$

For example: if n is 3 and x is 5, then the program computes 1+5+25+125.

Print x, n, the sum

Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

Week 10

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

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

Week 11

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

i) Reading a complex number

ii) Writing a complex number

iii) Addition of two complex numbers

iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

Week 12

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

b) Write a C program to reverse the first n characters in a file.

(Note: The file name and n are specified on the command line.)

Week 13

a) Write a C program to display the contents of a file.

b) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

Week 14

a) Write a C program that uses non recursive function to search for a Key value in a given list of integers using Linear search.

b) Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using Binary search.

Week 15

a) Write a C program that implements the Selection sort method to sort a given array of integers in ascending order.

b) Write a C program that implements the Bubble sort method to sort a given list of names in ascending order.

Week 16

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

i) Create a singly linked list of integer elements.

ii) Traverse the above list and display the elements.

Week 17

Write a C program that implements stack (its operations) using a singly linked list to display a given list of integers in reverse order. Ex. input: 10 23 4 6 output: 6 4 23 10

Week 18

Write a C program that implements Queue (its operations) using a singly linked list to display a given list of integers in the same order. Ex. input: 10

23 4 6 output: 10 23 4 6

Week 19

Write a C program to implement the linear regression algorithm.

Week 20

Write a C program to implement the polynomial regression algorithm.

Week 21

Write a C program to implement the Lagrange interpolation.

Week 22

Write C program to implement the Newton- Gregory forward interpolation.

Week 23

Write a C program to implement Trapezoidal method.

Week 24

Write a C program to implement Simpson method.

TEXT BOOKS:

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications.
2. Computer Programming in C, V. Rajaraman, PHI Publishers.
3. C Programming, E.Balagurusamy, 3rd edition, TMH Publishers.
4. C Programming, M.V.S.S.N.Prasad, ACME Learning Pvt. Ltd.
5. C and Data Structures, N.B.Venkateswarlu and E.V.Prasad,S.Chand Publishers.
6. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech. CE	**L**	**T/P/D**	**C**
	-	**-/3/-**	**4**

(A10081) ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB

ENGINEERING PHYSICS LAB

(Any TEN experiments compulsory)

Objectives

This course on Physics lab is designed with 13 experiments in an academic year. It is common to all branches of Engineering in B.Tech Ist year.

The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student.

The experiments are selected from various areas of Physics like Physical Optics, Lasers, Fiber Optics, Sound, Mechanics, Electricity & Magnetism and Basic Electronics.

Also the student is exposed to various tools like Screw gauge, Vernier Callipers, Physics Balance , Spectrometer and Microscope.

1. Dispersive power of the material of a prism – Spectrometer
2. Determination of wavelength of a source – Diffraction Grating.
3. Newton's Rings - Radius of curvature of plano convex lens.
4. Melde's experiment – Transverse and longitudinal modes.
5. Time constant of an R-C circuit.
6. L-C-R circuit.
7. Magnetic field along the axis of current carrying coil – Stewart and Gees method.
8. Study the characteristics of LED and LASER sources.
9. Bending losses of fibres & Evaluation of numerical aperture of a given fibre.
10. Energy gap of a material of p-n junction.
11. Torsional pendulum.
12. Wavelength of light –diffraction grating - using laser.
13. Characteristics of a solar cell

LABORATORY MANUAL:

1. Laboratory Manual of Engineering Physics by Dr.Y.Aparna & Dr.K.Venkateswara Rao (V.G.S Publishers)

Outcomes

The student is expected to learn from this laboratory course the concept of error and its analysis. It also allows the student to develop experimental skills to design new experiments in Engineering.

With the exposure to these experiments the student can compare the theory and correlate with experiment.

ENGINEERING CHEMISTRY LAB

List of Experiments (Any 12 of the following)

Titrimetry:

1. Estimation of ferrous iron by dichrometry.
2. Estimation of hardness of water by EDTA method.

Mineral analysis:

3. Determination of percentage of copper in brass.
4. Estimation of manganese dioxide in pyrolusite.

Instrumental Methods:

Colorimetry:

5. Determination of ferrous iron in cement by colorimetric method
6. Estimation of copper by colorimetric method.

Conductometry:

7. Conductometric titration of strong acid vs strong base.
8. Conductometric titration of mixture of acids vs strong base.

Potentiometry:

9. Titration of strong acid vs strong base by potentiometry.
10. Titration of weak acid vs strong base by potentiometry.

Physical properties:

11. Determination of viscosity of sample oil by redwood / oswald's viscometer.
12. Determination of Surface tension of lubricants.

Preparations:

13. Preparation of Aspirin
14. Preparation of Thiokol rubber

Adsorption:

15. Adsorption of acetic acid on charcoal.

TEXT BOOKS:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Inorganic quantitative analysis, Vogel.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R. N. Goyal and Harrmendra Goel, Ane Books Private Ltd.,
2. A text book on experiments and calculation Engg. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech. CE	**L**	**T/P/D**	**C**
	-	**-/3/-**	**4**

(A10083) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

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

Objectives

- To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- To sensitise the students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency in spoken English and neutralize mother tongue influence
- To train students to use language appropriately for interviews, group discussion and public speaking

Syllabus: English Language Communication Skills Lab shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab

b. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the **English Language Communication Skills Lab**

Exercise – I

CALL Lab: Introduction to Phonetics – Speech Sounds – Vowels and Consonants

ICS Lab: Ice-Breaking activity and JAM session

Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

Exercise – II

CALL Lab: Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.

ICS Lab: Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.

Concord (Subject in agreement with verb) and Words often misspelt-confused/misused

Exercise - III

CALL Lab: Minimal Pairs- Word accent and Stress Shifts- Listening Comprehension.

ICS Lab: Descriptions- Narrations- Giving Directions and guidelines.

Sequence of Tenses, Question Tags and One word substitutes.

Exercise – IV

CALL Lab: Intonation and Common errors in Pronunciation.

ICS Lab: Extempore- Public Speaking

Active and Passive Voice, –Common Errors in English, Idioms and Phrases

Exercise – V

CALL Lab: Neutralization of Mother Tongue Influence and Conversation Practice

ICS Lab: Information Transfer- Oral Presentation Skills

Reading Comprehension and Job Application with Resume preparation.

Minimum Requirement of infra structural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

i) P – IV Processor

a) Speed – 2.8 GHZ

b) RAM – 512 MB Minimum

c) Hard Disk – 80 GB

ii) Headphones of High quality

2. Interactive Communication Skills (ICS) Lab :

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. Suresh Kumar, E. & Sreehari, P. 2009. *A Handbook for English Language Laboratories.* New Delhi: Foundation.
2. *Speaking English Effectively* 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
3. Sasi Kumar, V & Dhamija, P.V. *How to Prepare for Group Discussion and Interviews.* Tata McGraw Hill.
4. Hancock, M. 2009. *English Pronunciation in Use. Intermediate.* Cambridge: CUP.
5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
6. Hewings, M. 2009. *English Pronunciation in Use. Advanced.* Cambridge: CUP.
7. Marks, J. 2009. *English Pronunciation in Use. Elementary.* Cambridge: CUP.
8. Nambiar, K.C. 2011. *Speaking Accurately. A Course in International Communication.* New Delhi : Foundation.
9. Soundararaj, Francis. 2012. *Basics of Communication in English. New Delhi: Macmillan.*
10. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.
11. **English Pronouncing Dictionary** Daniel Jones Current Edition with CD.
12. **A textbook of English Phonetics for Indian Students** by T. Balasubramanian (Macmillan).
13. **Prescribed Lab Manual:** A Manual entitled "***English Language Communication Skills (ELCS) Lab Manual- cum- Work Book***", published by Cengage Learning India Pvt. Ltd, New Delhi. 2013.

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Examination:

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

Outcomes:

- Better Understanding of nuances of language through audio- visual experience and group activities.
- Neutralization of accent for intelligibility.
- Speaking with clarity and confidence thereby enhancing employability skills of the students.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech. CE	**L**	**T/P/D**	**C**
	-	**-/3/-**	**4**

(A10082) IT WORKSHOP / ENGINEERING WORKSHOP

Objectives:

The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel and Power Point.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. **The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.**

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools and LaTeX. (**Recommended to use Microsoft office 2007 in place of MS Office 2003)**

PC Hardware

Week 1 – Task 1 : Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Week 2 – Task 2 : Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Week 3 – Task 3 : Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Week 4 – Task 4 : Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Week 5 – Task 5: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Week 6 – Task 6 : Software Troubleshooting : Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Internet & World Wide Web

Week 7 - Task 1 : **Orientation & Connectivity Boot Camp :** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Week 8 - Task 2 : Web Browsers, Surfing the Web : Students customize their 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.

Week 9 - Task 3 : **Search Engines & Netiquette :** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Week 10 - Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Week 11- Task 5: Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.

Productivity tools

LaTeX and Word

Week 12 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

Task 1 : Using LaTeX and Word to create project certificate. Features to be covered:-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.

Week 13 - Task 2: Creating project abstract Features to be covered:- Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Week 14 - Task 3 : Creating a Newsletter : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel

Week 15 - Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

Week 16 - Task 2 : Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting

LaTeX and MS/equivalent (FOSS) tool Power Point

Week 17 - Task1: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and

Arrows in both LaTeX and Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Week 18- Task 2: Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyperlinks, Inserting – Images, Clip Art, Audio, Video, Objects, Tables and Charts

Week 19 - Task 3: Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.

REFERENCE BOOKS:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill Publishers.
4. Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education
5. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
7. PC Hardware and A+Handbook – Kate J. Chase PHI (Microsoft)

Outcomes:

- Apply knowledge for computer assembling and software installation.
- Ability how to solve the trouble shooting problems.
- Apply the tools for preparation of PPT, Documentation and budget sheet etc.

ENGINEERING WORKSHOP

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.

4. Black Smithy
5. House-wiring
6. Foundry
7. Welding
8. Power tools in construction, wood working, electrical engineering and mechanical Engineering.

2. TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. Machine Shop
3. Metal Cutting (Water Plasma)

TEXT BOOK:

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
2. Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A30006) MATHEMATICS - II

Objectives:

- The objective is to find the relation between the variables x and y out of the given data (x,y).
- This unit also aims to find such relationships which exactly pass through data or approximately satisfy the data under the condition of least sum of squares of errors.
- The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data.
- This topic deals with methods to find roots of an equation and solving a differential equation.
- The numerical methods are important because finding an analytical procedure to solve an equation may not be always available.
- In the diverse fields like electrical circuits, electronic communication, mechanical vibration and structural engineering, periodic functions naturally occur and hence their properties are very much required.
- Indeed, any periodic and non-periodic function can be best analyzed in one way by Fourier series and transforms methods.
- The unit aims at forming a partial differential equation (PDE) for a function with many variables and their solution methods. Two important methods for first order PDE's are learnt. While separation of variables technique is learnt for typical second order PDE's such as Wave, Heat and Laplace equations.
- In many Engineering fields the physical quantities involved are vector-valued functions.
- Hence the unit aims at the basic properties of vector-valued functions and their applications to line integrals, surface integrals and volume integrals.

UNIT – I

Vector Calculus: Vector Calculus: Scalar point function and vector point function, Gradient- Divergence- Curl and their related properties. Solenoidal and irrotational vectors – finding the Potential function. Laplacian operator. Line integral – work done – Surface integrals -Volume integral. Green's

Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification).

UNIT – II:

Fourier series and Fourier Transforms: Definition of periodic function. Fourier expansion of periodic functions in a given interval of length 2π . Determination of Fourier coefficients – Fourier series of even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

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

UNIT – III:

Interpolation and Curve fitting

Interpolation: Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences –Central differences – Symbolic relations of symbols. Difference expressions – Differences of a polynomial-Newton's formulae for interpolation - Gauss Central Difference Formulae –Interpolation with unevenly spaced points-Lagrange's Interpolation formula.

Curve fitting: Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares.

UNIT – IV : Numerical techniques

Solution of Algebraic and Transcendental Equations and Linear system of equations: Introduction – Graphical interpretation of solution of equations .The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method .

Solving system of non-homogeneous equations by L-U Decomposition method (Crout's Method). Jacobi's and Gauss-Seidel iteration methods.

UNIT – V

Numerical Integration and Numerical solutions of differential equations:

Numerical integration - Trapezoidal rule, Simpson's 1/3rd and 3/8 Rule , Gauss-Legendre one point, two point and three point formulas.

Numerical solution of Ordinary Differential equations: Picard's Method of successive approximations. Solution by Taylor's series method – Single step methods-Euler's Method-Euler's modified method, Runge-Kutta (second and classical fourth order) Methods.

Boundary values & Eigen value problems: Shooting method, Finite difference method and solving eigen values problems, power method

TEXT BOOKS:

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers.

REFERENCES:

1. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi & Others, S. Chand.
2. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt. Ltd.
3. Mathematical Methods by G.Shankar Rao, I.K. International Publications, N.Delhi.
4. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, 2013, CRC Press Taylor & Francis Group.
5. Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edi, 2013, Chapman & Hall/ CRC.
6. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Person Education.
7. Mathematics For Engineers By K.B.Datta And M.A S.Srinivas, Cengage Publications.

Outcomes: From a given discrete data, one will be able to predict the value of the data at an intermediate point and by curve fitting, can find the most appropriate formula for a guessed relation of the data variables. This method of analysis data helps engineers to understand the system for better interpretation and decision making

- After studying this unit one will be able to find a root of a given equation and will be able to find a numerical solution for a given differential equation.
- Helps in describing the system by an ODE, if possible. Also, suggests to find the solution as a first approximation.
- One will be able to find the expansion of a given function by Fourier series and Fourier Transform of the function.
- Helps in phase transformation, Phase change and attenuation of coefficients in acoustics.
- After studying this unit, one will be able to find a corresponding Partial

Differential Equation for an unknown function with many independent variables and to find their solution.

- Most of the problems in physical and engineering applications, problems are highly non-linear and hence expressing them as PDEs'. Hence understanding the nature of the equation and finding a suitable solution is very much essential.
- After studying this unit, one will be able to evaluate multiple integrals (line, surface, volume integrals) and convert line integrals to area integrals and surface integrals to volume integrals.
- It is an essential requirement for an engineer to understand the behavior of the physical system.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A30203) ELECTRICAL AND ELECTRONICS ENGINEERING

OBJECTIVE:

This course introduces the concepts of electrical DC and AC circuits, basic law's of electricity, instruments to measure the electrical quantities, different methods to solve the electrical networks, construction operational features of energy conversion devices i.e. DC and AC machines, transformers. It also emphasis on basics of electronics, semiconductor devices and their characteristics and operational features.

UNIT-I:

Electrical Circuits: Basic definitions, Types of elements, Ohm's Law, Resistive networks, Kirchhoff's Laws, Inductive networks, capacitive networks, Series, Parallel circuits and Star-delta and delta-star transformations.

Instruments: Basic Principle of indicating instruments – permanent magnet moving coil and moving iron instruments.

UNIT-II:

DC Machines: Principle of operation of DC Generator – EMF equation - types – DC motor types –torque equation – applications – three point starter.

UNIT-III:

Transformers: Principle of operation of single phase transformers –EMF equation – losses – efficiency and regulation.

AC Machines: Principle of operation of alternators – regulation by synchronous impedance method –Principle of operation of induction motor – slip – torque characteristics – applications.

UNIT–IV:

Diodes: P-n junction diode, symbol, V-I Characteristics, Diode Applications, and Rectifiers – Half wave, Full wave and Bridge rectifiers (simple Problems).

Transistors: PNP and NPN Junction transistor, Transistor as an amplifier, SCR characteristics and applications.

UNIT-V:

Cathode Ray Oscillos Scope: Principles of CRT (Cathode Ray Tube), Deflection, Sensitivity, Electrostatic and Magnetic deflection, Applications of CRO - Voltage, Current and frequency measurements.

EEE: TEXT BOOKS:

1. Basic concepts of Electrical Engineering, PS Subramanyam, BS

Publications.

2. Basic Electrical Engineering, S.N. Singh, PHI.

EEE: REFERENCE BOOKS:

1. Basic Electrical Engineering, Abhijit Chakrabarthi, Sudipta nath, Chandrakumar Chanda, Tata-McGraw-Hill.
2. Principles of Electrical Engineering, V.K Mehta, Rohit Mehta, S.Chand Publications.
3. Basic Electrical Engineering, T.K.Nagasarkar and M.S. Sukhija, Oxford University Press.
4. Fundamentals of Electrical Engineering, RajendraPrasad, PHI.
5. Basic Electrical Engineering by D.P.Kothari , I.J. Nagrath, McGraw-Hill.

ECE: TEXT BOOKS:

1. Electronic Devices and Circuits, S.Salivahanan, N.Suresh Kumar, A.Vallavaraj,Tata McGraw-Hill companies..
2. Electronic Devices and Circuits, K. Lal Kishore,BS Publications.

ECE: REFERENCE BOOKS:

1. Millman's Electronic Devices and Circuits,J. Millman, C.C.Halkias, and Satyabrata Jit, Tata McGraw-Hill companies.
2. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky,PEI/PHI.
3. Introduction to Electronic Devices and Circuits, Rober T. Paynter,PE.
4. Integrated Electronics, J. Millman and Christos C. Halkias, Tata McGraw-Hill companies.
5. Electronic Devices and Circuits, Anil K. Maini, Varsha Agarwal,Wiley India Pvt. Ltd.

Outcomes:

After going through this course the student gets a thorough knowledge on basic electrical circuits, parameters, and operation of the transformers in the energy conversion process, electromechanical energy conversion, construction operation characteristics of DC and AC machines and the constructional features and operation of measuring instruments like voltmeter, ammeter, wattmeter etc...and different semiconductor devices, their voltage-current characteristics, operation of diodes, transistors, realization of various electronic circuits with the various semiconductor devices, and cathode ray oscilloscope, With which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A30107) STRENGTH OF MATERIALS – I

UNIT – I

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 modulii and the relationship between them – Bars of varying section – composite bars – Temperature stresses. Elastic constants.

Strain Energy – Resilience – Gradual, sudden, impact and shock loadings – simple applications.

UNIT – II

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 cantilver, simply supported and overhanging beams subjected to point loads, uniformly distributed load, uniformly varying loads and combination of these loads – Point of contraflexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT – III

Flexural Stresses: Theory of simple bending – Assumptions – Derivation of bending equation: M/I = f/y = E/R - 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.

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

UNIT – IV

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

Theories of Failure: Introduction – Various theories of failure - Maximum Principal Stress Theory, Maximum Principal Strain Theory, Strain Energy and Shear Strain Energy Theory (Von Mises Theory).

UNIT – V

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 including overhanging beams.

Conjugate Beam Method: Introduction – Concept of conjugate beam method. Difference between a real beam and a conjugate beam. Deflections of determinate beams with constant and different moments of inertia.

TEXT BOOKS:

1) Strength of Materials by R.K.Bansal, Lakshmi Publications House Pvt. Ltd.

2) Strength of Materials by R.K Rajput, S.Chand & Company Ltd.

3) Mechanics of Materials by Pytel, Cengage Learning Pvt. Ltd.

REFERENCES:

1) Strength of Materials by S.S.Bhavikatti, Vikas Publishing House Pvt. Ltd.

2) Mechanics of Structures Vol –I by H.J.Shah and S.B.Junnarkar, Charotar Publishing House Pvt. Ltd.

3) Strength of Materials by D.S Prakash Rao, Universities Press Pvt. Ltd.

4) Strength of Materials by S.S.Rattan, Tata McGraw Hill Education Pvt. Ltd.

5) Fundamentals of Solid Mechancis by M.L.Gambhir, PHI Learning Pvt. Ltd

6) Strength of Materials and Structures by John Case *et al.*, Butterworth-Heinemann.

7) Strength of Materials by R.Subramanian, Oxford University Press.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A30108) SURVEYING

UNIT – I

Introduction: Overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications, Scales, Conventional Symbols, Signals

Distances and Direction: Distance measurement methods; use of chain, tape and Electronic distance measurements, Meridians, Azimuths and Bearings, declination, computation of angle.

UNIT – II

Leveling and Contouring: Concept and Terminology, Temporary adjustments- method of leveling.

Characteristics and Uses of contours- methods of conducting contour surveys and their plotting.

UNIT – III

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 -I V

Theodolite: Theodolite, description, uses and adjustments – temporary and permanent, measurement of horizontal and vertical angles. Principles of Electronic Theodolite. Trigonometrical leveling, Traversing.

UNIT – V

Tacheometric Surveying: Stadia and tangential methods of Tacheometry. Distance and Elevation formulae for Staff vertical position. **Curves:** Types of curves, design and setting out – simple and compound curves.

Introduction to Advanced Surveying : Total Station and Global positioning system, Introduction to Geographic information system (GIS).

TEXT BOOKS:

1. Chandra A M, “Plane Surveying” and “Higher Surveying” New age International Pvt. Ltd., Publishers, New Delhi, 2002
2. Duggal S K, “Surveying (Vol – 1 & 2), Tata Mc.Graw Hill Publishing Co. Ltd. New Delhi, 2004.

3. Text book of surveying by C.Venkataramaiah, Unversiities Press

REFERENCES:

1. Surveying and Leveling by R. Subramanian, Second Edition Oxford University Press - 2012
2. Surveying Theory and Practice Seventh edition by James M. and Anderson Edward M. Mikhail TATA McGraw Hill
3. Arthur R Benton and Philip J Taety, Elements of Plane Surying, McGraw Hill – 2000
4 “Advanced Surveying Total Station GIS and Remote Sensing by Satheesh Gopi, R. Sathi Kumar and N. Madhu.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A30101) FLUID MECHANICS

UNIT I

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

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

UNIT – II

Fluid Kinematics : Description of fluid flow, Stream line, path line and streak lines and stream tube. Classification of flows : Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two , three dimensional flows – stream and velocity potential functions, flownet analysis.

UNIT –III

Fluid Dynamics: Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, (Navier – stokes equations (Explanationary) Momentum equation and its application – forces on pipe bend.

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

UNIT – IV

Boundary Layer Theory : Approximate Solutions of Navier Stoke's Equations – Boundary layer – concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarmen momentum integral equation, laminar and turbulent Boundary layers (no deviation), BL in transition, separation of BL, control of BL, flow around submerged objects- Drag and Lift- Magnus effect.

UNIT –V

Closed Conduit Flow : Reynold's experiment – Characteristics of Laminar & Turbulent flows. Flow between parallel plates, Flow through long tubes, flow through inclined tubes. 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 Reynold's number – Moody's Chart.

TEXT BOOKS:

1. Fluid Mechanics by Modi and Seth, Standard book house.
2. Introduction to Fluid Machines by S.K.Som & G.Biswas (Tata Mc.Grawhill publishers Pvt. Ltd.)
3. Mechanics of Fluids by Potter, Cengage Learning Pvt. Ltd.

REFERENCES:

1. Fluid Mechanics Basic Concepts & Principles, Shiv Kumar, Ane Books Pvt Ltd.
2. Fluid Mechanics and Machinary, CSP Ojha, Oxford Higher Eduction
3. Fluid Mechanics by Frank.M. White (Tata Mc.Grawhill Pvt. Ltd.)
4. Fluid Mehanics by A.K. Mohanty, Prentice Hall of India Pvt. Ltd., New Delhi
5. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) ltd., New Delhi.
6. Fluid Mechanics and Machinery by D. Ramdurgaia New Age Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A30010) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Objectives:

To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations namely: demand and supply, production function, cost analysis, markets, forms of business organisations, capital budgeting and financial accounting and financial analysis.

Unit I

Introduction & Demand Analysis*:* Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. *Elasticity of Demand*: Definition, Types, Measurement and Significance of Elasticity of Demand. *Demand Forecasting,* Factors governing demand forecasting, methods of demand forecasting.

Unit II

Production & Cost Analysis: *Production Function* – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. *Cost Analysis***:** Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

Unit III

Markets & New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. *Pricing*: Objectives and Policies of Pricing. Methods of Pricing. *Business:* Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, *New Economic Environment*: Changing Business Environment in Post-liberalization scenario.

Unit IV

Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital - Trading Forecast, Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

Unit V

Introduction to Financial Accounting & Financial Analysis: Accounting concepts and Conventions - Introduction IFRS - Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). *Financial Analysis***:** Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios. Du Pont Chart.

TEXT BOOKS:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2013.
3. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, 2012.

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2012.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey & Chrystel, Economics, Oxford University Press, 2012
4. Domnick Salvatore: Managerial Economics in a Global Economy, Thomson, 2012.
5. Narayanaswamy: Financial Accounting—A Managerial Perspective, Pearson, 2012.
6. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2012.
7. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2012.
8. Dwivedi: Managerial Economics, Vikas, 2012.
9. Shailaja & Usha : MEFA, University Press, 2012.
10. Aryasri: Managerial Economics and Financial Analysis, TMH, 2012.
11. Vijay Kumar & Appa Rao, Managerial Economics & Financial Analysis, Cengage 2011.
12. J. V. Prabhakar Rao & P.V. Rao, Managerial Economics & Financial Analysis, Maruthi Publishers, 2011.

Outcomes:

At the end of the course, the student will

- Understand the market dynamics namely, demand and supply, demand forecasting , elasticity of demand and supply, pricing methods

and pricing in different market structures.

- Gain an insight into how production function is carried out to achieve least cost combination of inputs and cost analysis
- Develop an understanding of
- Analyse how capital budgeting decisions are carried out
- Understand the framework for both manual and computerised accounting process
- Know how to analyse and interpret the financial statements through ratio analysis.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	-	**-/3/-**	**2**

(A30185) SURVEYING LAB – I

LIST OF EXERCISES:

1. Survey of an area by chain survey (closed traverse) & Plotting
2. Chaining across obstacles
3. Determination of distance between two inaccessible points with compass.
4. Surveying of a given area by prismatic compass (closed traverse) and plotting after adjustment.
5. Radiation method, intersection methods by plane Table survey
6. Two point and three point problems in plane table survey
7. Traversing by plane table survey
8. Fly leveling (differential leveling)
9. An exercise of L.S and C.S and plotting
10. Two exercises on contouring.

List of Major Equipment:

1. Chains, tapes, Ranging rods, cross staff, arrows
2. Compasses and Tripods, Optical square.
3. Plane tables, Alidade, Plumbing fork, trough compasses
4. Leveling instruments and leveling staves
5. Box sextants, planimeter.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	-	**-/3/-**	**2**

(A30183) STRENGTH OF MATERIALS LAB

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

List of Major Equipment:

1. UTM for conducting tension test on rods
2. Steel beam for flexure test
3. Wooden beam for flexure test
4. Torsion testing machine
5. Brinnell's / Rock well's hardness testing machine
6. Spring testing machine
7. Compression testing machine
8. Izod Impact machine
9. Shear testing machine
10. Beam setup for Maxwell's theorem verification.
11. Continuous beam setup
12. Electrical Resistance gauges.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A40008) PROBABILITY AND STATISTICS

Objectives: To learn

- Understand a random variable that describes randomness or an uncertainty in certain realistic situation. It can be of either discrete or continuous type.
- In the discrete case, study of the binomial and the Poisson random variables and the Normal random variable for the continuous case predominantly describe important probability distributions. Important statistical properties for these random variables provide very good insight and are essential for industrial applications.
- Most of the random situations are described as functions of many single random variables. In this unit, the objective is to learn functions of many random variables through joint distributions.
- The types of sampling, Sampling distribution of means ,Sampling distribution of variance,Estimations of statistical parameters, Testing of hypothesis of few unknown statistical parameters.
- The mechanism of queuing system ,The characteristics of queue,The mean arrival and service rates
- The expected queue length, The waiting line
- The random processes, The classification of random processes, Markov chain, Classification of states
- Stochastic matrix (transition probability matrix),Limiting probabilities, Applications of Markov chains

UNIT-I:

Single Random variables and probability distributions: Random variables – Discrete and continuous. Probability distributions, mass function/ density function of a probability distribution . Mathematical Expectation, Moment about origin, Central moments Moment generating function of probability distribution. Binomial, Poisson & normal distributions and their properties . Moment generating functions of the above three distributions. and hence finding the mean and variance.

UNIT-II

Multiple Random variables, Correlation & Regression: Joint probability distributions- Joint probability mass / density function, Marginal probability mass / density functions, Covariance of two random variables, Correlation - Coefficient of correlation, The rank correlation. Regression- Regression

Coefficient, The lines of regression and multiple correlation & regression.

UNIT-III:

Sampling Distributions and Testing of Hypothesis : Sampling: Definitions of population, sampling, statistic, parameter. Types of sampling, Expected values of Sample mean and varience, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of varience.

Parameter estimations – likelihood estimate, interval estimations .

Testing of hypothesis: Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, Level of significance. One sided test, Two sided test,

Large sample tests:

(i) Test of Equality of means of two samples equality of sample mean and population mean (cases of known varience & unknown varience, equal and unequal variances)

(ii) Tests of significance of difference between sample S.D and population S.D.

(iii) Tests of significance difference between sample proportion and population proportion&difference between two sample proportions.

Small sample tests: Student t-distribution,its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples

Snedecor's F- distribution and it's properties. Test of equality of two population variences

Chi-square distribution , it's properties, Chi-square test of goodness of fit

UNIT-IV

Queuing Theory: Structure of a queuing system, Operating Characteristics of queuing system, Transient and steady states, Terminology of Queuing systems, Arrival and service processes- Pure Birth-Death process Deterministic queuing models- M/M/1 Model of infinite queue, M/M/1 model of finite queue .

UNIT-V

Stochastic processes: Introduction to Stochastic Processes –Classification of Random processes, Methods of description of random processes, Stationary and non-stationary random process, Average values of single random process and two or more random processes. Markov process, Markov chain, classification of states – Examples of Markov Chains, Stochastic Matrix.

TEXT BOOKS:

1. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna

Publishers

2. Probability and Statistics for Engineers and Scientists by Sheldon M.Ross, Academic Press
3. Operations Research by S.D. Sarma,

REFERENCE BOOKS:

1. Mathematics for Engineers by K.B.Datta and M.A S.Srinivas,Cengage Publications
2. Probability and Statistics by T.K.V.Iyengar & B.Krishna Gandhi Et
3. Fundamentals of Mathematical Statistics by S C Gupta and V.K.Kapoor
4. Probability and Statistics for Engineers and Scientists by Jay l.Devore.
5. Probability Theory & Stochastic Processes by P. Sri Hari, Hi-Tech Publishers.
6. Probability & Statistics by Ahmed Waheedullah, M. Ahmed Mohiuddin, Sultan Ali, HI-TECH Publishers

Outcomes:

- Students would be able to identify distribution in certain realistic situation. It is mainly useful for circuit as well as non-circuit branches of engineering. Also able to differentiate among many random variable involved in the probability models. It is quite useful for all branches of engineering.
- The student would be able to calculate mean and proportions (small and large sample) and to make important decisions from few samples which are taken out of unmanageably huge populations .It is Mainly useful for non-circuit branches of engineering.
- The students would be able to find the expected queue length, the ideal time, the traffic intensity and the waiting time. These are very useful tools in many engineering and data management problems in the industry. It is useful for all branches of engineering.
- The student would able to understand about the random process, Markov process and Markov chains which are essentially models of many time dependent processes such as signals in communications, time series analysis, queuing systems. The student would be able to find the limiting probabilities and the probabilities in n^{th} state. It is quite useful for all branches of engineering

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A40114) STRENGTH OF MATERIALS – II

UNIT – I

Torsion of Circular Shafts : Theory of pure torsion – Derivation of Torsion equations : $T/J = q/r = N\theta/L$ – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending and torsion and end thrust – Design of shafts according to theories of failure.

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

UNIT – II

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.

Beams Curved in Plan: Introduction – circular beams loaded uniformly and supported on symmetrically placed Columns – Semi-circular beam simply-supported on three equally spaced supports.

UNIT - III

Beam Columns: Laterally loaded struts – subjected to uniformly distributed and concentrated loads – Maximum B.M. and stress due to transverse and lateral loading.

Direct and Bending Stresses: Stresses under the combined action of direct loading and bending moment, 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 bending moment about both axis.

UNIT – IV

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.

Shear Centre: Introduction - Shear centre for symmetrical and unsymmetrical (channel, I, T and L) sections

UNIT – V

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.

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) Strength of Materials by R.K.Bansal, Lakshmi Publications House Pvt. Ltd.

2) Strength of Materials by R.K Rajput, S.Chand & Company Ltd.

3) Mechanics of Materials by Gere, Cengage Learning Pvt. Ltd.

REFERENCES:

1) Fundamentals of Solid Mechancis by M.L.Gambhir, PHI Learning Pvt. Ltd

2) Introduction to Strength of Materials by U.C.Jindal, Galgotia Publications Pvt. Ltd.

3) Strength of Materials by Bhattacharya, Cengage Learning

3) Strength of Materials by D.S Prakash Rao, Universities Press Pvt. Ltd.

4) Strength of Materials by S.S.Rattan, Tata McGraw Hill Education Pvt. Ltd.

5) Strength of Materials by R.Subramanian, Oxford University Press.

6) Mechanics of Materials by Ferdinand P. Beer *et al.,* Tata McGraw Hill Education Pvt. Ltd.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A40111) HYDRAULICS AND HYRAULIC MACHINERY

UNIT – I

Open Channel Flow: Types of flows - Type of channels – Velocity distribution – Energy and momentum correction factors – Chezy's, Manning's; and Bazin formulae for uniform flow – Most Economical sections. Critical flow: Specific energy-critical depth – computation of critical depth – critical sub-critical and super critical flows.

Non uniform flow-Dynamic equation for G.V.F., Mild, Critical, Steep, horizontal and adverse slopes-surface profiles-direct step method- Rapidly varied flow, hydraulic jump, energy dissipation.

UNIT - II

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

UNIT-III

Hydrodynamic Force on Jets : 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. Layout of a typical Hydropower installation – Heads and efficiencies.

UNIT-IV

Hydruaulic Turbines: Classification of turbines-pelton wheel-Francis turbine-Kaplan turbine-working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and function efficiency.

Governing of turbines-surge tanks-unit and specific turbines-unit speed-unit quantity-unit power-specific speed performance characteristics-geometric similarity-cavitation.

UNIT – V

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

Classification of Hydropower plants – Definition of terms – load factor, utilization factor, capacity factor, estimation of hydropower potential.

TEXT BOOKS:

1. Open Channel flow by K,Subramanya . Tata Mc.Grawhill Publishers.
2. Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard book house.
3. Fluid Mechanics & Fluid machines by Narayana pillai, Universities press.

REFERENCES :

1. Fluid Mechanics and Machinary, CSP OJHA, Oxford University Press
2. Elements of Open channel flow by Ranga Raju, Tata Mc.Graw Hill, Publications.
3. Fluid mechanics and fluid machines by Rajput, S.Chand &Co.
4. Open Channel flow by V.T.Chow, Mc.Graw Hill book company.
5. Fluid Mechanics and Machinery by D. Ramdurgaia New Age Publications.
6. Mechanics of Fluids by Merle C. Potter, David C. Wiggert,Bassem H. Ramadan, Cengage Learning.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A40009) ENVIRONMENTAL STUDIES

Objectives:

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

UNIT-I :

Ecosystems: Definition, Scope and Importance of ecosystem. Classification, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT-II:

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III:

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV:

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and

characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Problems and Global Efforts: C**limate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

UNIT-V:

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

SUGGESTED TEXT BOOKS:

1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.

2 Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B.Botkin & Edward A.Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

Outcomes:

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which inturn helps in sustainable development

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A40115) STRUCTURAL ANALYSIS – I

UNIT – I

Analysis Of Perfect Frames: Types of frames- Perfect, Imperfect and Redundant pin jointed frames. - Analysis of determinate pin jointed frames using method of joints, method of sections and tension coefficient method for vertical loads, horizontal loads and inclined loads.

UNIT – II

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-Unit Load Method. Deflections of simple beams and pin- jointed plane trusses. Deflections of statically determinate bent frames.

Three Hinged Arches – Introduction – Types of Arches – Comparision between Three hinged and Two hinged Arches. Linear Arch. Eddy's theorem. Analysis of Three hinged arches. Normal Thrust and radial shear in an arch. Geometrical properties of parabolic and circular arch. Three hinged circular arch at different levels. Absolute maximum bending moment diagram for a three hinged arch.

UNIT-III

Propped Cantilever and Fixed Beams: Analysis of Propped cantilever and fixed beams, including the beams with varying moments of inertia, subjected to uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads - Shear force and Bending moment diagrams for Propped Cantilever and Fixed Beams-Deflection of Propped cantilever and fixed beams; effect of sinking of support, effect of rotation of a support.

UNIT – IV

Slope-Deflection Method and Moment Distribution Method: Introduction-Continuous beams. Clapeyron's theorem of three moments- Analysis of continuous beams with constant and variable moments of inertia with one or both ends fixed-continuous beams with overhang. Effects of sinking of supports. Derivation of slope-deflection equation, application to continuous beams with and without settlement of supports. Analysis of continuous beams with and without settlement of supports using Moment Distribution Method. Shear force and Bending moment diagrams, Elastic curve.

UNIT – V

Moving Loads and Influence Lines: Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load U.D load longer than the span, U.D load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length. Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section-Load position for maximum BM at a section - Point loads, UDL longer than the span, UDL shorter than the span- Influence lines for forces in members of Pratt and Warren trusses.

TEXT BOOKS:

1) Structural Analysis Vol –I & II by Vazarani and Ratwani, Khanna Publishers.

2) Structural Analysis Vol I & II by Pundit and Gupta., Tata McGraw Hill Publishers.

REFERENCES:

1) Basic Structural Analysis by K.U.Muthu *et al.,* I.K.International Publishing House Pvt.Ltd.

2) Structural Analysis by Hibbeler, pearson Education Ltd

3) Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Publishers.

4) Fundamentals of structural Analysis by M.L.Gamhir, PHI.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A40109) BUILDING MATERIALS, CONSTRUCTION AND PLANNING

UNIT – I

Stones and Bricks, Tiles: Building stones – classifications and quarrying – properties – structural requirements – dressing Bricks – Composition of Brick earth – manufacture and structural requirements.

Wood, Aluminum, Glass and Paints: Wood - structure – types and properties – seasoning – defects; alternate materials for wood – GI / fibre – reinforced glass bricks, steel & aluminum.

UNIT-II

Cement & Admixtures : Ingredients of cement – manufacture – Chemical composition – Hydration - field & lab tests Admixtures – mineral & chemical admixtures – uses.

UNIT-III

Building Components : Lintels, Arches, walls, vaults – stair cases – types of floors, types of roofs – flat, curved, trussed ; foundations – types ; Damp Proof Course ; Joinery – doors – windows – materials – types.

Building Services : Plumbing Services : Water Distribution, Sanitary – Lines & Fittings ; Ventilations : Functional requirements systems of ventilations. Air-conditioning - Essentials and Types ; Acoustics – characteristic – absorption – Acoustic design ; Fire protection – FireHarzards – Classification of fire resistant materials and constructions

UNIT -IV

Masonry and Finishing's : Brick masonry – types – bonds ; Stone masonry – types ; Composite masonry – Brick-stone composite ; Concrete, Reinforced brick.

Finishers : Plastering, Pointing, Painting, Claddings – Types – Tiles - ACP

Form work : Requirements – Standards – Scaffolding – Design ; Shoring, Underpinning.

UNIT –V

Building Planning : Principles of Building Planning, Classification of buildings and Building by laws.

TEXT BOOKS:

1. Building Materials and Construction – Arora & Bindra, Dhanpat Roy Publications.

2. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi

REFERENCES:

1. Building Materials by Duggal, New Age Internations.
2. Building Construction by PC Verghese PHI.
3. Construction Technology – Vol – I & II by R. Chuddy, Longman UK.
4. Basics of Civil Engg by Subhash Chander; Jain Brothers.
5. Alternate Building materials and Technology, K.S.Jagadish, Venkatarama Reddyand others; New Age Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	-	**-/3/-**	**2**

(A40186) COMPUTER AIDED DRAFTING OF BUILDINGS

1. Introduction to computer aided drafting
2. Software for CAD – Introduction to different softwares
3. Practice exercises on CAD software
4. Drawing of plans of buildings using software
   a) single storeyed buildings b) multi storyed buildings
5. Developing sections and elevations for
   a) single storeyed buildings b) multi storyed buildings
6. Detailing of building components like Doors, Windows, Roof Trusses etc. using CAD softwares
7. Exercises on development of working of buildings

TEXT BOOKS :

1. Computer Aided Design Laboratory by M. N. Sesha Praksh & Dr. G. S. Servesh – Laxmi Publications.
2. Engineering Graphics by P. J. Sha – S. Chand & Co.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	-	**-/3/-**	**2**

(A40190) SURVEYING LAB – II

LIST OF EXERCISES :

1. Study of theodolite in detail - practice for measurement of horizontal and vertical angles.
2. Measurement of horizontal angles by method of repetition and reiteration.
3. Trigonometric Leveling - Heights and distance problem (Two Exercises)
4. Heights and distance using Principles of tacheometric surveying (Two Exercises)
5. Curve setting – different methods. (Two Exercises)
6. Setting out works for buildings & pipe lines.
7. Determine of area using total station
8. Traversing using total station
9. contouring using total station
10. Determination of remote height using total station
11. State-out using total station
12. Distance, gradient, Diff, height between tow inaccessible points using total stations

LIST OF EQUIPMENT:

1. Theodolites and leveling staffs.
2. Tachometers.
3. Total station.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A50116) CONCRETE TECHNOLOGY

UNIT I

Cement : Portland cement – chemical composition – Hydration of cement – Structure of hydrate cement – Test on physical properties – Different grades of cement.

Admixtures : Types of admixtures – mineral and chemical admixtures – properties – dosages – effects - usage.

Aggregates: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregate – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded aggregate – Maximum aggregate size.

UNIT – II

Fresh Concrete: Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water.

UNIT – III

Hardened Concrete : Water / Cement ratio – Abram's Law – Gelspaoe ratio – Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength - Curing.

Testing of Hardened Concrete: Compression tests – Tension tests – Factors affecting strength – Flexure tests – Splitting tests – Pull-out test, Non-destructive testing methods – codal provisions for NDT.

ELASTICITY, CREEP & SHRINKAGE – Modulus of elasticity – Dynamic modulus of elasticity – Posisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – types of shrinkage.

UNIT – IV

Mix Design : Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical Quality Control – Acceptance criteria – Proportioning of concrete mix by normal and pumpable concretes by –

BIS method of mix design.

UNIT – V

Special Concretes: Light weight concrete – Light weight aggregate concrete – Cellular concrete – No-fines concrete – Fibre reinforced concrete – Polymer concrete – Types of Polymer concrete – Self compacting concrete.

TEXT BOOKS:

1. Properties of Concrete by A.M.Neville – Low priced Edition – 4th edition.
2. Concrete Technology by M.S.Shetty. – S.Chand & Co.

REFERENCES:

1. Concrete Technology by Job Thomas, Cengage Learning.
2. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi.
3. Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi.
4. Concrete: Micro structure, Properties and Materials – P.K.Mehta and J.M.Monteiro, Mc-Graw Hill Publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A50121) REINFORCED CONCRETE STRUCTURES DESIGN AND DRAWING

UNIT –I

Concepts of RC. Design – Limit State method – Material Stress- Strain Curves – Safety factors – Characteristic values. Stress Block parameters – IS – 456 – 2000 – Working Stress Method.

Beams **:** Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections.

UNIT – II

Shear, Torsion and Bond **:** Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, detailing Limit state design for serviceability for deflection, cracking and codal provision.

UNIT - III

Design of Two-way slabs, one way slab, continuous slab Using I S Coefficients, Cantilever slab /Canopy slab.

UNIT –IV

Short and Long columns –axial loads, uni axial and biaxial bending I S Code provisions.

UNIT – V

Design of Footings - isolated (square, rectangular) and Combined footings. Design of Stair case.

TEXT BOOKS:

1. Limit state designed of reinforced concrete – P.C.Varghese, Prentice Hall of India, New Delhi.
2. Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age International Publishers, New Delhi
3. Reinforced concrete design by S.Unnikrishna Pillai & Devdas Menon, Tata Mc.Graw Hill, New Delhi.
4. Fundamentals of reinforced concrete by N.C. Sinha and S.K Roy, S. Chand publishers

REFERENCES :

1. Fundamentals of Reinforced concrete design by M.L. Gambhir, Printice Hall of India Private Ltd., New Delhi.

2. Reinforced concrete structural elements – behaviour, Analysis and design by P.Purushotham, Tata Mc.Graw-Hill, 1994.
3. Plasticity in Reinforced Concrete by Chen – Cengage Learning Pvt. Ltd.
4. Design of concrete structures – Arthus H.Nilson, David Darwin, and Chorles W. Dolar, Tata Mc.Graw-Hill, 3rd Edition, 2005.
5. Design of Reinforced Concrete Foundations – P.C. Varghese Prentice Hall of India, New Delhi.
6. Reinforced concrete structures, Vol.1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
7. Reinforced concrete structures – I.C. Syal & A.K.Goel, S.Chand Publishers.
8. Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A50118) ENGINEERING GEOLOGY

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 tunnels weathering of common rock like “Granite”

UNIT – II

Mineralogy : Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties.Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming minerals: Feldsper , Quartz , Flint , Jasper, Olivine, Augite, Hornblende, Muscovite , Biotite , Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economics minerals such as Pyrite, Hematite , Magnetite, Chrorite , Galena , Pyrolusite , Graphite, Magnesite, and Bauxite. **Petrology** : Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous. Sedimentary and metamorphic rocks. Their distinguishing features, Megascopic and microscopic study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate. Rock excavation, stone aggregates.

UNIT – III

Structural Geology : Indian stratigraphy, paleontology and geological time scale**,** Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities, and joints - their important types. Ground water: Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration. Earth quakes, 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, land slides hazards, water in land slides their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, Earthquake and landslides.

UNIT – IV

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. Factors Contributing to the success of a reservoir. Geological factors influencing water tightness and life of reservoirs, Geo hazards, ground subsidence. Geophysical studies: Importance of Geophysical studies Principles of geophysical study by Gravity methods. Magnetic methods, Electrical methods. Seismic methods, Radio metric methods and Geothermal method. Special importance of Electrical resistivity methods, and seismic refraction methods. Improvement of competence of sites by grouting etc. Fundamental aspects of Rock mechanics and Environmental Geology.

UNIT – V

Tunnels: Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (lithological, structural and ground water) in tunneling over break and lining in tunnels, Tunnels in rock, subsidence over old mines , minining substances

TEXT BOOKS:

1) Engineering Geology by N.Chennkesavulu, Mac-Millan, Publishers 2nd Edition India Ltd. 2010.

2) Principals of Engineering Geology by K.V.G.K. Gokhale – B.S publications

3) Engineering Geology by Subinoy Gangopadhyay, Oxford University press.

REFERENCES:

1. Engineering Geology for Civil Engineering, P.C. Varghese, PHI Learning& private Limited.

2. Geology basics of Engineering by Aurele Parriaux, CRC press

3. Krynine & Judd, principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution.

4. F.G. Bell, Fundamental of Engineering Geology Butterworths, Publications, New Delhi, 1992.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A50120) GEOTECHNICAL ENGINEERING

UNIT – I

Introduction: Soil formation – clay mineralogy and soil structure and clay mineralogy – moisture content – weight- volume relationship – Relative density.

Index Properties of Soils: Grain size analysis – Sieve analysis, principle of Hydrometer method – consistency limits and indices – I.S. Classification of soils.

UNIT –II

Permeability: Soil water – capillary rise – flow of water through soils – Darcy's law- permeability – Factors affecting permeability – laboratory determination of coefficient of permeability –Permeability of layered soils – In-situ permeability tests (Pumping in & Pumping out test).

Effective Stress & Seepage Through Soils: Total, neutral and effective stress – principle of effective stress - quick sand condition – Seepage through soils – Flownets: Characteristics and Uses.

UNIT –III

Stress Distribution in Soils: Boussinesq's and Westergaard's theories for point load, uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under point load along the vertical and horizontal plane, and Newmark's influence chart for irregular areas.

Compaction: Mechanism of compaction – factors affecting compaction – effects of compaction on soil properties – Field compaction Equipment – compaction quality control.

UNIT – IV

Consolidation: Types of compressibility – Immediate Settlement, primary consolidation and secondary consolidation **-** stress history of clay; e-p and e-log p curves – normally consolidated soil, over consolidated soil and under consolidated soil - preconsolidation pressure and its determination - Terzaghi's 1-D consolidation theory – coefficient of consolidation: square root time and logarithm of time fitting methods - computation of total settlement and time rate of settlement.

UNIT - V

Shear Strength of Soils: Importance of shear strength **–** Mohr's– Coulomb Failure theories – Types of laboratory tests for strength parameters – strength tests based on drainage conditions – strength envelops – Shear strength of

sands - dilatancy – critical void ratio – Liquefaction- shear strength of clays.

TEXT BOOKS:

1 Principals of Geotechnical Engineering by Braja M.Das, Cengage Learning Publishers.

2. Soil Mechanics and Foundation Engineering by VNS Murthy, CBS Publishers and Distributors.

3. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt . Ltd, New Delhi.

REFERENCES:

1. Geotechnical Engineering by C. Venkataramiah, New age International Pvt . Ltd, (2002).

2. Geotechnical Engineering Handbook By Das – JRoss Publishing.

3. Geotechnical Engineering Principles and Practices by Cuduto, PHI Intrernational.

4. Geotechnical Engineering by Manoj Dutta & Gulati S.K – Tata Mc.Grawhill Publishers New Delhi.

5. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.

6. Soil Mechanics and Foundation by by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A50122) WATER RESOURCES ENGINEERING-I

UNIT I

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 - Adjustment of record -Rainfall Double Mass Curve. Runoff- Factors affecting Runoff – Runoff over a Catchment- Empirical and Rational Formulae.

Abstraction from rainfall-evaporation, factors affecting evaporation, measurement of evaporation- Evapotranspiration- Penman and Blaney & Criddle Methods -Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT II

Distribution of Runoff – Hydrograph Analysis Flood Hydrograph – Effective Rainfall – Base Flow- Base Flow Separation - Direct Runoff Hydrograph - Unit Hydrograph, definition, and limitations of applications of Unit hydrograph, derivation of Unit Hydrograph from Direct Runoff Hydrograph and vice versa - S-hydrograph, Synthetic Unit Hydrograph.

UNIT-III

Ground water Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, Darcy's law, radial flow to wells in confined and unconfined aquifers. Types of wells,- Well Construction – Well Development.

UNIT-IV

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 –Crop Roation, preparation of land for Irrigation, standards of quality for Irrigation water.

Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, Duty and delta, factors affecting duty- Design discharge for a water course. Depth and frequency of Irrigation, irrigation efficiencies-Water Logging.

UNIT-V

Classification of canals, Design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, IS standards for a canal design canal lining.

Design Discharge over a catchment, Computation of design discharge-

rational formula, SCS curve number method, flood frequency analysis-Introductory Part only. Stream Gauging – measurement and estimation of stream flow.

TEXT BOOKS:

1. Engineering Hydrology by Jayaram Reddy, Laxmi publications pvt. Ltd., New Delhi.
2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi.

REFERENCES:

1. Elementary hydrology by V.P.Singh, PHI publications.
2. Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House.
3. Water Resources Engineering – I by Dr. G.Venkata Ramana, Acadamic Publishing Company.
4. Irrigation Water Management by D.K. Majundar, Printice Hall of India.
5. Irrigation and Hydraulic structures by S.K.Grag.
6. Applied hydrology by Ven Te Chow, David R. Maidment larry W. Mays Tata Mc. Graw Hill.
7. Introduction to hydrology by Warren Viessvann, Jr, Garyl. Lewis, PHI.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A50117) DISASTER MANAGEMENT

(Open Elective)

Unit-I

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

Unit –II

Types of Environmental hazards & Disasters: Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards –

Unit –III

Endogenous Hazards - Volcanic Eruption – Earthquakes – Landslides - Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - - Earthquake Hazards in India - - Human adjustment, perception & mitigation of earthquake.

Unit –IV

Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters.

Infrequent events: Cyclones – Lightning – Hailstorms.

Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes , distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves Floods:- Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & mitigation) Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Palnetary Hazards/ Disasters- Man induced Hazards / Disasters- Physical hazards/ Disasters-Soil Erosion.

Soil Erosion:— Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion.

Chemical hazards/ disasters:— Release of toxic chemicals, nuclear explosion- Sedimentation processes Sedimentation processes:- Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation

Biological hazards/ disasters:- Population Explosion.

Unit –V

Emerging approaches in Disaster Management- Three Stages

1. Pre- disaster stage (preparedness)
2. Emergency Stage
3. Post Disaster stage-Rehabilitation

TEXT BOOKS:

1. Disaster Mitigation: Experiences And Reflections by Pardeep Sahni.
2. Natural Hazards & Disasters by Donald Hyndman & David Hyndman – Cengage Learning.

REFERENCES

1. R.B.Singh (Ed) Environmental Geography, Heritage Publishers New Delhi,1990.
2. Savinder Singh Environmental Geography, Prayag Pustak Bhawan, 1997.
3. Kates,B.I & White, G.F The Environment as Hazards, oxford, New York, 1978.
4. R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000.
5. H.K. Gupta (Ed) Disaster Management, Universiters Press, India, 2003.
6. R.B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994.
7. Dr. Satender , Disaster Management t in Hills, Concept Publishing Co., New Delhi, 2003.
8. A.S. Arya Action Plan For Earthquake,Disaster, Mitigation in V.K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994.
9. R.K. Bhandani An overview on Natural & Man made Disaster & their Reduction,CSIR, New Delhi .
10. M.C. Gupta Manuals on Natural Disaster management in India, National Centre for Disaster Management,IIPA, New Delhi, 2001.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A50017) INTELLECTUAL PROPERTY RIGHTS

(Open Elective)

UNIT – I

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II

Trade Marks : Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT – III

Law of copy rights : Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents : Foundation of patent law, patent searching process, ownership rights and transfer

UNIT – IV

Trade Secrets : Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

Unfair competition : Misappropriation right of publicity, False advertising.

UNIT – V

New development of intellectual property: new developments in trade mark law ; copy right law, patent law, intellectual property audits.

International overview on intellectual property, international – trade mark law, copy right law, international patent law, international development in trade secrets law.

TEXT BOOKS & REFERENCES:

1. Intellectual property right, Deborah. E. Bouchoux, cengage learing.
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tate Mc Graw Hill Publishing company ltd.,

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A50018) HUMAN VALUES AND PROFESSONAL ETHICS

(Open Elective)

Objectives : This introductory course input is intended

a. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.

b. To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Value based living in a natural way.

c. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

Unit I:

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

Unit II:

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

Unit III:

Understanding Harmony in the Family and Society- Harmony in Human -

Human Relationship : Understanding harmony in the Family- the basic unit of human interaction. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; **Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.** Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals. Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family!

Unit IV:

Understanding Harmony in the Nature and Existence - Whole existence as Co-existence : Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

Unit V:

Implications of the above Holistic Understanding of Harmony on Professional Ethics : Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

a) Ability to utilize the professional competence for augmenting universal human order,

b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,

c) Ability to identify and develop appropriate technologies and management patterns for above production systems.

Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order:

a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers

b) At the level of society: as mutually enriching institutions and organizations

TEXT BOOKS:

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.

2. Prof. KV Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications,3rd Edition.

REFERENCE BOOKS

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA.
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. A Nagraj, 1998, Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991.
5. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Purblishers.
6. A.N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethichs (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charlie Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	-	**-/3/-**	**2**

(A50181) FLUID MECHANICS & HYDRAULIC MACHINERY LAB

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice / mouthpiece by constant head method.
3. Calibration of contracted Rectangular Notch and / Triangular Notch
4. Determination of friction factor of a pipe.
5. Determination of Coefficient for minor losses.
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. Performance characteristics of a single stage/ multi-stage centrifugal pump.
12. Performance characteristics of a reciprocating pump.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	-	**-/3/-**	**2**

(A50191) ENGINEERING GEOLOGY LAB

1. Study of physical properties and identification of minerals referred under theory.
2. Megascopic and microscopic description and identification of rocks referred under theory.
3. Megascopic and microscopic identification of rocks & minerals.
4. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.
5. Simple Structural Geology problems.

LAB EXAMINATION PATTERN:

1. Description and identification of SIX minerals
2. Description and identification of Six (including igneous, sedimentary and metamorphic rocks)
3. Interpretation of a Geological map along with a geological section.
4. Simple strike and Dip problems.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	3	**-/-/2**	**4**

(A60130) STEEL STRUCTURES DESIGN AND DRAWING

UNIT – I

Materials – Making of iron and steel – types of structural steel – mechanical properties of steel – Concepts of plasticity – yield strength. Loads–and combinations loading wind loads on roof trusses, behavior of steel, local buckling. Concept of limit State Design – Different Limit States as per IS 800 -2007 – Design Strengths- deflection limits – serviceability - Bolted connections – Welded connections – Design Strength – Efficiency of joint – Prying action Types of Welded joints - Design of Tension members – Design Strength of members.

UNIT – II

Design of compression members – Buckling class – slenderness ratio / strength design – laced – battened columns –column splice – column base – slab base.

UNIT – III

Design of Beams – Plastic moment – Bending and shear strength laterally / supported beams design – Built up sections – large plates Web buckling Crippling and Deflection of beams, Design of Purlin.

UNIT – IV

Design of eccentric connections with brackets, Beam end connections – Web angle – Un-stiffened and stiffened seated connections (bolted and Welded types) Design of truss joints

UNIT – V

Design of welded plate girders – optimum depth Design of main section – Design of end bearing stiffness and intermediate stiffness

Connection between web and flange and Design of flange splice and web splices.

TEXT BOOKS :

1. Design of steel structures – N. Subramanian, Oxford University Press – 2009.
2. Limit State Design of steel structures, S.K. Duggal, Tata McGraw-Hill, 2010.

REFERENCE BOOKS :

1. Design of Steel structures by K.S. Sai Ram, Person Education.

2. Design of Steel Structures Edwin H. Gaylord, Jr. Charles N. Gaylord and James Stallmeyer Tata McGraw-Hill Education pvt. Ltd.
3. Design of Steel Structures Vol. 1 & 2 – Ramchandra, Standard Publications.
4. Design of steel structures, Structures, S.S. Bhavikatti, IK int Publication House, New Delhi, 2010.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A60119) ENVIRONMENTAL ENGINEERING

UNIT – I

Introduction: Water supply schemes – Protected water supply – Population forecasts, design period – water demand – Types of demand – factors affecting – fluctuations – fire demand – Sources of Water– intakes – infiltration galleries, confined and unconfined aquifers – water quality parameters and testing – drinking water standards.

UNIT II

Layout and general outline of water treatment units – sedimentation, uniform settling velocity– principles – design factors – surface loading – Jar test – optimum dosage of coagulant - coagulation-flocculation, clarifier design – coagulants – feeding arrangements. Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation comparison of filters – disinfection – types of disinfection - theory of chlorination - chlorine demand - other disinfection treatment methods. Distribution systems – Types of layouts of Distribution systems – design of distribution systems - Hardy Cross and equivalent pipe methods - service reservoirs – Determination of Storage capacity.

UNIT - III

Conservancy and water carriage systems – sewage and storm water estimation – time of concentration – storm water overflows combined flow – characteristics of sewage –examination of sewage – B.O.D. – C.O.D. equations. Design of sewers – shapes and materials – sewer appurtenances manholes – inverted siphon – catch basins – flushing tanks – ejectors, pumps and pump houses – house drainage – components requirements – sanitary fittings-traps – one pipe and two pipe systems of plumbing.

UNIT – IV

Layout and general out line of various units in a waste water treatment plant – primary treatment design of screens – grit chambers – skimming tanks – sedimentation tanks – principles and design of biological treatment – trickling filters – standard and high rate- Filters – ASP – ASP modification – Aeration.

UNIT - V

Construction and design of oxidation ponds – Oxidation ditches – Sludge Treatment - Sludge digestion tanks –design of Digestion tank –Factors affecting sludge digestion - Sludge disposal by drying – septic tanks - working principles and design – soak pits. Ultimate disposal of waste water – self purification of rivers – Sewage farming..

TEXT BOOKS:

1. Water Supply & Sanitory Engineering by G.S.Bindie.
2. Water Supply Engineering, Vol. 1, waste water Engineering, Vol. II, B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi.
3. Water Supply Engineering Vol.1 & Waste water Engineering Vol. II, P.N. Modi, Standard Book Publishers, Newdelhi.

REFERENCS :

1. Water and Waste Water Technology by Mark J Hammar and Mark J. Hammar Jr.
2. Water and Waste Water Technology by Steel.
3. Water and Waste Water Engineering by Fair Geyer and Okun.
4. Waste water treatment- concepts and design approach by G.L. Karia and R.A. Christian, PHI.
5. Waste water Engineering by Metcalf and Eddy.
6. Theory & Practice of Water & Wastewater Treatment by Ronald L Droste, Wiley India Publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A60132) TRANSPORTATION ENGINEERING – I

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 – Highway Project.

UNIT – II

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

UNIT – III

Traffic Engineering & Regulations: Basic Parameters of Traffic-Volume, Speed and Density - Traffic Volume Studies - Data Collection and Presentation - Speed studies - Data Collection and Presentation - Origin & Destination studies, Parking Studies – Onstreet & Off street Parking - Road Accidents - Causes and Preventive Measures - Accident Data Recording – Condition Diagram and Collision Diagrams - Traffic Signs – Types and Specifications – Road Markings - Need for Road Markings-Types of Road Markings - Design of Traffic Signals – Webster Method.

UNIT – IV

Intersection Design: Types of Intersections – Conflicts at Intersections – Requirements of At-Grade Intersections - Types of At-Grade Intersections: Channelized and Unchannelized Intersections – Traffic Islands - Types of Grade Separated Intersections - Rotary Intersection – Concept of Rotary – Design Factors of Rotary – Advantages and Limitations of Rotary Intersections.

Unit - V

Highway Material, Construction and Maintenance: Highway Material Characterization: Subgrade Soil, Stone Aggregates, Bitumen Materials, Construction of Gravel Roads - Construction of Water Bound Macadam Roads - Construction of Bituminous Pavements: Surface Dressing, Bitumen Bound Macadam, Bituminous Concrete - Construction of Cement Concrete Pavements - Construction of Joints in Cement Concrete Pavements - Joint

Filler and Seal - Pavement Failures – Maintenance of Highways – Highway Drainage.

TEXT BOOKS:

1. Highway Engineering – S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000).
2. Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna Publications – 6th Edition – 1997.

REFERENCES:

1. Principles of Traffic and Highway Engineering – Garber & Hoel, Cengage Learning.
2. Principles and Practices of Highway Engineering – Dr.L.R.Kadiyali and Dr.N.BLal - Khanna Publications.
3. Highway Engineering – S.P.Bindra , Dhanpat Rai & Sons. – 4th Edition (1981).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A60126) FOUNDATION ENGINEERING

UNIT – I

Soil Exploration: Need – Methods of soil exploration – Boring and Sampling methods – Penetration Tests – Plate load test – Pressure meter – planning of Programme and preparation of soil investigation report.

UNIT – II

Slope Stability: Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes – stability analysis by Swedish arc method, standard 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 different soils and layered soils – Coulomb's earth pressure theory – Culmann's graphical method.

RETAINING WALLS: Types of retaining walls – stability of retaining walls against overturning, sliding, bearing capacity and drainage from backfill

UNIT – IV

Shallow Foundations - Strength Criteria - Types - choice of foundation – Location of depth – Safe Bearing Capacity – Terzaghi, Meyerhof, Skempton and IS Methods

Shallow Foundations - Settlement Criteria - Safe bearing pressure based on N- value – allowable bearing pressure; safe bearing capacity - allowable settlements of structures.

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

UNIT - V

Well Foundations: Types – Different shapes of wells – Components of wells – Sinking of wells – Tilts and shifts.

TEXT BOOKS:

1. Das, B.M., - (2012) Principles of Foundation Engineering –Cengage Learning
2. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt. Ltd, (2004).

3. Geotechnical Engineering : Principles and practices of soil mechanics and foundation Engineering by VNS Murthy, Taylor & Francis Group.

REFERENCES:

1. Analysis and Design of Substructures – Swami Saran, Oxford and IBH Publishing company Pvt Ltd 1998.
2. Geotechnical Engineering by S. K.Gulhati & Manoj Datta – Tata Mc.Graw Hill Publishing company New Delhi. 2005.
3. Teng,W.C – Foundation Design , Prentice Hall, New Jersy.
4. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A60131) STRUCTRUAL ANALYSIS - II

UNIT – I

Moment Distribution Method - Analysis of Single Bay Single Storey Portal Frames including side Sway. Analysis of inclined frames.

Kani's Method: Analysis of continuous beams including settlement of supports. Analysis of single bay single storey and single bay two Storey Frames by Kani's Method Including Side Sway. Shear force and bending moment diagrams. Elastic curve.

UNIT – II

Slope Deflection Method: Analysis of Single Bay – single storey Portal Frames by Slope Deflection Method Including Side Sway. Shear force and bending moment diagrams. Elastic curve.

Two Hinged Arches: Introduction – Classification of Two hinged Arches – Analysis of two hinged parabolic arches – Secondary stresses in two hinged arches due to temperature and elastic shortening of rib.

UNIT – III

Approximate Methods of Analysis: Introduction – Analysis of multi-storey frames for lateral loads: Portal Method, Cantilever method and Factor method. Analysis of multi-storey frames for gravity (vertical) loads. Substitute Frame method. Analysis of Mill bents.

UNIT – IV

Matrix Methods of Analysis: Introduction – Static and Kinematic Indeterminacy - Analysis of continuous beams including settlement of supports, using stiffness method. Analysis of pin-jointed determinate plane frames using stiffness method- Analysis of single bay single storey frames including side sway, using stiffness method. Analysis of continuous beams upto three degree of indeterminacy using flexibility method. Shear force and bending moment diagrams. Elastic curve.

UNIT- V

Influence Lines for Indeterminate Beams: Introduction – ILD for two span continuous beam with constant and variable moments of inertia. ILD for propped cantilever beams.

Indeterminate Trusses: Determination of static and kinematic indeterminacies – Analysis of trusses having single and two degrees of internal and external indeterminacies –Castigliano's second theorem.

TEXT BOOKS:

1) Structural Analysis Vol –I &II by Vazarani and Ratwani, Khanna Publishers.
2) Structural Analysis Vol I & II by Pundit and Gupta., Tata McGraw Hill Publishers.
3) Structural Analysis SI edition by Aslam Kassimali, Cengage Learning.

REFERENCES:

1) Matrix Analysis of Structures by Singh, Cengage Learning Pvt. Ltd.
2) Structural Analysis by Hibbeler.
3) Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Publishers.
4) Matrix Analysis of Structures by Pundit and Gupta., Tata McGraw Hill Publishers.
5) Advanced Structural Analysis by A.K.Jain, Nem Chand Bros.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A60123) ELEMENTS OF EARTHQUAKE ENGINEERING

(Elective-I)

UNIT I

Engineering Seismology: Earthquake phenomenon cause of earthquakes-Faults- Plate tectonics- Seismic waves- Terms associated with earthquakes-Magnitude/Intensity of an earthquake-scales-Energy released-Earthquake measuring instruments-Seismoscope, Seismograph, accelerograph-strong ground motions- Seismic zones of India.

Theory of Vibrations: Elements of a vibratory system- Degrees of Freedom-Continuous system-Lumped mass idealization-Oscillatory motion-Simple Harmonic Motion-Free vibration of single degree of freedom (SDOF) system-undamped and damped-critical damping-Logarithmic decrement-Forced vibrations-Harmonic excitation-Dynamic magnification factor-Excitation by rigid based translation for SDOF system-Earthquake ground motion.

UNIT II

Conceptual design: Introduction-Functional planning-Continuous load path-Overall form-simplicity and symmetry-elongated shapes-stiffness and strength-Horizontal and Vertical members-Twisting of buildings-Ductility-definition-ductility relationships-flexible buildings-framing systems-choice of construction materials-unconfined concrete-confined concrete-masonry-reinforcing steel.

Introduction to earthquake resistant design: Seismic design requirements-regular and irregular configurations-basic assumptions-design earthquake loads-basic load combinations-permissible stresses-seismic methods of analysis-factors in seismic analysis-equivalent lateral force method.

UNIT III

Reinforced Concrete Buildings: Principles of earthquake resistant deign of RC members- Structural models for frame buildings- Seismic methods of analysis- Seismic deign methods- IS code based methods for seismic design-Seismic evaluation and retrofitting- Vertical irregularities- Plan configuration problems- Lateral load resisting systems- Determination of design lateral forces- Equivalent lateral force procedure- Lateral distribution of base shear.

UNIT IV

Masonry Buildings: Introduction- Elastic properties of masonry assemblage-Categories of masonry buildings- Behaviour of unreinforced and reinforced masonry walls- Behaviour of walls- Box action and bands- Behaviour of infill

walls- Improving seismic behaviour of masonry buildings- Load combinations and permissible stresses- Seismic design requirements- Lateral load analysis of masonry buildings.

UNIT V

Structural Walls and Non-Structural Elements: Strategies in the location of structural walls- sectional shapes- variations in elevation- cantilever walls without openings – Failure mechanism of non-structures- Effects of non-structural elements on structural system- Analysis of non-structural elements- Prevention of non-structural damage- Isolation of non-structures. Ductility Considerations in Earthquake Resistant Design of RC Buildings: Introduction- Impact of Ductility- Requirements for Ductility- Assessment of Ductility- Factors affecting Ductility- Ductile detailing considerations as per IS 13920. Behaviour of beams, columns and joints in RC buildings during earthquakes- Vulnerability of open ground storey and short columns during earthquakes

TEXT BOOKS:

1. Earthquake Resistant Design of structures – S. K. Duggal, Oxford University Press.
2. Earthquake Resistant Design of structures – Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd.

REFERENCES:

1. Seismic Design of Reinforced Concrete and Masonry Building – T. Paulay and M.J.N. Priestly, John Wiley & Sons.
2. Eartquake Resistant Design of Buidling structures by Vinod Hosur, Wiley India Pvt. Ltd.
3. Elements of Mechanical Vibration by R.N.Iyengar, I.K.International Publishing House Pvt. Ltd.
4. Masory and Timber structures including earthquake Resistant Design –Anand S.Arya, Nem chand & Bros.
5. Earthquake Tips – Learning Earthquake Design and Construction C.V.R. Murthy.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A60127) GROUND IMPROVEMENT TECHNIQUES

(Elective-I)

UNIT – I

Introduction to Ground Modification: Need and objectives, Identification of soil types, In situ and laboratory tests to characterise problematic soils; Mechanical, Hydraulic, Physico-chemical, Electrical, Thermal methods, and their applications.

UNIT – II

Mechanical Modification – Deep Compaction Techniques- Blasting Vibrocompaction, Dynamic Tamping and Compaction piles.

UNIT – III

Hydraulic Modification – Objectives and techniques, traditional dewatering methods and their choice, Design of dewatering system, Electro-osmosis, Electro-kinetic dewatering. Filtration, Drainage and Seepage control with Geosynthetics, Preloading and vertical drains,

UNIT – IV

Physical and Chemical Modification – Modification by admixtures, Shotcreting and Guniting Technology, Modification at depth by grouting, Crack Grouting and compaction grouting, Jet grouting, Thermal Modification, Ground freezing.

UNIT – V

Modification by Inclusions and Confinement - Soil reinforcement, reinforcement with strip, and grid reinforced soil. In-situ ground reinforcement, ground anchors, rock bolting and soil nailing.

TEXT BOOKS

1. Hausmann, M. R. (1990) – Engineering Principles of Ground Modifications, McGraw Hill publications.

REFERENCES:

1. Koerner, R. M (1994) – Designing with Geosynthetics – Prentice Hall, New Jersey.
2. Jones C. J. F. P. (1985) – Earth Reinforcement and soil structures – Butterworths, London.
3. Xianthakos, Abreimson and Bruce - Ground Control and Improvement
4. Mosley – Ground Improvement.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A60128) GROUND WATER HYDROLOGY

(Elective-I)

UNIT – I

Ground Water Occurrence and Movement: Ground water hydrologic cycle, origin of ground Water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention. Permeability, Darcy's law, storage coefficient, Transmissivity, differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinates system, ground water flow contours their applications.

UNIT – II

Analysis of Pumping Test data-I: Steady flow ground water flow towards a well in confined and unconfined aquifers-Dupit's and Theism's equations, Assumptions, Formation constants, yield of an open well interface and well tests. Unsteady flow towards a well – Non equilibrium equations-Thesis solution-Jacob and Chow's simplifications, Leak aquifers.

UNIT – III

Surface and Subsurface Investigation: Surface methods of exploration-Electrical resistivity and Seismic refraction methods. Subsurface methods-geophysical logging and resistivity logging. Aerial Photogrammetry applications along with Case Studies in Subsurface Investigation.

UNIT – IV

Artificial Recharge of Ground Water: Concept of artificial recharge-recharge methods, relative merits. Applications of GIS and Remote Sensing in Artificial Recharge of Ground water along with Case studies.

UNIT – V

Saline Water Intrusion In aquifers: Occurrence of saline water intrusions, Ghyben-Herzberg relation, Shape of interface, control of seawater intrusion.

TEXT BOOKS:

1. Ground Water Hydrology by H. M. Raghunath, Wiley Eastern Ltd.
2. Introduction to Hydraulics & Hydrology: With Applications for Stormwater Management, 4th Edition, Cengage Learning.

REFERENCES:

1. Ground water Hydrology by David Keith Todd, John Wiley &sons. New York.
2. Ground water by Bawver, John Wiley &sons.
3. Hydrology by Subramanya K.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A60124) ENVIRONMENTAL IMPACT ASSESSMENT

(Elective-I)

UNIT I

Definition of EIA, Types of EIA, Various types of Environmental Impacts: Direct Impacts, Indirect Impacts, Cumulative Impacts, Induced Impacts**,** EIA Principles, Process, Benefits and Flaws, Environmental Impact Statement, Objectives of EIA, Environmental Sustainability, Identification of Potential Impacts , Affected Environment, Impact prediction, Impact Assessment, Impact Mitigation, Selecting the Proposed Action, Environmental Monitoring, Public consultation.

UNIT II

Creation of EIA Data Base, Compilation, Environmental Inventory: Baseline Data Generation, Environmental Monitoring Networking Design (EMND), Monitoring Stations, Data Products and Sources, Impact Identification (II) Methodologies, Interaction-Matrix Methods, Use of the Leopold Matrix, Checklist Methodologies: Simple Checklists, Descriptive Checklists, Uses of Checklists, Network Methodologies.

UNIT III

Meteorological Data, Ambient Air Quality Monitoring, Air Quality Standards and Regulations, Impact Prediction, Impact Prediction Approach, Utilization of Dispersion Models, Impact Prediction Tools, Impact Assessment (IA): Significance and Assessment of the Impacts, Impact Mitigation Measures**, Impacts on Water Environment** - Sources of Pollution, Major Pollutants- Water Quality parameters, Surface Water Contaminants and their Impacts, Existing Groundwater Quality Environment – Standards – Prediction and Assessment of Impacts – Mitigation measures.

UNIT IV

Soil Pollution, Causes, Soil erosion, Desertification, Salinisation, Acidification, Land Filling of Waste, Impacts on Soils, Conceptual Approach: Identification, prediction and assessment of Soil Quantity-Quality Impacts, Description of Existing Resources, Identification and Incorporation of Mitigation Measures, Impacts on Noise Environment: Basics of Noise Pollution, Noise Exposure Forecast (NEF), Standards and Guidelines, Impact Prediction, Assessment of Impact Significance, Identification and Incorporation of Mitigation Measures.

UNIT V

Status of Wetlands, Threats to Wetlands, Ecology Impact Assessment System**: Importance of Biological Impact Assessment**, Identification, Prediction and Assessment and Significance of Biological Impacts, Mitigation Measures, Conservation of Flora & Fauna, **Impacts on Socio Economic and Other Environment:** Components, Considerations, Human Environment: Socio Economic Factors - Advantages of Impact Assessment – Assessment of Impact on Historical Structures – Mitigation Measures.

TEXT BOOKS:

1. Environmental Impact Assessment, Canter, L.W., 1977, McGraw Hills, New York.
2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers.

REFERENCES:

1. Technological guidance manuals of EIA. MoEF, GoI.
2. Environmental Impact Assessment, 2003, Y. Anjaneyulu, B.S Publications.
3. Environmental Impact Assessment Principles and applications, Erickson, P.A.
4. Environmental Impact Assessment: Theory and Practice, Dr.M.Anji Reddy, BS Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A60129) PRINCIPLES OF ENTREPRENEURSHIP

(Elective -I)

Unit I:

Introduction to Entrepreneurship: Definition of Entrepreneur Entrepreneurial Traits. Entrepreneur vs. Manager, Creating and Starting the venture: Sources of new ideas, methods of generating ideas, creative problem solving - Writing Business Plan, Evaluating Business Plans. Launching formalities.

Unit II:

Financing and Managing the new venture: Sources of capital, Record keeping, recruitment, motivating and leading teams, financial controls. Marketing and sales controls. E-commerce and entrepreneurship, Internet advertising- New venture Expansion Strategies and Issues.

Unit III:

Institutional/financial support: Schemes and functions of Directorate of Industries, District Industries Centres (DICs), Industrial Development Corporation (IDC), State Financial Corporation (SFCs), Small Scale Industries Development Corporations (SSIDCs), Khadi and Village Industries Commission (KVIC), Technical Consultancy Organisation (TCO), Small Industries Service Institute (SISI), National Small Industries Corporation (NSIC), Small Industries Development Bank of India (SIDBI).

Unit IV:

Production and Marketing Management: Thrust areas of production management, Selection of production Techniques, Plant utilization and maintenance, Designing the work place, Inventory control , material handling and quality control. Marketing functions, market segmentation, market research and channels of distribution, Sales promotion and product pricing.

Unit V :

Labour legislation, Salient Provisions of Health, Safety, and Welfare under Indian Factories Act, Industrial Disputes Act, Employees State Insurance Act, Workmen's Compensation Act and Payment of Bonus Act.

TEXT BOOKS:

1. Robert Hisrich, & Michael Peters: Entrepreneurship, TMH,2009.
2. Dollinger: Entrepreneurship, Pearson,2009.

REFERENCE BOOKS:

1. Vasant Desai, Dynamics of Entrepreneurial Development and

Management, Himalaya Publishing House, 2009.

2. Harvard Business Review on Entrepreneurship, HBR Paper Back.
3. Robert J.Calvin: Entrepreneurial Management, TMH, 2009.
4. Gurmeet Naroola: The entrepreneurial Connection, TMH, 2009.
5. Bolton & Thompson: Entrepreneurs—Talent, Temperament and Techniques, Butterworth Heinemann, 2009.
6. Agarwal: Indian Economy, Wishwa Prakashan 2009.
7. Dutt & Sundaram: Indian Economy,S.Chand, 2009
8. B D Singh,:Industrial Relations & Labour Laws, Excel, 2009.
9. Aruna Kaulgud: Entrepreneurship Management by, Vikas publishing house, 2009.
10. Essential of entrepreneurship and small business management by Thomas W.Zimmerer & Norman M.Searborough, PHI-2009.
11. ND Kapoor: Industrial Law, Sultan Chand & Sons, 2009.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	-	**-/3/-**	**2**

(A60194) GEOTECHNICAL ENGINEERING LAB

LIST OF EXPERIMENTS

1. Atterberg's Limits (LL & PL)
2. Field density-core cutter and sand replacement method
3. Grain size analysis
4. Permeability of soil, constant and variable head test
5. Compaction test
6. CBR Test
7. Consolidation test
8. Unconfined compression test
9. Tri-axial Compression test
10. Direct shear test.
11. Vane shear test

Note: Any eight experiments may be completed.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	-	**-/3/-**	**2**

(A60086) ADVANCED COMMUNICATION SKILLS (ACS) LAB

Introduction

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd 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.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

Gathering ideas and information to organise ideas relevantly and coherently.

Engaging in debates.

Participating in group discussions.

- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

Syllabus:

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

1. **Activities on Fundamentals of Inter-personal Communication and Building Vocabulary** - Starting a conversation – responding

appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

2. **Activities on Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
3. **Activities on Writing Skills** – Structure and presentation of different types of writing – *letter writing/Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing* – planning for writing – improving one's writing.
4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/**PPTs** and written presentations through posters/projects/reports/ e-mails/assignments etc.
5. **Activities on Group Discussion and Interview Skills** – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

Minimum Requirement:

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- **Spacious room with appropriate acoustics.**
- **Round Tables with movable chairs**
- **Audio-visual aids**
- **LCD Projector**
- **Public Address system**
- **P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ**
- **T. V, a digital stereo & Camcorder**
- **Headphones of High quality**

Prescribed Lab Manual: A book titled ***A Course Book of Advanced Communication Skills (ACS) Lab*** published by Universities Press, Hyderabad.

Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

- **Oxford Advanced Learner's Compass**, 7th Edition
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE**(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- **The following software from 'train2success.com'**
  - **Preparing for being Interviewed**
  - **Positive Thinking**
  - **Interviewing Skills**
  - **Telephone Skills**
  - **Time Management**

Books Recommended:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. English Language Communication : A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
3. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
4. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
5. Business and Professional Communication: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.
6. The Basics of Communication: A Relational Perspective. Steve Duck & David T. McMahan. Sage South Asia Edition. Sage Publications. 2012.
7. English Vocabulary in Use series, Cambridge University Press 2008.
8. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
9. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
10. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New

Delhi, 2009.

11. Handbook for Technical Writing by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
12. Job Hunting by Colm Downes, Cambridge University Press 2008.
13. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
14. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.
15. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/ Cambridge University Press.
16. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

***Advanced Communication Skills Lab Practicals**:*

1. The practical examinations for the ACS Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

Mini Project: As a part of Internal Evaluation

1. **Seminar/ Professional Presentation**
2. **A Report on the same has to be prepared and presented.**

* ***Teachers may use their discretion to choose topics relevant and suitable to the needs of students.***

* ***Not more than two students to work on each mini project.***

* ***Students may be assessed by their performance both in oral presentation and written report.***

Outcomes

- Accomplishment of sound vocabulary and its proper use contextually.
- Flair in Writing and felicity in written expression.
- Enhanced job prospects.
- Effective Speaking Abilities

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A70140) REMOTE SENSING & GIS

UNIT – I

Introduction to Photogrammetry: Principles& types of aerial photograph, geometry of vertical aerial photograph, Scale & Height measurement on single vertical aerial photograph, Height measurement based on relief displacement, Fundamentals of stereoscopy, fiducial points, parallax measurement using fiducial line.

UNIT – II

Remote Sensing –: Basic concept of Remote sensing, Data and Information, Remote sensing data Collection, Remote sensing advantages & Limitations, Remote Sensing process.

Electro-magnetic Spectrum, Energy interactions with atmosphere and with earth surface features (soil, water, vegetation), Indian Satellites and Sensors characteristics, Resolution, Map and Image and False color composite, introduction to digital data, elements of visual interpretation techniques.

UNIT – III

Geographic Information Systems: Introduction to GIS; Components of a GIS; Geospatial Data: Spatial Data-Attribute data – Joining Spatial and Attribute data; GIS Operations: Spatial Data Input- Attribute data Management –Data display- Data Exploration- Data Analysis. COORDINATE SYSTEMS: Geographic Coordinate System: Approximation of the Earth, Datum; Map Projections: Types of Map Projections-Map projection parameters-Commonly used Map Projections - Projected coordinate Systems

UNIT –IV

Vector Data Model: Representation of simple features- Topology and its importance; coverage and its data structure, Shape file; Data models for composite features Object Based Vector Data Model; Classes and their Relationship; The geobase data model; Geometric representation of Spatial Feature and data structure, Topology rules

UNIT –V

Raster Data Model: Elements of the Raster data model, Types of Raster Data, Raster Data Structure, Data Conversion, Integration of Raster and Vector data.

Data Input: Metadata, Conversion of Existing data, Creating new data; Remote Sensing data, Field data, Text data, Digitizing, Scanning, on screen digitizing, importance of source map, Data Editing

TEXT BOOKS:

1 Remote sensing of the environment – An earth resource perspective – 2nd edition – by John R. Jensen, Pearson Education.

2 Introduction to Geographic Information System – Kang-Tsung Chang, Tata McGraw-Hill Education Private Limited.

REFERENCES:

1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.

2. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001, B.S.Publications.

3. Principals of Geo physical Information Systems – Peter A Burragh and Rachael A. Mc Donnell, Oxford Publishers 2004.

4. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A70143) TRANSPORTATION ENGINEERING - II

UNIT – I

Introduction to Railway : Permanent way components – Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast, Gauge –Creep of Rails- Theories related to Creep – Sleeper density.

UNIT – II

Geometric Design of Railway Track: Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve, Points and Crossing, Rail Joints & Welding of Joints, Railway station& Yards, Signalizing & interlocking.

UNIT – III

Airport Engineering: Airport Site selection – Runway Orientation – Basic Runway Length – Corrections for Elevation, Temperature – Airport Classification - Runway Geometric design – Factors Controlling Taxiway Layout - Terminal Area – Apron – Hangar – Blast Considerations, Typical Airport Layouts – Wind rose diagram - Runway Lightening system & Marking.

UNIT – IV

Port and Harbour Engineering: Requirements of Port and Harbour, Classification of Port & Harbour, Features of a Harbour, Planning of Harbour, Breakwaters, Dry docks, Jetties, Aprons, Transit shed and Warehouses, Navigational aids, Maintenance of Port and Harbours, Inland Water Transport

UNIT –V

Intelligent Transport Systems: ITS Definition, Benefits of ITS, user services, Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Introduction to ITS applications; Advanced Traffic Management systems (ATMS), Advanced Public Transportation systems (APTS), ITS architecture components and standards, Overview of ITS implementations in developed countries.

TEXT BOOKS:

1. Satish Chandra and Agarwal, M.M. (2007) “Railway Engineering” Oxford Higher Education, University Press New Delhi.
2. Airport Planning and Design- S.K. Khanna and M.G Arora, Nemchand Bros.
3. A Text book of Transportation Engineering – S.P.Chandola – S.Chand & Co. Ltd. – (2001).

4. Transportation Engineering and Planning – C.S. Papacostas, P.D.Prevedouros.

REFERENCES:

1. A Text Book of Railway Engineering-S.C.Saxena and S.Arora, Dhanpatrai and Sons, New Delhi.
2. Highway, railway, Airport and Harbour Engineering – K.P. Subramanian.
3. Harbour, Dock and Tunnel Engineering – R. Srinivasan.
4. Dock and Harbour Engineering – Hasmukh P Oza, Gutam H Oza.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A70138) ESTIMATING AND COSTING

UNIT – I

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

UNIT – II

Earthwork for roads and canals.

UNIT - III

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

UNIT -IV

Reinforcement bar bending and bar requirement schedules. Contracts – Types of contracts – Contract Documents – Conditions of contract.

UNIT – V

Valuation of buildings. Standard specifications for different items of building construction.

TEXT BOOKS

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Estimating and Costing by G.S. Birdie.

REFERENCES :

1. Standard Schedule of rates and standard data book by public works department.
2. I. S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S.).
3. Estimation, Costing and Specifications by M. Chakraborthi; Laxmi publications.
4. National Building Code.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A70133) WATER RESOURCES ENGINEERING-II

UNIT-I

Storage Works-Reservoirs - Types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve- Reservoir Sedimentation – Life of Reservoir.. Types of dams, factors affecting selection of type of dam, factors governing selection of site for a dam.

UNIT-II

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, Factors of Safety - Stability Analysis, Foundation for a Gravity Dam, drainage and inspection galleries.

UNIT-III

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

Spillways: types of spillways, Design principles of Ogee spillways - Spillway gates. Energy Dissipaters and Stilling Basins Significance of Jump Height Curve and Tail Water Rating Curve - USBR and Indian types of Stilling Basins.

UNIT-IV

Diversion Head works: Types of Diversion head works- weirs and barrages, layout of diversion head work - components. Causes and failure of Weirs and Barrages on permeable foundations,-Silt Ejectors and Silt Excluders

Weirs on Permeable Foundations – Creep Theories - Bligh's, Lane's and Khosla's theories, Determination of uplift pressure- Various Correction Factors – Design principles of weirs on permeable foundations using Creep theories - exit gradient, U/s and D/s Sheet Piles - Launching Apron.

UNIT-V

Canal Falls - types of falls and their location, Design principles of Notch Fall and Sarada type Fall.

Canal regulation works, design principles of distributory and head regulators, Cross Regulators -canal outlets, types of canal modules,

Cross Drainage works: types, selection of site, Design principles of aqueduct, siphon aqueduct and super passage.

TEXT BOOKS:

1. Irrigation engineering and hydraulic structures by S.K Garg, Khanna publishers.
2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi.

REFERENCES:

1. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers.
2. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta.
3. Irrigation engineering by K.R.Arora.
4. Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand Publishers.
5. Introduction to hydrology by Warren Viessvann, Jr, Garyl. Lewis, PHI.
6. Engineering Hydrology by CS Pojha, R. Berndtsson and P. Bhunya, Oxford University Press.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A70330) FINITE ELEMENT METHODS

(Elective-II)

UNIT – I

Introduction to Finite Element Method – Basic Equations in Elasticity – stress strain equations – concept of plane stress – plane strain— advantages and disadvantages of FEM.

Element shapes – nodes – nodal degree of freedom – strain displacement relations.

UNIT – II

Finite Element Analysis (FEA) of – one dimensional problems – Bar element – Shape functions stiffness matrix

FEA Beam elements – stress strain relation- shape functions -stiffness matrix– continuous beams.

UNIT – III

FEA Two dimensional problem – CST – LST element – shape function – stress – strain.

Lagrangian – Serendipity elements – Hermite polynomials – regular, Irregular 2 D & 3D – Element –shape functions.

UNIT – IV

Isoparametric formulation – Concepts of isoparametric elements for 2D analysis -formulation of CST element, 4 –noded and 8-noded iso-parametric quadrilateral elements.

UNIT-V

Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

TEXT BOOKS:

1. Introduction to Finite elements in engineering by Chandrupatla, Belegundu, Prentice Hall.
2. Finite element method by Daryl L. Logan, CENGAGE Learning.

REFERENCES:

1. Finite element analysis by S.S. Bhavikatti-New age International publishers.
2. Finite element analysis by P. Seshu, PHI.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A70134) ADVANCED FOUNDATION ENGINEERING

(Elective-II)

UNIT – I

Introduction-Bearing capacity of Footings subjected to Eccentric and inclined loading – Meyerhoff's, Hansen's, Vesic theories – Foundations on layered soils - Elastic settlement of Footings embedded in sands and clays of Infinite thickness – Footings on soils of Finite thickness-Schmertamaunn's method, Janbu method.

UNIT – II

Pile Foundations – pile groups- settlement of pile groups resting in sands and clays - negative skin friction-under reamed piles-laterally loaded piles – ultimate lateral capacity - Broms Method - Reese and Matlock Approach.

UNIT – III

Lateral earth pressures theories – Rankine's and Coulomb's theories – Graphical Methods, Culmann's, Trial Wedge methods - Stability checks of cantilever and gravity retaining walls.

UNIT - IV

Cantilever and anchored sheet piles - earth pressure diagram - determination of depth of embedment in sands and clays – braced cuts - earth pressure diagrams – forces in struts.

UNIT – V

Foundations in Expansive Soils – problems in expansive soils – mechanism of swelling – swell pressure and swelling potential – heave – foundation practices – sand cushion – CNS technique – under-reamed pile foundations – granular pile anchor technique, stabilization of expansive soils.

TEXT BOOKS:

1) Das, B.M., - (1999) Principles of Foundation Engineering –4th edition PWS Publishing, Singapore.

2) Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill International.

3) Soil Mechanics and Foundation Engineering by V N S Murthy, CBS Publsihers and Distributors.

REFERENCE BOOKS:

1) Geotechnical Engineering Principles and Practices by Cuduto, PHI Intrernational.

2). Geotechnical Engineering by C. Venkataramah, NewAge International Pvt.Ltd, Publishers (2002).

3) Analysis and Design of Substructures – Swami Saran, Oxford & IBH Publishing Company Pvt.Ltd (1998).

4) Basics and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt.Ltd, Publishers (2002).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A70145) WATERSHED MANAGEMENT

(Elective-II)

UNIT-I

Introduction: Concept of watershed development, objectives of watershed development, need for watershed development in India, Integrated and multidisciplinary approach for watershed management.

Characteristics of Watershed: size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socio-economic characteristics, basic data on watersheds.

UNIT-II

Watershed delineation – Runoff Computations from a watershed – Flood Frequency Analysis – Gumbell, Log Pearson and Weibull Methods of Analysis.

Planning of watershed management activities, peoples participation, preparation of action plan, administrative requirements

UNIT-III

Principles of Erosion: Types of erosion, factors affecting erosion, effects of erosion on land fertility and land capability, estimation of soil loss due to erosion, Universal soil loss equation.

Measures to Control Erosion: Contour techniques, ploughing, furrowing, trenching, bunding, terracing, gully control, rockfill dams, brushwood dam, Gabion.

UNIT-IV

Water Harvesting: Rainwater Harvesting, catchment harvesting, harvesting structures, soil moisture conservation, check dams, artificial recharge, farm ponds, percolation tanks.

UNIT-V

Forest and Grass Land Management: Interpretation of Satellite Imageries-Land use and Land Cover. Land capability classification, management of forest, agricultural, grassland and wild land. Reclamation of saline and alkaline soils.

Ecosystem Management: Role of Ecosystem, crop husbandry, soil enrichment, inter, mixed and strip cropping, cropping pattern, sustainable agriculture, bio-mass management, dry land agriculture, Silvi pasture, horticulture, social forestry and afforestation.

TEXT BOOKS:

1. Watershed Management by JVS Murthy, - New Age International Publishers.
2. Water Resource Engineering by R.Awurbs and WP James, - Prentice Hall Publishers.

REFERENCE:

1. Land and Water Management by VVN Murthy, - Kalyani Publications.
2. Irrigation and Water Management by D.K.Majumdar, Printice Hall of India.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A70136) AIR POLLUTION AND CONTROL

(Elective -II)

UNIT – I

Air Pollution – Definitions, Scope, Significance and Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary air pollutants, Point, Line and Areal Sources of air pollution- Stationary and mobile sources. 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 – II

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

UNIT-III

Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control.

Equipment's – Settling Chambers, Cyclone separators, filters, Dry and Wet scrubbers, Electrostatic precipitators.

UNIT – IV

Control of gaseous emissions - General Methods of Control of NOx and SOx emissions – In-plant Control Measures, process changes, dry and wet methods of removal and recycling – Adsorption – Absorption – Combustion.

UNIT – V

Air Quality Management – Monitoring of SPM, SOx; NOx and CO Emission Standards– Air sampling – Sampling Techniques – High volume air sampler – Stack sampling - Analysis of Air pollutants – Air quality standards – Air pollution control act.

TEXT BOOKS:

1. Air pollution By M.N.Rao and H.V.N.Rao – Tata Mc.Graw Hill Company.
2. Air pollution by Wark and Warner.- Harper & Row, New York.

REFERENCE:

1. An introduction to Air pollution by R.K. Trivedy and P.K. Goel, B.S. Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A70135) ADVANCED STRUCTURAL DESIGN

(Elective-III)

UNIT-I

Design and Detailing of cantilever type of Retaining walls – Stability Check. Principles of Counterfort Retaining walls and shelf type retaining walls.

UNIT-II

Design of Circular and Rectangular Water tanks at Ground level and elevated with staging.

UNIT-III

Design of Flat slabs- Design of Raft and pile foundations .

UNIT-IV

Design of Concrete Bridges – IRC loading Design of Stab bridge, T-beam girder bridge.

Introduction to Steel bridges.

UNIT-V

Design of RCC Chimneys Bunkers & Silos.

TEXT BOOKS:

1. Advanced Reinforced Concrete Structures by Varghese, Pranties Hall of India Pvt. Ltd.
2. Bridge Engineering by S Ponnuswamy Mc Graw Hill Co.
3. Reinforced Concrete Design by S.A. Pillai and D. Menon, Tata Mc. Ghrawhill Publishing Company.
4. Advanced Reinforced Concrete Structures by Krishna Raju.

REFERENCES :

1. Reinforced Concrete Structures Vol. 2 by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, Publications Pvt. Ltd., New Delhi.
2. Essentials of Bridge Engineering by D. John Son Victor, Oxford and IBM Publication Co., Pvt. Ltd.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A70137) EARTH AND ROCKFILL DAMS AND SLOPE STABILITY

(Elective-III)

UNIT-I

Earth and Rockfill Dams: General features, Selection of site; Merits and demerits of the earth and rock fill dams, Classification of earth dams, Causes of failure, Safe design criteria. Instrumentation in earth dams: Pore pressure measurements, Settlement gauges, Inclinometers, Stress measurements, Seismic measurements.

UNIT-II

Failures, Damages and Protection of Earth Dams: Nature and importance of failure, Piping through embankment and foundations, Methods of seepage control through embankments and foundations, Design Criteria for filters, Treatment of upstream and down stream of slopes, Drainage control, Filter design.

UNIT-III

Slope Stability Analysis: Types of Failure: Failure surfaces - Planar surfaces, Circular surfaces, Non-circular surfaces, Limit equilibrium methods, Total stress analysis versus effective Stress analysis, Use of Bishop's pore pressure parameters, Short term and Long term stability in slopes. Taylor Charts.

UNIT-IV

Methods of Slope Stability: Method of Slices, Effect of Tension Cracks, Vertical Cuts. Bishop's Analysis, Bishop and Morgenstern Analysis, Non-circular Failure Surfaces: Janbu Analysis, Sliding Block Analysis, Seismic stability, Stabilization of slopes: Soil reinforcement (geosynthetics/soil nailing/ micro piles etc), soil treatment (cement/lime treatment), surface protection (vegetation/erosion control mats/shotcrete).

UNIT-V

Rockfill Dams: Requirements of compacted rockfill, Shear strength of rockfill, Rockfill mixtures, Rockfill embankments, Earth-core Rockfill dams, Stability, Upstream & Downstream slopes.

Text Books:

1. Sherard, Woodward, Gizienski and Clevenger. Earth and Earth-Rock Dams. John Wiley &. Sons. 1963.

References:

1. Bharat Singh and Sharma, H. D. – Earth and Rockfill Dams, 1999
2. Sowers, G. F. and Salley, H. I. – Earth and Rockfill Dams, Willams, R.C., and Willace, T.S. 1965.
3. Abramson, L. W., Lee, T. S. and Sharma, S. - Slope Stability and Stabilisation methods – John Wiley & sons. (2002)
4. Bromhead, E. N. (1992). The Stability of Slopes, Blackie academic and professional, London.
5. Christian, Earth & Rockfill Dams – Principles of Design and Construction, Kutzner Published Oxford and IBH.
6. Ortiago, J. A. R. and Sayao, A. S. F. J. - Handbook of Slope Stabilisation, 2004.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A70144) WATER RESOURCES SYSTEMS ANALYSIS

(Elective-III)

UNIT - I

Introduction: Definition of system, Types of systems, System approach, System analysis and types of systems, Techniques of water resources system analysis.

Systems Techniques in Water Resources: Objective function and constraints, optimization using calculus, Optimization of a function of single variable, Optimization of a function of multiple variables, Constrained optimization, Kuhn – Tucker conditions.

UNIT - II

Linear programming –I: Formulation of linear programming models, graphical method, simplex method, application of Linear programming in water resources.

UNIT - III

Linear programming –II:

Revised simplex method,duality in linear programming, sensitivity and post optimality analysis.

UNIT - IV

Dynamics programming: Belman's principles of optimality forward and backward recursive dynamic programming, curse of dimensionality, application of dynamic programming for resource allocation.

UNIT - V

Water Resources Economics: Basics of Engineering economics, Discount factors, Uniform annual series, Amortization, Comparison of alternate plans.

Principles of Economics analysis, Conditions of project optimality, benefit cost analysis socio economic intuitional and pricing of water resources.

TEXT BOOKS:

1 Water Resources System Analysis – Vedula & Mujumdar – Tata Mc. Graw Hill Company Ltd.

2 Water Resources Economics - James & Lee. Oxford Publishers 2005.

REFERENCES:

1 Operational Research by Taha, Printice Hall of India publishers.

2. Water Resources project Economic by Kuiper.E.

3. Engineering optimization: Theory and Practice, Rao, Singiresu S. New Age International.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A70139) INDUSTRIAL WASTE WATER TREATMENT

(Elective-III)

UNIT – I

Sources of Pollution – Physical, Chemical, Organic and Biological properties of Industrial Wastes – Differences between industrial and municipal waste waters – Effects of industrial effluents on sewers and Natural Water Bodies.

UNIT – II

Pre and Primary Treatment – Equalization, Proportioning, Neutralization, Oil Separation by Floatation – Waste Reduction - Volume Reduction – Strength Reduction.

UNIT – III

Waste Treatment Methods – Nitrification and De-nitrification – Phosphorous removal – Heavy metal removal – Membrane Separation Process – Air Stripping and Absorption Processes – Special Treatment Methods – Disposal of Treated Waste Water.

UNIT – IV

Characteristics and Composition of waste water and Manufacturing Processes of Industries like Sugar, Characteristics and Composition of Industries like Food Processing Industries, Steel, Petroleum Refineries,

UNIT – V

Characteristics and Composition of Industries like Textiles, Tanneries, Atomic Energy Plants and other Mineral Processing Industries - Joint Treatment of Raw Industrial waste water and Domestic Sewage – Common Effluent Treatment Plants (CETP) – Location, Design, Operation and Maintenance Problems – Economical aspects.

TEXT BOOKS

1. Industrial Waste Water Pollution Control by W. Wesley Eckenfelder – McGraw-Hill.
2. Industrial Waste Treatment by Rao & Datta.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	-	**-/3/-**	**2**

(A70195) CONCRETE AND HIGHWAY MATERIALS LAB

I. 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

II. BITUMINOUS MATERIALS:

1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.

III. CEMENT AND CONCRETES :

TESTS ON CEMENTS :

1. Normal Consistency of fineness of cement.
2. Initial setting time and final setting time of cement.
3. Specific gravity and soundness of cement.
4. Compressive strength of cement.
5. Workability test on concrete by compaction factor, slump and Vee-bee.
6. Young's modulus and compressive strength of concrete.
7. Bulking of sand.
8. Non-Destructive testing on concrete (for demonstration).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-I Sem	**L**	**T/P/D**	**C**
	-	**-/3/-**	**2**

(A70192) ENVIRONMENTAL ENGINEERING LAB

LIST OF EXPERIMENTS

1. Determination of pH and Turbidity
2. Determination of Conductivity and Total dissolved solids (Organic and Inorganic)
3. Determination of Alkalinity/Acidity.
4. Determination of Chlorides.
5. Determination of iron.
6. Determination of Dissolved Oxygen.
7. Determination of Nitrates.
8. Determination of Optimum dose of coagulant
9. Determination of Chlorine demand
10. Determination of total Phosphorous.
11. Determination of B.O.D
12. Determination of C.O.D
13. Determination of Optimum coagulant dose.
14. Determination of Chlorine demand.
15. Presumptive coliform test.

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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A80151) REHABILITATION AND RETROFITING OF STRUCTURES

(Elective -IV)

UNIT – I

Introduction – Deterioration of Structures – Distress in Structures – Causes and Prevention. Mechanism of Damage – Types of Damage

UNIT – II

Corrosion of Steel Reinforcement – Causes – Mechanism and Prevention. Damage of Structures due to Fire – Fire Rating of Structures – Phenomena of Desiccation.

UNIT – III

Inspection and Testing – Symptoms and Diagnosis of Distress – Damage assessment – NDT.

UNIT – IV

Repair of Structure – Common Types of Repairs – Repair in Concrete Structures – Repairs in Under Water Structures – Guniting – Shot Create – Underpinning. Strengthening of Structures – Strengthening Methods – Retrofitting – Jacketing.

UNIT – V

Health Monitoring of Structures – Use of Sensors – Building Instrumentation.

TEXT BOOKS:

1. Maintenance and Repair of Civil Structures, B.L. Gupta and Amit Gupta, Standard Publications.
2. Concrete Technology by A.R. Santakumar, Oxford University press.

REFERENCES

1. Defects and Deterioration in Buildings, EF & N Spon, London.
2. Non-Destructive Evaluation of Concrete Structures by Bungey – Surrey University Press.
3. Concrete Repair and Maintenance Illustrated, RS Means Company Inc W.H. Ranso, (1981).
4. Building Failures : Diagnosis and Avoidance, EF & N Spon, London, B.A. Richardson, (1991).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A80148) GEOENVIRONMENTAL ENGINEERING

(Elective-IV)

UNIT-I

Sources and Site Characterization: Scope of Geo-environmental Engineering, Various Sources of Contaminations, Need for contaminated site characterization; and Characterization methods.

UNIT-II

Solid and Hazardous Waste Management: Classification of waste, Characterization solid wastes, Environmental Concerns with waste, waste management strategies.

UNIT-III

Contaminant Transport: Transport process, Mass-transfer process, Modeling, NAPL

UNIT-IV

Remediation Techniques: Objectives of site remediation, various active and passive methods, Bioremediation, Phytoremediation, Remediation of NAPL sites.

UNIT-V

Landfills: Types of landfills, Site Selection, Waste Containment Liners, Leachate collection system, Cover system, Gas collection system.

TEXT BOOKS:

1. Phillip B. Bedient, Refai, H. S. & Newell C. J. - Ground Water Contamination - Prentice Hall Publications, 4th Edition, 2008.
2. Sharma, H. D. and Reddy, K. R. - Geoenvironmental Engineering, John Wiley & Sons (2004).

REFERENCES:

1. Rowe, R. K. - Geotechnical & Geoenvironmental Engineering Handbook, Kluwer Academic, 2001.
2. Reddi, L. N. and Inyang, H. I. - Geoenvironmental Engineering Principles and Applications, Marcel. Dekker, Inc., New York (2000).
3. LaGrega, M. D., Buckingham, P. L. and Evans, J. C. - Hazardous Waste Management, New York: McGraw-Hill, 2001.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A80147) DESIGN AND DRAWING OF IRRIGATION STRUCTURES

(Elective-IV)

Design and drawing of the following hydraulic structures.

Group A

1. Surplus weir.
2. Syphon Well Drop
3. Trapezoidal notch fall.
4. Tank sluice with tower head

Group B

1. Sloping glacis weir.
2. Canal regulator
3. Under Tunnel.
4. Type III Syphon aqueduct

Final Examination pattern:

The Question paper is divided into two parts with two questions in each part. The student has to answer ONE question from each part. Part I should cover the designs and drawings from Group A for 45 marks and Part II should cover only designs from group B carrying 30 marks.

The duration of examination will be FOUR hours.

However, the students are supposed to practise the drawings for Group B structures also for internal evaluation.

TEXT BOOKS:

1. Water Resources Engineering – Principles and Practice by Challa Satyanarayana Murthy, New Age International Publishers.
2. Irrigation engineering and Hydraulic structures by S.K.Garg, Standard Book House.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A80141) SOLID WASTE MANAGEMENT

(Elective-IV)

UNIT I:

Solid Waste and their Handling: Definition of solid wastes – types of solid wastes – Sources - Industrial, mining, agricultural and domestic – Characteristics. Solid waste Problems - impact on environmental health

UNIT II:

Collection, Segregation and Transport AND Management of Municipal Solid Wastes: Handling and segregation, Collection and storage of municipal solid wastes; analysis of Collection systems. Transfer stations – labeling and handling of hazardous wastes. Solid waste processing technologies. Mechanical and thermal volume reduction. Biological and chemical techniques for energy and other resource recovery: composting - types, vermicomposting, termigradation, fermentation. Incineration of solid wastes. Disposal in landfills: site selection, design, and operation of sanitary landfills; Leachate and landfill gas management; landfill closure and post-closure environmental monitoring; landfill remediation. Regulatory aspects of municipal solid waste management.

UNIT III:

Hazardous Waste and Management: Hazardous waste definition. Physical and biological routes of transport of hazardous substances – sources and characterization. Sampling and analysis of hazardous wastes –proximate analysis – survey analysis – directed analysis handling, collection, storage and transport. Hazardous waste treatment technologies TSDF concept - Physical, chemical and thermal treatment of hazardous waste: solidification, chemical fixation, encapsulation, pyrolysis and incineration. Hazardous waste land fills - Site selections, design and operation. HW reduction, recycling and reuse, Regulatory aspects of HWM/HWM rules.

UNIT IV:

Biomedical Waste Management: Classification, collection, segregation Treatment and disposal. Radioactive waste: Definition, Low level and high level radioactive wastes and their management, Radiation standards.

UNIT V:

E-Waste Management: Waste characteristics, generation, collection, transport and disposal, regulatory aspects of e waste, global strategy, recycling.

TEXT BOOKS:

1. Hazardous waste management Charles A. Wentz. Second edition 1995. McGraw Hill International.
2. Integrated solid waste management George Tchobanoglous, Hilary Theisen & Sammuel A. Vigil.

REFERENCES:

1. Hazardous waste management by Prof. Anjaneyulu.
2. Criteria for hazardous waste landfills – CPCB guidelines 2000.
3. Standard handbook of Hazardous waste treatment and disposal by Harry M. Freeman, McGraw Hill 1997.
4. Management of Solid waste in developing countries by FrankFlintoff, WHO regional publications 1976.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A80150) PRESTRESSED CONCRETE STRUCTURES

UNIT I:

Introduction: Historic development- General principles of prestressing pretensioning and post tensioning- Advantages and limitations of Prestressed concrete- General principles of PSC- Classification and types of prestressing- Materials- high strength concrete and high tensile steel their characteristics. **Methods and Systems of prestressing:** Pretensioning and Posttensioning methods and systems of prestressing like Hoyer system, Magnel Blaton system, Freyssinet system and Gifford- Udall System- Lee McCall system.

UNIT II:

Losses of Prestress: Loss of prestress in pretensioned and post-tesnioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, relaxation of stress in steel, slip in anchorage, frictional losses.

UNIT III:

Flexure: Analysis of sections for flexure- beams prestressed with straight, concentric, eccentric, bent and parabolic tendons- stress diagrams- Elastic design of PSC beams of rectangular and I sections- Kern line – Cable profile and cable layout.

Shear: General Considerations- Principal tension and compression- Improving shear resistance of concrete by horizontal and vertical prestressing and by using inclined or parabolic cables- Analysis of rectangular and I beams for shear – Design of shear reinforcements- Bureau of Indian Standards (BIS) Code provisions**.**

UNIT IV:

Transfer of Prestress in Pretensioned Members : Transmission of prestressing force by bond – Transmission length – Flexural bond stresses – IS code provisions – Anchorage zone stresses in post tensioned members – stress distribution in End block – Analysis by Guyon, Magnel, Zielinski and Rowe's methods – Anchorage zone reinforcement- BIS Provisions

UNIT V

Composite Beams: Different Types- Propped and Unpropped- stress distribution- Differential shrinkage- Analysis of composite beams- General design considerations.

Deflections: Importance of control of deflections- Factors influencing deflections – Short term deflections of uncracked beams- prediction of long

time deflections- BIS code requirements.

TEXT BOOK:

1) Prestressed concrete by N.Krishna Raju, 5th Edition,Tata McGraw Hill Book Education Pvt. Ltd.

REFERENCES :

1) Design of prestress concrete structures by T.Y. Lin and Burn, John Wiley, New York.
2) Prestressed concrete by S. Ramamrutham, Dhanpat Rai & Sons, Delhi.
3) Prestressed Concrete by N. Rajagopalan, Narosa Publishing House.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(A80146) CONSTRUCTION MANAGEMENT

UNIT-I

Management process- Roles . management theories . Social responsibilities. planning and strategic management . strategy implementation . Decision making: tools and techniques – Organizational structure . Human resource management- motivation performance- leadership.

UNIT-II

Classification of Construction projects, Construction stages, Resources-Functions of Construction Management and its Applications .Preliminary Planning- Collection of Data-Contract Planning – Scientific Methods of Management: Network Techniques in construction management - Bar chart, Gant chart, CPM, PERT- Cost & Time optimization.

UNIT-III

Resource planning - planning for manpower, materials, costs, equipment. Labour, -Scheduling .Forms of scheduling - Resource allocation . budget and budgetary control methods

UNIT-IV

Contract - types of contract, contract document, specification, important conditions of contract – tender and tender document - Deposits by the contractor - Arbitration . negotiation - M.Book - Muster roll -stores.

UNIT-V

Management Information System - Labour Regulations: Social Security - welfare Legislation - Laws relating to Wages, Bonus and Industrial disputes, Labour Administration - Insurance and Safety Regulations - Workmen's Compensation Act -other labour Laws - Safety in construction : legal and financial aspects of accidents in construction . occupational and safety hazard assessment. Human factors in safety . legal and financial aspects of accidents in construction . occupational and safety hazard assessment

TEXT BOOKS

1. Ghalot, P.S., Dhir,D.M., Construction Planning and Management, Wiley Eastern Limited,1992.
2. Chitkara,K.K., Construction Project Management¸ Tata McGraw Hill Publishing Co, Ltd., New Delhi, 1998.
3. Punmia,B,C., Project Planning and Control with PERT and CPM, Laxmi Publications, new delhi,1987.

REFERENCE:

1. Construction Management And Planning by: sengupta, b. /guha, h. tata mcgraw-hill publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	-	**-/-/-**	**2**

(A80087) INDUSTRY ORIENTED MINI PROJECT

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	-	**-/6/-**	**2**

(A80089) SEMINAR

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	-	**-/15/-**	**10**

(A80088) PROJECT WORK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	**L**	**T/P/D**	**C**
	-	**-/-/-**	**2**

(A80090) COMPREHENSIVE VIVA