JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Course Structure for Civil Engineering
B.Tech(Regular)
(For batches admitted from the year 2015)

I YEAR **I SEMESTER**

CODE	Subject		L	P	Credits
15A55101	Theory	English	4	--	4
15A51101	Theory	Mathematics-I	4	--	4
15A53101	Theory	Engineering Chemistry	4	--	4
15A01101	Theory	Environmental Studies	4	--	4
15A01102	Theory	Engineering Mechanics	4	--	4
15A53103	Practical	Engineering Chemistry Lab	--	4	2
15A35101	Practical	Engineering Workshop & IT workshop	--	4	2
15A55102	Practical	English Language Communication Skills Lab	--	4	2
	Total		**20**	**12**	**26**

I YEAR **II SEMESTER**

CODE	Subject		L	P	Credits
15A55201	Theory	Technical Communication presentation skills	4	--	4
15A51201	Theory	Mathematics-II	4	--	4
15A52201	Theory	Engineering Physics	4	--	4
15A05201	Theory	Problem Solving & Computer Programming	4	--	4
15A01201	Theory	Building Materials and Construction	4	--	4
15A03202	Theory	Engineering Graphics	4	--	4
15A05202	Practical	Computer Programming Lab	--	4	2
15A52202	Practical	Engineering Physics Lab	--	4	2
	Total		**24**	**8**	**28**

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II B.Tech– I Sem

CODE	Subject		**L**	**P**	Credits
15A51301	Theory	Mathematical Methods	4	0	4
15A23301	Theory	Electrical and Mechanical Technology	4	0	4
15A01301	Theory	Strength of Materials - I	4	0	4
15A01302	Theory	Surveying – I	4	0	4
15A01303	Theory	Fluid Mechanics	4	0	4
15A01304	Theory	Building Planning & Drawing	4	0	4
15A54302	Audit Course	Human Values & Professional Ethics	2	0	0
15A01305	Practical	Surveying Lab – I	0	4	2
15A01306	Practical	Strength of Materials Lab	0	4	2
	Total		26	8	28

II B.Tech– II Sem

CODE	Subject		**L**	**P**	Credits
15A51401	Theory	Probability & Statistics	4	0	4
15A01401	Theory	Strength of Materials – II	4	0	4
15A01402	Theory	Hydraulics & Hydraulic Machinery	4	0	4
15A54401	Theory	Managerial Economics & Financial Analysis (MEFA)	4	0	4
15A01403	Theory	Structural Analysis – I	4	0	4
15A01404	Theory	Surveying – II	4	0	4
15A01405	Practical	Fluid Mechanics & Hydraulic Machinery Lab	0	4	2
15A01406	Practical	Surveying Lab - II	0	4	2
	Total		24	8	28

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

III B.Tech **I Sem**

Code No	Subject		**L**	**P**	Credits
15A01501	Theory	Design of Steel Structures	4	0	4
15A01502	Theory	Concrete Technology	4	0	4
15A01503	Theory	Environmental Engineering	4	0	4
15A01504	Theory	Water Resources Engineering –I	4	0	4
15A01505	Theory	Structural Analysis – II	4	0	4
15A01506	Theory	Engineering Geology	4	0	4
15A01507	Practical	Engineering Geology Lab	0	4	2
15A01508	Practical	Concrete Technology Lab	0	4	2
15A55501	Audit Course	Advanced Communication skills lab	0	4	0
	Total		24	12	28

III B.Tech- **II Sem**

Code No	Subject		**L**	**P**	Credits
15A01601	Theory	Design of Reinforced Concrete Structures	4	0	4
15A01602	Theory	Geotechnical Engineering – I	4	0	4
15A01603	Theory	Transportation Engineering – I	4	0	4
15A01604	Theory	Water Resources Engineering – II	4	0	4
15A01605	Theory	Estimation, Costing & Valuation	4	0	4
15A01606a 15A01606b 15A01606c	Theory	OPEN ELECTIVE 1. Experimental Stress Analysis 2. Environmental Impact Assessment & Management 3. Industrial Waste & Waste water Management	4	0	4
15A01607	Practical	Geotechnical Engineering Lab	0	4	2
15A01608	Practical	Environmental Engineering Lab	0	4	2
	Total		24	8	28

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COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

IV B.Tech I Sem

Code No	Subject		**L**	**P**	Credits
15A01701	Theory	Finite Element Analysis	4	0	4
15A01702	Theory	Bridge Engineering	4	0	4
15A01703	Theory	Geotechnical Engineering – II	4	0	4
15A01704	Theory	Transportation Engineering – II	4	0	4
15A01705	Theory	Cost Effective Housing Techniques	4	0	4
15A01706	Theory	Elective-I (Through MOOC)	4	0	4
15A01707	Practical	CAD Lab	0	4	2
15A01708	Practical	Highway Materials Lab	0	4	2
15A01709	Project	Project Work Part-A	0	2	0
	Total		24	10	28

IV B.Tech – II Sem

Code No	Subject		**L**	**P**	Credits
15A01801a 15A01801b 15A01801c	Theory	Elective-II 1. Advanced Structural Engineering 2.Building Construction Management 3.Water Harvesting and Conservation	4	0	4
15A01802a 15A01802b 15A01802c	Theory	Elective-III 1.Design & Drawing of Irrigation Structures 2.Advanced Foundation Engineering 3.Architecture and Town planning	4	0	4
15A01803a 15A01803b 15A01803c	Theory	Elective-IV 1.Rehabilitation & Retrofitting of structures 2.Urban Transportation Planning 3.Remote Sensing & GIS	4	0	4
15A01804a 15A01804b 15A01804c	Theory	Elective-V 1.Air Pollution & Control 2.Prestressed Concrete 3.Earth Quake Resistant Structures	4	0	4
15A01805		Seminar	0	4	2
15A01806	Project	Project Work Part-B	0	20	10
	Total		16	24	28

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A55101
I Year B.Tech (Civil Engineering) - I Semester

L	P	C
4	0	4

ENGLISH

1. INTRODUCTION:

English is an international language as well as a living and vibrant one. People have found that knowledge of English is a passport for better career, better pay, advanced knowledge and for communication with the entire world. As it is a language of opportunities in this global age, English is bound to expand its domain of use everywhere. The syllabus has been designed to enhance communication skills of the students of engineering and technology. The prescribed books serve the purpose of preparing them for everyday communication and to face the global competitions in future.

The first text prescribed for detailed study focuses on LSRW skills and vocabulary development. The teachers should encourage the students to use the target language. The classes should be interactive and student-centered. They should be encouraged to participate in the classroom activities keenly.

The text for non-detailed study is meant for extensive reading/reading for pleasure by the students. They may be encouraged to read some select topics on their own, which could lead into a classroom discussion. In addition to the exercises from the texts done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements, promotional material etc.

2. OBJECTIVES:

1. To enable the students to communicate in English for academic and social purpose
2. To enable the students to acquire structure and written expressions required for their profession.
3. To develop the listening skills of the students
4. To inculcate the habit of reading for pleasure
5. To enhance the study skills of the students with emphasis on LSRW skills

3. SYLLABUS:

UNIT –I

Chapter entitled *Humour* from "Using English"
Chapter entitled '*Homi Jehangir Bhabha'* from "New Horizons"

L- Listening -Techniques - Importance of phonetics
L- Meet & Greet and Leave taking, Introducing Oneself and Others (Formal and Informal situations)
R- -Reading Strategies -Skimming and Scanning
W- Writing strategies- sentence structures
G-Parts of Speech –Noun-number, pronoun-personal pronoun, verb- analysis
V-Affixes-prefix and suffix, root words, derivatives

UNIT –II

Chapter entitled *Inspiration* from "Using English"
Chapter entitled 'My Struggle for an Education' from "New Horizons"

L- Listening to details
S- Apologizing, Interrupting, Requesting and Making polite conversations
R-note making strategies
W- Paragraph-types- topic sentences, unity, coherence, length , linking devices
G-Auxiliary verbs and question tags
V- synonyms-antonyms, homonyms , homophones, homographs, words often confused

UNIT –III

Chapter entitled *Sustainable Development* from "Using English"
Chapter entitled 'The Autobiography of Abraham Lincoln' from "New Horizons"

L- Listening to themes and note taking
S- Giving instructions and Directions, making suggestions, Accepting ideas, fixing a time and Advising
R- Reading for details -1
W- Resume and cover letter
G- Tenses – Present tense, Past tense and Future tense
V-Word formation and One-Word Substitutes

UNIT –IV

Chapter entitled *Relationships* from "Using English"
Chapter entitled ' T*he Happy Prince* from "New Horizons"

L- Listening to news
S- Narrating stories, Expressing ideas and opinions and telephone skills
R- Reading for specific details and Information
W- Technical Report writing-strategies, formats-types-technical report writing
G- Voice and Subject – Verb Agreement
V- Idioms and prepositional Phrases

UNIT –V

Chapter entitled Science and Humanism from "Using English"
Chapter entitled 'If'from "New Horizons"
L- Listening to speeches
S- Making Presentations and Group Discussions
R- Reading for Information
W- E-mail drafting
G- Conditional clauses and conjunctions
V- Collocations and Technical Vocabulary and using words appropriately

4.EXPECTED OUTCOME:

The students will get the required training in LSRW skills through the prescribed texts and develop communicative competence

Prescribed Books:

1. **Using English (for detailed study)** published by Orient Black Swan, 2013
2. **New Horizons** published by Pearson, 2013

SUGGESTED READING:

1. **Raymond Murphy's English Grammar with CD,** Murphy, Cambridge University

Press, 2012.
2. **English Conversation Practice –**Grant Taylor, Tata McGraw Hill, 2009.
3. **Communication Skills, Sanjay Kumar & Pushpalatha** Oxford University Press, 2012.
4. **A Course in Communication Skills**- Kiranmai Dutt & co. Foundation Books, 2012.
5. **Current English grammar and usage**-S M Guptha, PHI, 2013.
6. **Modern English Grammar**-Krishna SWAMI .McMillan, 2009.
7. **Powerful Vocabulary Builder**- Anjana Agarwal New Age International Publishers, 2011.
8. **Writing with a Purpose, Tickoo and Sasi Kumar, OUP, 2011**
9. **Strengthen Your Writing, Orient Blackswan**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A51101

I Year B.Tech-I semester	**L**	**P**	**C**
	4	**0**	**4**

MATHEMATICS – I
(Common to All Branches)

Objectives

- To train the students thoroughly in Mathematical concepts of ordinary differential equations and their applications.
- To prepare students for lifelong learning and successful careers using mathematical concepts of differential and Integral calculus, ordinary differential equations and vector calculus.
- To develop the skill pertinent to the practice of the mathematical concepts including the students abilities to formulate and modeling the problems, to think creatively and to synthesize information.

UNIT – I

Exact, linear and Bernoulli equations, Applications to first order equations.

Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax}, sin ax, cos ax, polynomials in x, e^{ax} V(x), xV(x), method of variation of parameters, linear equations with variable coefficients: Euler-Cauchy Equations, Legendre's linear equation. Applications of linear differential equations- Mechanical and Electrical oscillatory circuits and Deflection of Beams.

UNIT – II

Taylor's and Maclaurin's Series - Functions of several variables – Jacobian – Maxima and Minima of functions of two variables, Lagrange's method of undetermined Multipliers with three variables only. Radius of curvature, center of curvature, Involutes, evolutes and envelopes..

UNIT – III

Curve tracing – Cartesian, polar and parametric curves. Length of curves, surface area of solid of revolution (single integrals)

UNIT – IV

Multiple integral – Double and triple integrals – Change of Variables – Change of order of integration. Applications to areas and volumes in Cartesian and polar coordinates using double and triple integral.

UNIT – V

Vector Calculus: Gradient – Divergence – Curl and their properties; Vector integration – Line integral - Potential function – Area – Surface and volume integrals. Vector integral theorems: Green's theorem – Stoke's and Gauss's Divergence Theorem (Without proof). Application of Green's, Stoke's and Gauss's Theorems.

TEXT BOOKS:

1. Engineering Mathematics-I, E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher
2. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.

REFERENCES:

1. Engineering Mathematics Volume-I, by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S.Chand publication.
2. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.
3. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
4. Advanced Engineering Mathematics, by Alan Jeffrey, Elsevier.

Outcomes:

- The students become familiar with the application of differential and integral calculus, ordinary differential equations and vector calculus to engineering problems.

- The students attain the abilities to use mathematical knowledge to analyze, formulate and solve problems in engineering applications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A53101

I Year B.Tech-I semester	**L**	**P**	**C**
	4	**0**	**4**

ENGINEERING CHEMISTRY
(Common to C.E, ME)

Knowledge in chemistry serves as basic nutrient for the understanding and thereby design of materials of importance in life. Thus the advancement in Engineering is depend on the outcome of basic sciences. Many advances in engineering either produce a new chemical demand as in the case of polymers or wait upon chemical developments for their applications as in the case of implants and alloys. Currently the electronics and computer engineers are looking forward for suitable biopolymers and nano materials for use in miniature super computers, the electrical materials engineers are in search of proper conducting polymers, the mechanical engineers are on lookout for micro fluids and the civil engineers are looking for materials that are environmental friendly, economical but long lasting.

COURSE OBJECTIVES (CO):

- The Engineering Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications.
- The course main aim is to impart in-depth knowledge of the subject and highlight the role of chemistry in the field of engineering.
- The lucid explanation of the topics will help students understand the fundamental concepts and apply them to design engineering materials and solve problems related to them. An attempt has been made to logically correlate the topic with its application.
- The extension of fundamentals of electrochemistry to energy storage devices such as commercial batteries and fuel cells is one such example.
- After the completion of the course, the student would understand about the concepts of chemistry in respect of Electrochemical cells, fuel cells, mechanism of corrosion and factors to influence, polymers with their applications, engineering materials and water chemistry.

UNIT.1
ELECTROCHEMISTRY

i).Review of electrochemical cells, Numerical calculations, Batteries: Rechargeable batteries (Lead acid, Ni-Cd, Lithium Ion Batteries), Fuels cells: (Hydrogen-Oxygen and Methanol-Oxygen)

ii).Electrochemical sensors: Potentiometric Sensors and voltammetric sensors. Examples: analysis of Glucose and urea

iii).Corrosion: definition, Types of Corrosion: Dry Corrosion (Direct Chemical attack), Wet Corrosion, Electrochemical Theory of corrosion, Factors affecting the corrosion. Prevention: Anodic and catholic protection and electro and electroless plating. (10h)

UNIT.2

POLYMERS

i).Introduction to polymers, Polymerisation process, mechanism:cationic, anionic, free radical and coordination covalent. Elastomers - Natural Rubber; Compounding of Rubber

Synthetic Rubber: Preparation, properties and engineering applications of Buna-S, buna-N, Polyurethene, Polysulfide (Thiokol) rubbers.

Plastomers: Thermosetting and Thermoplatics, Preparation, properties and Engineering applications , PVC, Bakelite, nylons. Elastomers (rubbers)

ii).Conducting polymers: Mechanism, synthesis and applications of polyacetyline, polyaniline.

iii).Liquid Crystals: Introduction, classification and applications

iii).Inorganic Polymers: Basic Introduction, Silicones, Polyphospazins (-(R)2-P=N-) applications.(12h)

UNIT.3

FUEL TECHNOLOGY

i).Classifications of Fuels – Characteristics of Fuels- Calorific Value – Units, Numerical Problems.Solid Fuels–Coal, Coke : Manufacture of Metallurgical Coke by Otto Hoffmann's by product oven processes.

ii).Liquid Fuels:

Petroleum: Refining of Petroleum, Gasoline: Octane Number, Synthetic Petrol: Bergius Processes, Fischer Troph's synthesis - Power Alcohol: Manufacture, Advantages and Disadvantages of Power Alcohol

iii). Gaseous Fuels: Origin, Production and uses of Natural gas, Producer gas, Water gas, Coal gas and Biogas. Flue Gas analysis by Orsat's apparatus, Solving of problems on Combustion. (12h)

UNIT.4

CHEMISTRY OF ENGINEERING MATERIALS

i).Ceramic: General properties, classification.

ii).Glass: Manufacture of glass, properties of glass, fracture of glasses, types of glasses.

iii).Cement: Composition, Setting and Hardening (Hydration and Hydrolysis)

iv).Refractories: Classification, properties and applications

v).Lubricants: Theory of lubrication, properties of lubricants and applications

vi). Rocket Propellants: Classification, Characteristics of good propellant. (9h)

UNIT.5

WATER TREATMENT

Impurities in water, Hardness of water and its Units, Disadvantages of hard water, Estimation of hardness by EDTA method, Numerical problems on hardness, Estimation of dissolved

oxygen, Alkalinity, acidity and chlorides in water, Water treatment for domestic purpose (Chlorination, Bleaching powder, ionisation)
Industrial Use of water:
For steam generation, troubles of Boilers: Scale & Sludge, Priming and Foaming, Caustic Embrittlement and Boiler Corrosion.
Treatment of Boiler Feed water:
Internal Treatment: Colloidal, Phosphate, Carbonate, Calgon and sodium aluminate treatment.
External Treatment: Ion-Exchange and Permutit processes.
Demineralisation of brackish water: Reverse Osmosis and Electro dialysis (12h)

TEXT BOOKS:

1. Engineering Chemistry by KNJayaveera, GVSubba Reddy and C. Ramachandraiah, McGraw Hill Higher Education, Foruth Edition, New Delhi
2. A Text book of Engineering Chemistry by SS Dhara, S. Chand Publications, New Delhi

REFERENCES:

1. A Text Book of Enigneering Chemistry, Jain and Jain, Dhanapathi Rai Publications, New Delhi
2. Engineering Chemistry by K.B.Chandra Sekhar, UN.Das and Sujatha Mishra, SCITECH
Pubblications India Pvt Limited.
3. Concepts of Engineering Chemistry- Ashima Srivastavaf and N.N. Janhavi
4. Text Book of Engineering Chemistry – C. Parameswara Murthy, C.V.Agarwal and Andra Naidu
5. Chemistry of Engineering Materials, C.V.Agarwal, C.Parameswaramurthy and Andranaidu
6. Text Book of Engineering Chemistry, Shashichawla, Dhanapathirai Publications.

EXPECTED OUTCOMES (EO): The student is expected to:

- Understand the electrochemical sources of energy
- Understand industrially based polymers, various engineering materials.
- Differentiate between hard and soft water. Understand the disadvantages of using hard water domestically and industrially. Select and apply suitable treatments domestically and industrially.

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COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01101

I Year B.Tech (Common to all Branches) - I Semester

L	P	C
4	0	4

ENVIRONMENTAL STUDIES

OBJECTIVE: *To make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save earth from the inventions by the engineers.*

UNIT – I

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

NATURAL RESOURCES : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

UNIT – II

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

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

BIODIVERSITY AND ITS CONSERVATION : Introduction 0 Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – III

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

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

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

UNIT – IV

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

UNIT – V

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

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

TEXT BOOKS :

(1) Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press.
(2) Environmental Studies by Kaushik, New Age Pubilishers.
(3) Environmental Studies by Dr.S.Azeem Unnisa, Academic Publishing Company

REFERENCES :

(1) Textbook of Environmental Science by Deeksha Dave and E.Sai Baba Reddy, Cengage Pubilications.
(2) Text book of Environmental Sciences and Technology by M.Anji Reddy, BS Publication.
(3) Comprehensive Environmental studies by J.P.Sharma, Laxmi publications.
(4) Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Printice hall of India Private limited.
(5) A Text Book of Environmental Studies by G.R.Chatwal, Himalaya Pubilishing House
(6) Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Printice hall of India Private limited.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01102

I Year B.Tech (Common to Civil, Mechanical, Chemical) - II Semester

L	P	C
4	0	4

ENGINEERING MECHANICS

OBJECTIVE: *This course will serve as a basic course by introducing the concepts of basic mechanics which will help as a foundation to various courses.*

UNIT – I

INTRODUCTION OF ENGINEERING MECHANICS – Basic concepts - System of Forces – Moment of Forces and its Application – Couples and Resultant of Force System – Equilibrium of System of Forces - Degrees of Freedom – Free body diagrams –Types of Supports – Support reactions for beams with different types of loading – concentrated, uniformly distributed and uniformly varying loading.

UNIT – II

FRICTION : Types of friction– laws of Friction – Limiting friction- Cone of limiting friction– static and Dynamic Frictions – Motion of bodies – Wedge, Screw jack and differential Screw jack.

UNIT – III

CENTROID AND CENTER OF GRAVITY: Centroids of simple figures – Centroids of Composite figures – Centre of Gravity of bodies – Area moment of Inertia - Parallel axis and perpendicular axis theorems - Moments of Inertia of Composite Figures.

MASS MOMENT OF INERTIA: Moment of Inertia of Simple solids – Moment of Inertia of composite masses.(Simple problems only)

UNIT – IV

KINEMATICS: Rectilinear and Curvilinear motion – Velocity and Acceleration – Motion of A Rigid Body – Types and their Analysis in Planar Motion.

KINETICS : Analysis as a particle and Analysis as a Rigid Body in Translation – Central Forces of motion – Equations of Plane Motion – Fixed Axis Rotation – Rolling Bodies – Work Energy Method – Equation for Translation – Work Energy application to Particle Motion, Connection System – Fixed axis Rotation and Plane Motion.

UNIT – V

ANALYSIS OF PERFECT FRAMES: Types of frames – cantilever frames and simply supported frames – Analysis of frames using method of joints, method of sections and tension coefficient method for vertical loads, horizontal loads and inclined loads.

MECHANICAL VIBRATIONS: Definitions, Concepts-Simple Harmonic motion-Free vibrations-Simple Compound and Torsional pendulum- Numerical problems

TEXT BOOKS:

(1) Engineering Mechanics by Dr.R.k.Bansal, Lakshmi Publications.
(2) Engineering Mechanics by Shames & Rao – Pearson Education.
(3) Engineering Mechanics by Bhavakatti, New age pubilishers

REFERENCES:

(1) Engineering Mechanics by Seshigiri Rao, Universities Press, Hyderabad.
(2) Engineering Mechanics – B. Bhattacharyya, Oxford University Publications.
(3) Engineering Mechanics by Fedrinand L.Singer – Harper Collings Publishers.

(4) Engineering Mechanics (Statics and Dynamics) by Hibller and Gupta; Pearson Education
(5) Engineering Mechanics by S.Timoshenko, D.H.Young and J.V.Rao, Tata McGraw-Hill Company
(6) Engineering Mechanics by Chandramouli, PHI publications.
(7) Engineering Mechanics –Arthur P. Boresi and Richard J. Schmidt. – Brooks/Cole – Cengage Learning

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A53103

I Year B.Tech-I semester	**L**	**P**	**C**
	0	**4**	**2**

ENGINEERING CHEMISTRY LAB

The experiments are designed in a manner that the students can validate their own theory understanding in chemistry by self involvement and practical execution. Thus the execution of these experiments by the student will reinforce his/her understanding of the subject and also provide opportunity to refine their understanding of conceptual aspects. As a result, the student gets an opportunity to have feel good factor at the laboratory bench about the chemical principles that he/she learned in the classroom.

Programme Objective:

- Will learn practical understanding of the redox reaction
- Will able to understand the function of fuel cells, batteries and extend the knowledge to the processes of corrosion and its prevention
- Will learn the preparation and properties of synthetic polymers and other material that would provide sufficient impetus to engineer these to suit diverse applications
- Will also learn the hygiene aspects of water would be in a position to design methods to produce potable water using modern technology

LIST OF EXPERIMENTS

1. Determination of total hardness of water by EDTA method.
2. Determination of Copper by EDTA method.
3. Estimation of Dissolved Oxygen by Winkler's method
4. Determination of Copper by Iodometry
5. Estimation of iron (II) using diphenylamine indicator (Dichrometry – Internal indicator method).
6. Determination of Alkalinity of Water
7. Determination of acidity of Water
8. Preparation of Phenol-Formaldehyde (Bakelite)
9. Determination of Viscosity of oils using Redwood Viscometer I
10. Determination of Viscosity of oils using Redwood Viscometer II
11. Conductometric titration of strong acid Vs strong base (Neutralization titration).
12. Conductometric titration of Barium Chloride vs Sodium Sulphate (Precipitation Titration)
13. Determination of Corrosion rate and inhibition efficiency of an inhibitor for mild steel in hydrochloric acid medium.
14. Estimation of Chloride ion using potassium Chromite indicator (Mohrs method)

(Any 10 experiments from the above list)

Course Outcomes

- **Would be confident in handling energy storage systems and would be able combat chemical corrosion**
- **Would have acquired the practical skill to handle the analytical methods with confidence.**
- **Would feel comfortable to think of design materials with the requisite properties**
- **Would be in a postion to technically address the water related problems.**

TEXT BOOKS:

1. Vogel's Text book of Quantitative Chemical Analysis, Sixth Edition – J. Mendham et al, Pearson
Education.
2. Chemistry Practical – Lab Manual by Chandra Sekhar, GV Subba Reddy and Jayaveera.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A35101

I Year B.Tech-I semester	**L**	**P**	**C**
	0	**4**	**2**

Engineering Workshop& IT Workshop Lab

1. TRADES FOR EXERCISES :

At least 2 exercises In each :

1. Carpentry
2. Fitting
3. House-wiring
4. Black Smithy
5. Tin smithy
6. Power Tools Demonstration

TEXT BOOK:

1. Work shop Manual / P.Kannaiah/ K.L.Narayana/ Scitech Publishers.

Objective : The objective of this subject is to provide the basic concepts about different manufacturing processes and use of various workshop tools the exposer to the Power tools used in the inclusion

Codes / Tables : Nil

Question Paper pattern : Test in any two out of 6 trades

IT Workshop
(Common to All Branches)

Course Objectives

- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations
- To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system
- To learn about Networking of computers and use Internet facility for Browsing and Searching

Course Outcomes

- Disassemble and Assemble a Personal Computer and prepare the computer ready to use
- Prepare the Documents using Word processors
- Prepare Slide presentations using the presentation tool
- Interconnect two or more computers for information sharing
- Access the Internet and Browse it to obtain the required information
- Install single or dual operating systems on computer.

- Prepare spread sheets for calculations using excel.

Preparing your Computer

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

Task 3: Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4: **Operating system features**: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

Networking and Internet

Task 5: Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc should be done by the student. The entire process has to be documented.

Task 6: Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email. They should get acquaintance with applications like Facebook, skype etc.

If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, search process using different natural languages, and creating e-mail account.

Task 7: Antivirus: Students should download freely available Antivirus software, install it and use it to check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc.

Productivity tools

Task 8: Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

Task 9: Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

Task 10: Presentations: creating, opening, saving and running the presentations, Selecting the style for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

References:

1. Introduction to Computers, Peter Norton, Mc Graw Hill
2. MOS study guide for word, Excel, Powerpoint & Outlook Exams", Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI
5. Trouble shooting, Maintaining & Repairing PCs", Bigelows, TMH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A55102

I Year B.Tech-I semester	**L**	**P**	**C**
	0	**4**	**2**

English Language Communication Skills (ELCS) Lab

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

OBJECTIVES:

- To train students to use language effectively in everyday conversations, to participate in group discussions, to help them face interviews, and sharpen public speaking skills
- To expose the students to a varied blend of self-instructional learner-friendly modes of language learning through computer-aided multi-media instruction.
- To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.
- To help the second language learners to acquire fluency in spoken English and neutralize mother tongue influence
- To train students to use language appropriately for interviews, group discussion and public speaking

SYLLABUS:

UNIT- I

Phonetics – Introduction to Sounds of Speech – Vowels – Consonants – Phonetic Transcription & Orthographic Transcription

UNIT – II

Syllabification – Word Stress – Rules of word stress – Intonation – Falling tone and Rising tone

UNIT – III

Situational Dialogues – Role-play – Expressions in various situations – Self Introduction – Introducing others – Greetings – Apologies – Requests – Social and Professional etiquettes – Telephone Etiquettes

UNIT – IV

JAM – Describing object/person/place/situation – Giving directions

UNIT – V

Debates and Group Discussions

EXPECTED OUTCOMES:

- Becoming active participants in the learning process and acquiring proficiency in spoken English of the students
- Speaking with clarity and confidence thereby enhancing employability skills of the students

MINIMUM REQUIREMENT FOR ELCS LAB:

The English Language Lab shall have two parts:

1. Computer Assisted Language Learning (CALL) Lab:

   The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.

2. The Communication Skills Lab with movable chairs and audio-visual aids with a P.A. system, Projector, a digital stereo-audio & video system and camcorder etc.

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

SUGGESTED SOFTWARE:

1. Walden Infotech English Language Communication Skills.
2. Clarity Pronunciation Power – Part I (Sky Pronunciation)
3. Clarity Pronunciation Power – part II
4. K-Van Advanced Communication Skills
5. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
6. *DELTA's key to the Next Generation TOEFL Test: Advanced Skills Practice.*
7. Lingua TOEFL CBT Insider, by Dreamtech
8. English Pronunciation in Use (Elementary, Intermediate, Advanced) CUP
9. Cambridge Advanced Learners' English Dictionary with CD.

REFERENCE BOOKS:

1. **A Textbook of English Phonetics for Indian Students** 2nd Ed T. Balasubramanian. (Macmillian), 2012.
2. **A Course in Phonetics and Spoken English**, Dhamija Sethi, Prentice-Hall of India Pvt.Ltd
3. **Speaking English Effectively**, 2nd Edition Krishna Mohan & NP Singh, 2011. (Mcmillan).
4. **A Hand book for English Laboratories**, E.Suresh kumar, P.Sreehari, Foundation Books,2011
5. **English Pronunciation in Use. Intermediate & Advanced**, Hancock, M. 2009. CUP
6. **Basics of Communication in English**, Soundararaj, Francis. 2012.. *New Delhi: Macmillan*
7. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.
8. **English Pronouncing Dictionary**, Daniel Jones Current Edition with CD.Cambridge, 17th edition, 2011.

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COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A55201

I Year B.Tech-II semester	**L**	**P**	**C**
	4	**0**	**4**

TECHNICAL COMMUNICATION & PRESENTATION SKILLS

PREAMBLE:

In the increasingly globalized world, technical communication and presentation skills are assuming great importance. Industries and employers constantly complain that young engineers have adequate technical knowledge, but no communication and presentation skills. Success is defined these days in terms of possessing these skills. The syllabus has been designed to develop communicative competencies of the students.

OBJECTIVES:

1. To develop awareness in students of the relevance and importance of technical communication and presentation skills.
2. To prepare the students for placements
3. To provide students with interactive practice sessions to make them internalize these skills

UNIT 1:
Basics of Technical Communication – Introduction – Objectives & Characteristics of Technical Communication – Importance and need for Technical communication - LSRW Skills – Barriers to effective communication

UNIT II
Informal and Formal Conversation - Verbal and Non-verbal communication –Kinesics, Proxemics, Chronemics, Haptics, Paralanguage

UNIT III
Written communication – Differences between spoken and written communication – Features of effective writing –Advantages and disadvantages of spoken and written communication

UNIT IV
Presentation Skills – Nature and importance of oral presentation – Defining the purpose – Analyzing the audience - Planning and preparing the presentation, organizing and rehearsing the presentation –Individual and group presentations - Handling stage fright

UNIT V
Interview Skills – The Interview process –Characteristics of the job interview – Pre-interview preparation techniques – Projecting the positive image – Answering Strategies

OUTCOME

Turning out the students with a clear concept of communication and presentation skills, getting them ready for placements and equipping them with readiness to implement them at work place.

Prescribed Books

1. **Effective Technical Communication,** Ashrif Rizvi, TataMcGrahill, 2011
2. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, O U Press 2009

Reference Books

1.Communication Skills by Pushpalatha & Sanjay Kumar, Oxford Univsesity Press
2.Books on **TOEFL/GRE/GMAT/CAT/ IELTS** by Barron's/DELTA/Cambridge University Press.2012.
3. **Soft Skills for Everyone,** Butterfield Jeff, Cengage Publications, 2011.
4. **Management Shapers Series** by Universities Press (India) Pvt Ltd., Himayatnagar, Hyderabad 2008.
5. **Handbook for Technical Writing** by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
6.**English for Technical Communication for Engineering Students, Aysha Vishwamohan,**
Tata Mc Graw-Hill 2009.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A51201

I- Year B.Tech. II-Sem	**L**	**P**	**C**
	4	**0**	**4**

MATHEMATICS - II
(Common to All Branches)

Objectives: Our emphasis will be more on conceptual understanding and application of Fourier series, Fourier, Z and Laplace transforms and solution of partial differential equations.

UNIT – I

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 – Laplace transform of Periodic function.

Differentiation and integration of transform – Application of Laplace transforms to ordinary differential equations of first and second order.

UNIT – II

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- Parseval's formula- Complex form of Fourier series.

UNIT – III

Fourier integral theorem (only statement) – Fourier sine and cosine integrals. Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – Finite Fourier transforms.

UNIT – IV

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Method of separation of variables – Solutions of one dimensional wave equation, heat equation and two-dimensional Laplace's equation under initial and boundary conditions.s

UNIT – V

z-transform – Inverse z-transform – Properties – Damping rule – Shifting rule – Initial and final value theorems. Convolution theorem – Solution of difference equations by z-transforms.

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Engineering Mathematics, Volume - II, E. Rukmangadachari Pearson Publisher.

REFERENCES:

1. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad S. Chand publication.
2. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
3. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.

Outcomes: The student gains the knowledge to tackle the engineering problems using the concepts of Fourier series, various transforms and partial differential equations.

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COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A52201

I- Year B.Tech. II-Sem	**L**	**P**	**C**
	4	**0**	**4**

ENGINEERING PHYSICS
(Common to Civil, Mechanical & Chemical Engg.)

OBJECTIVES:

- To evoke interest on applications of superposition effects like interference and diffraction, the mechanisms of emission of light, achieving amplification of electromagnetic radiation through stimulated emission, study of propagation of light through transparent dielectric waveguides along with engineering applications.
- To understand and employ the concepts of waves & oscillations and acoustics to engineering applications.
- To open new avenues of knowledge in dielectric and magnetic materials which find potential in the emerging micro device applications.
- To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications. Considering the significance of micro miniaturization of electronic devices and significance of low dimensional materials, the basic concepts of nano and smart materials, their properties and applications in modern emerging technologies are elicited.
- To enlighten the characterization of materials by different techniques, the periodic arrangement of atoms in crystals, Bragg's law and X-Ray diffraction technique.

UNIT 1: PHYSICAL OPTICS, LASERS AND FIBRE OPTICS

Physical Optics*:* Introduction to interference – Colours in thin films – Newton's Rings – Michelson interferometer - Fraunhoffer diffraction due to single slit, double slit – Diffraction grating.

Lasers*:* Introduction – Characteristics of laser – Spontaneous and stimulated emission of radiation –- Einstein's coefficients –– Population inversion – Pumping mechanisms - Ruby laser – He-Ne laser – Applications of lasers.

Fiber optics: Introduction – working principle of optical fiber – Numerical aperture and acceptance angle – Types of optical fibers –Optical fiber communication system – Attenuation and losses in optical fibers – Applications of optical fibers.

UNIT 2: **WAVES & OSCILLATIONS AND ACOUSTICS**

Waves & Oscillations*:* Categories of waves: Mechanical, electromagnetic, matter and gravitational – Reflection and transmission of waves at a boundary – Free oscillations – Damped Oscillations – Forced oscillations – Resonance – Coupled oscillations.

Acoustics*:* Sound absorption – Absorption coefficient and its measurement – Reverberation time – Sabine's formula – Eyring's formula.

UNIT 3: **DIELECTRICS AND MAGNETIC MATERIALS**

***Dielectrics**:* Introduction – Dielectric Polarization – Types of Polarization – Lorentz field – Clausius- Mosotti equation – Dielectric strength, loss, breakdown.

***Magnetic materials**:* Introduction – Basic definitions – Origin of magnetic moment – Classification of magnetic materials into dia, para, ferro, antiferro and ferri magnetic materials – Hysteresis – Soft and hard magnetic materials – Applications of magnetic materials.

UNIT 4: **ADVANCED MATERIALS**

***Superconductors**:* Introduction – Properties of superconductors – Meissner effect– Type I and Type II superconductors – ac and dc Josephson effects – BCS theory (qualitative treatment) – High T_c superconductors – Applications of superconductors.

Nanomaterials: Introduction – Significance of nanoscale – Surface area and quantum confinement – Physical properties: optical, thermal, mechanical and magnetic – Carbon nanotubes & their properties – Applications of nanomaterials.

Smart Materials: Shape Memory Alloys: Definition – Two phases – One way and two way memory effect – Pseudo elasticity – Applications
of shape memory alloys.

UNIT 5: MATERIAL CHARACTERIZATION AND CRYSTALLOGRAPHY

Material Characterization: Electron microscopy: SEM, TEM, AFM – UV-Visible and IR Spectroscopy – Non-destructive testing: objectives – Methods: Pulse-echo method.

***Crystallography**:* Introduction – Space lattice –Unit cell – Lattice parameters –Bravias lattice – Crystal systems – Packing fractions of SC, BCC and FCC - Miller indices – Interplanar spacing in cubic crystals – X-ray diffraction – Bragg's law – Laue method.

Prescribed Text books:

1. Engineering Physics – Dr. M.N. Avadhanulu & Dr. P.G. Kshirsagar, S.Chand and Company
2. Engineering physics – S. Mani Naidu, Pearson Education
3.Instrumental methods of analysis - Willard and Meritt

Reference Books:

1. Introduction to modern optics – Grant R Fowles
2. A text book on Optics – Brijlal & Subramanyam
3. Laser Fundamentals – William T. Silfvast, Cambridge University Press
4. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &Sons
5. Introduction to Nanotechnology – C P Poole and F J Owens, Wiley
6. Shape Memory Alloys-Modeling and Engg. Applications – C Lagoudas, Springer
7. Hand Book of Non-destructive evaluation, C.J.Hellier, McGraw-Hill
8. Engineering Physics – V. Rajendran, K.Thyagarajan Tata MacGraw Hill Publishers
9. Engineering Physics – M.R.Srinivasan, New Age Publications
10. Engineering Physics – D K Pandey, S. Chaturvedi, Cengage Learning
11. Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish, University Press
12. Engineering Physics – M. Arumugam, Anuradha Publications

OUTCOMES:

- The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fiber optics.

- The concepts of types of waves and oscillations ,acoustics are highlighted
- The dielectric and magnetic response of materials are focussed.
- The importance of superconducting materials, nano and smart materials along with their engineering applications are well elucidated.
- Characterization of materials by advanced techniques, the important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction technique are focused.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A05201

I- Year B.Tech. II-Sem	**L**	**P**	**C**
	4	**0**	**4**

Problem Solving and Computer Programming
(Common to All Branches)

Course 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 understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
- To understand the notations used to analyze the Performance of algorithms.
- To understand and analyze various searching and sorting algorithms.

Course Outcomes:

- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs
- Able to write C programs for real world problems using simple and compound data types
- Adapt programming experience and language knowledge to other programming language contexts
- Employee good programming style, standards and practices during program development

UNIT - I

Introduction: Programs and Programming, Programming Languages, Compiler, Interpreter, Loader and Linker, Program Execution, Classification of Programming, Structured Programming Concept, Algorithms, Flowcharts, System Developments.

Fundamentals Algorithms: Exchange the Values between two variables, Counting, Summation of set of numbers, Factorial Computation, Generation of the Fibonacci sequence, Reversing the digits of a integer.

Basics Of C: Introduction**,** Developing Programs in C, A Simple C program, Parts of C Program Revisited.

UNIT – II

Structure of C: Structure of a C Program, Concept of a Variable, Data Types in C, Program Statements, Declaration, Tokens, Operators and Expressions, Type conversion in C.

Input and Output: Introduction, Basic Screen and Keyboard I/O in C, Non-Formatted Input and Output, Formatted Input and Output Function.

Control Statements: Introduction, Specifying Test Condition for Selection and Iteration, Writing Test Expression, Conditional Execution and Selection, Iteration and Repetitive Execution. Nested Loops.

UNIT – III

Arrays And Strings: Introduction, One-Dimensional Array, Strings, Multidimensional Arrays, Arrays of Strings.

Function: Introduction, Concept of Functions, Using Functions, Call by Value Mechanism, Working with Functions, Passing Arrays to Functions, Scope and Extent, Inline Function, Recursion.

UNIT - IV

Factoring Methods: Finding Square root of a Number, The Smallest Deviser of an Interger, The GCD of Two Integers, Generating Prime Numbers.

Pointers – Introduction, Understanding Memory, Address Operator, Pointer, Void Pointer, Null Pointer, Use of pointer, Arrays and Pointers, Pointers and string, Pointers and string, Pointers to pointers, Array of pointers, Pointers to Function, Dynamic Memory Allocation,.

UNIT – V

User-Defined Data Types and Variables: Introduction, User-defined Data Types, Structures, Union, Enumeration Types.

Files in C: Introduction, Using Files in C, Working with text Files, Working with Binary Fields, Direct File Input and Output, Files of Records, Random Access to Files of Records.

TEXT BOOKS:

1. Programming in C, Pradip Dey, Manas Ghosh, Second Edition, OXFORD,
2. How to Slove it by Computer by R.G. Dromey, Pearson.

REFERENCES:

1. Programming in C and Data Structures, Jeri R. Hanly, Elliot B. Koffman, Ashok Kamthane and A.Ananda Rao, Pearson Education.
2. C Programming with problem solving, J.A. Jones & K. Harrow, dreamtech Press
3. Programming In C, Remma Teraja, Second Edition OXFORD.
3 Programming in C – Stephen G. Kochan, III Edition, Pearson Eductaion.
3. C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International Edition
4. Education / PHI
5. C Programming & Data Structures,E.Balagurusamy,TMH.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01201

I- Year B.Tech. II-Sem	**L**	**P**	**C**
	4	**0**	**4**

BUILDING MATERIALS & CONSTRUCTION

OBJECTIVES: *To give the students a basic idea about the traditional and modern construction materials a brief knowledge on building components and its construction methodologies.*

UNIT – I

INTRODUCTION TO BUILDING MATERIALS

Traditional & Organic Building Materials – Stone – Dressing of Stones – Modern Building Materials – Bricks – Manufacturing process – Ceramic Products – Manufacturing Process – Building Materials for Low Cost Housing – Utilisation of Wastes for Alternative Building Materials –Sustainable Materials in Construction –National Standards.

UNIT – II

GLASS:

Introduction – Functions of Glass in Buildings – Constituents and Classification of Glass – Manufacturing Process –Properties of Glass – Common Types of Glass – Special Glass – Advantages and Disadvantages of Glass – National Standards.

PLASTIC:

Introduction – Polymerisation – Classification of Plastics – Commonly Used Plastics – Moulding and Fabricating for Plastic Products – Applications – Advantages – Disadvantages – Intelligent Use of Plastics in Buildings – National Standards.

UNIT – III

INSULATING MATERILAS

Thermal Insulating Materials: Introduction – Thermal Insulation – Heat Transfer Fundamentals – Thermal Properties of Insulating Materials – Selection of Insulating Materials – Classification of Insulation materials – Reflective Insulation Systems – Commonly Used Building Insulation Materials – Insulation that Should not be Used – National Standards.

Sound Insulating Materials: Introduction – Basics of Acoustics – Sound Absorption or Insulation – Green Insulation – National Standards.

UNIT – IV

STRUCTURAL COMPONENTS:–

Foundations – classification of Foundations – consideration in selection of foundation types – Masonry – Brick and block walls – Cavity walls – Damp–proof courses and membranes – Mortars – Arches and openings – Windows – Glass and glazing –Doors – Stairs – Types and Applications – Cladding to external walls – Flat roofs – Dormer windows – Formwork & Scaffolding – Precast concrete frames – Portal frames – Types – components – Framed structures – Components – Construction Procedure – Panel walls – National Standards.

UNIT – V

INTERNAL CONSTRUCTION AND FINISHES

Internal elements – Internal walls – Construction joints – Internal walls, fire protection – separating walls – Partitions – Plasters and plastering – Domestic floors and finishes – Sound insulation – Timber, concrete and metal stairs–Internal doors – Door sets – Fire resisting doors – Plasterboard ceilings – Suspended ceilings –Paints and painting – Components of

Paints – Types of Paint – Considerations in Selecting Paints – Cement Paints – Oil Paints – Emulsion Paints – Whitewash and Colourwash – Application of Paints –Distempers – Varnishes – Safety –Joinery production – Composite boarding – National Standards.

TEXT BOOKS:

1. Building Material by S K Duggal – New Age International Publishers; Second Edition
2. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi
3. A Textbook on Building Construction by S.K.Sharma, S.Chand Pubilishers.
4. Building Materials by M.L.Gambhir, TMH Pubilishers.

REFERENCES:

1. Building construction by W.B.Mckay, Vol.I, II, III & IV Pearson Publications, 2013 edition.
2. R.Chudly "Construction Technology "– Volumes I and II" 2nd Edition, Longman, UK, 1987.
3. Building materials by S.C.Rangawala, Charotar Pubilishing House, Anand- INDIA.
4. Building Construction by S.C.Rangawala, Charotar Pubilishing House, Anand-INDIA
5. Building Construction by P.C. Varghese, Prentice-Hall of India private Ltd, New Delhi.
6. Building materials by P.C. Varghese, Prentice-Hall of India private Ltd, New Delhi

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A03202

I- Year B.Tech. II-Sem	**L**	**P**	**C**
	4	**0**	**4**

ENGINEERING GRAPHICS
(CIVIL, EEE, ECE, CSE & CHEMICAL)

Unit-I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their significance Drawing Instruments and their Use – BIS Conventions in drawing and Lettering.

Curves used in practice:

a) Conic sections including the Rectangular Hyperbola
b) Cycloid, Epicycloid and Hypocycloid –Normals and Tangents
c) Involute of a circle –Normals and Tangents

Principles of orthographic projection, I and III angle projections –Conventions –Projections of points.

Unit –II

Projection of lines inclined to both planes –traces, Projection of plane figures inclined to both planes.

Unit –III

Projection of simple solids inclined to both planes.

Unit –IV

Sections and Developments: Sections and Sectional views of Regular solids –Prism, Cylinder, Pyramid, Cone – True shapes.

Unit –V

Isometric projections: Principles of pictorial representations-Isometric projection- Isometric scale-Isometric views- conventions- Isometric views of plane figures, solids-Isometric projection of objects with non isometric lines-Isometric projection of spherical parts.

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhat, Charotar Publishers
2. Engineering Drawing, K.L. Narayana& P. Kannaih, Scitech Publishers, Chennai.

REFERENCES:

1. Engineering Drawing, Johle, Tata McGraw-Hill Publishers.
2. Engineering Drawing, Shah and Rana,2/e, Pearson Education
3. Engineering Drawing and Graphics, Venugopal/New age Publishers
4. Engineering Graphics, John&john.

Suggestions:

Student is expected to buy a book mentioned under 'Text books' for better understanding.
Student should prepare rough sketches for all the problems given at the end of each chapter to improve his / her imaginations.

Student should also practice Auto CAD or any other drawing software to help understanding better.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A05202

I- Year B.Tech. II-Sem	**L**	**P**	**C**
	0	**4**	**2**

Computer Programming Lab
(Common to All Branches)

Course Objective

- To work with the compound data types
- To explore dynamic memory allocation concepts
- Able to design the flowchart and algorithm for real world problems
- Able to write C programs for real world problems using simple and compound data types
- Employee good programming style, standards and practices during program development

Course Outcomes

- Able to have fundamental concept.
- Able to write, compile and debug programs in C language.
- Able to formulate problems and implement algorithms in C.
- Able to effectively choose programming components that efficiently solve computing problems in real-world.
- Able to use different data types in a computer program.
- Able to design programs involving decision structures, loops and functions.

Week-1

1) Write a C program to make the following exchange between the variables a-> b -> c->d - > a
2) Write a C program to carry out the arithmetic operations addition, subtraction, multiplication, and division between two variables
3) Write a C program for printing prime numbers between 1 and n.

Week-2

1) Write a C program to construct a multiplication table for a given number.
2) Write a program to reverse the digit of a given integer.
3) Write a C program to find the sum of individual digits of a positive integer.
4) Write a C program to calculate the factorial of a given number

Week-3

1) 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.
2) Write a program to calculate tax, given the following conditions:
    a) If income is less than 1,50,000 then no tax.
    b) If taxable income is in the range 1,50,001 – 300,000 then charge 10% tax
    c) If taxable income is in the range 3,00,001 – 500,000 then charge 20% tax
    d) If taxable income is above 5,00,001 then charge 30% tax

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Week-4

1) Write a program to print the calendar for a month given the first Week- day of the month.
   Input the first day of the month (Sun=0,Mon=1,Tue=2,Wed=3,.....) :: 3
   Total number of days in the month : 31
   Expected output

Sun	*Mon*	*Tue*	*Wed*	*Thu*	*Fri*	*Sat*
-	-	-	*1*	*2*	*3*	*4*
5	*6*	*7*	*8*	*9*	*10*	*11*
12	*13*	*14*	*15*	*16*	*17*	*18*
19	*20*	*21*	*22*	*23*	*24*	*25*
25	*26*	*27*	*28*	*29*	*30*	*31*

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

Week-5

1) Write a program to print the Pascal triangle for a given number
2) Write a C program to find the GCD (greatest common divisor) of two given integers
3) Write a C program to construct a pyramid of numbers.
4) Write C code to define a function cash_dispense, which takes an amount as its input, and returns the number of 1000, 500, 100, 50, 20, 10, 5, 2, 1 rupee denomination that make up the given amount

Week-6

1) Write C code to reverse the contents of the array. For example, [1,2,3,4,5] should become [5,4,3,2,1]
2) Write a C program that uses functions to perform the following:
   i) Addition of Two Matrices
   ii) Multiplication of Two Matrices
3) Write a program that will search and find out the position where the given key element exist in a user chosen array and print it as output.

Week-7

1) Write C code to compute the frequency table of survey responses given by 20 users. The survey responses range from 1 to 5 and are stored in an array. For example, 10 responses are stored in the array [1,1,5,2,3,3,5,5,2,2]. The frequency table will be as shown below:
   a. 1 = 2
   b. 2 = 3
   c. 3 = 2
   d. 4 = 0
   e. 5 = 3
2) Write a program to define a function to sort an array of integers in ascending order by using exchange sort.

Week-8

1) Write a C program to check whether a given string is a palindrome or not, without using any built-in functions.
2) Write a C program to determine if the given string is a palindrome or not by using string functions.
3) Write a function that accepts a string and delete the first character.
4) Write a function that accepts a string and delete all the leading spaces.

Week-9 Write a program to accept a string from user and display number of vowels, consonants, digits and special characters present in each of the words of the given string.

Week-10

1) Write a C program to define a union and structure both having exactly the same numbers using the sizeof operators print the sizeof structure variables as well as union variable

2) Declare a structure *time* that has three fields *hr, min, secs.* Create two variables,*start_time*and*end_time.* Input there values from the user. Then while *start_time* is not equal to *end_time* display GOOD DAY on screen.

Week-11

1) Write a program to read in an array of names and to sort them in alphabetical order. Use sort function that receives pointers to the functions strcmp, and swap, sort in turn should call these functions via the pointers.
2) Write a program to read and display values of an integer array. Allocate space dynamically for the array using the *malloc().*
3) Write a program to calculate area of a triangle using function that has the input parameters as pointers as sides of the triangle.

Week-12

1) Two text files are given with the names text1 and text2. These files have several lines of text. Write a program to merge (first line of text1 followed by first line of text2 and so on until both the files reach the end of the file) the lines of text1 and text2 and write the merged text to a new file text3.
2) Write a program to split a given text file into n parts. Name each part as the name of the original file followed by .part<**n**> where n is the sequence number of the part file.

Reference Books:

1. Computer Science, A Structured Programming Approach Using C by Behrouz A. Forouzan& Richard F. Gilberg, Third Edition, Cengage Learning
2. C Programming A Problem-Solving Approach, Behrouz A. Forouzan& E.V. Prasad, F. Gilberg, Third Edition, Cengage Learning
3. Programming with C RemaTheraja, Oxford
4. "C Test Your Skills", Kamthane, Pearson Education
5. Programming in C: A Practical Approach, Ajay Mittal, Pearson
6. Problem solving with C, M.T.Somasekhara, PHI
7. C Programming with problem solving, J.A. Jones & K. Harrow,Dreamtech Press
8. Programming withc, Byron S Gottfried, Jitender Kumar Chhabra, TMH, 2011

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A52202

I- Year B.Tech. II-Sem	**L**	**P**	**C**
	0	**4**	**2**

ENGINEERING PHYSICS LABORATORY

Any EIGHT of the following experiments has to be performed during the SEMESTER

1. Determination of wavelengths of various colours of mercury spectrum using diffraction grating in normal incidence method
2. Determination of dispersive power of prism
3. Determination of thickness of thin object by wedge method
4. Determination of radius of curvature of lens by Newton's rings
5. Laser : Diffraction due to single slit
6. Laser : Diffraction due to double slit
7. Laser: Determination of wavelength using diffraction grating
8. Determination of Numerical aperture of an optical fiber
9. Meldes experiment: Determination of the frequency of tuning fork
10. Sonometer: Verification of the three laws of stretched strings
11. Energy gap of a material using p-n junction diode
12. Electrical conductivity by four probe method
13. Hall effect: Determination of mobility of charge carriers in semiconductor
14. B-H curve
15. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method
16. Determination of dielectric constant and Curie temperature of a ferroelectric material

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code: 15A51301

II Year B.Tech. I-Sem	**L**	**P**	**C**
	4	**0**	**4**

MATHEMATICAL METHODS

Objectives:

- This course aims at providing the student with the concepts of Matrices, Numerical Techniques and Curve fitting.

UNIT – I

Elementary row transformations-Rank – Echelon form, normal form – Consistency of System of Linear equations. Linear transformations. Hermitian, Skew-Hermitian and Unitary matrices and their properties. Eigen Values, Eigen vectors for both real and complex matrices. Cayley – Hamilton Theorem and its applications – Diagonolization of matrix. Calculation of powers of matrix and inverse of a matrix. Quadratic forms – Reduction of quadratic form to canonical form and their nature.

UNIT – II

Solution of Algebraic and Transcendental Equations: The Bisection Method – The Method of False Position– Newton-Raphson Method, Solution of linear simultaneous equation: Crout's triangularisation method, Gauss - Seidal iteration method.

UNIT – III

Interpolation: Newton's forward and backward interpolation formulae – Lagrange's formulae. Gauss forward and backward formula, Stirling's formula, Bessel's formula.

UNIT – IV

Curve fitting: Fitting of a straight line – Second degree curve – Exponentional curve-Power curve by method of least squares. Numerical Differentiation for Newton's interpolation formula. Numerical Integration: Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule.

UNIT – V

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Methods. Numerical solutions of Laplace equation using finite difference approximation.

TEXT BOOKS:

3. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
4. Introductory Methods of Numerical Analysis, S.S. Sastry, PHI publisher.

REFERENCES:

2. Engineering Mathematics, Volume - II, E. Rukmangadachari Pearson Publisher.
3. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S. Chand publication.
3. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
4. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.

Outcomes: The student will be able to analyze engineering problems using the concepts of Matrices and Numerical methods.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code: 15A23301

II Year B.Tech. I-Sem	**L**	**P**	**C**
	4	**0**	**4**

ELECTRICAL & MECHANICAL TECHNOLOGY

PART – A

ELECTRICAL TECHNOLOGY

Objective:
Electrical Technology contains basic Circuits, DC generators & motors, Transformers, Induction motors and their performance aspects will be studied.

UNIT – I Introduction to DC & AC Circuits
Ohm's Law, Basic Circuit Components, Kirchhoff's Laws, Types of Sources, Resistive Networks, Series Parallel Circuits, Star Delta and Delta Star Transformation. 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.

UNIT-II DC Machines
D.C Generators: Principle of Operation of Dc Machines, Types of D.C Generators, E.M.F Equation in D.C Generator, O.C.C. of a D.C. Shunt Generator
D.C Motors: Principle of Operation of Dc Motors, Types of D.C Motors, Torque Equation, Losses and Efficiency Calculation in D.C Motor- Swinburne's Test

UNIT-III AC Machines
Transformers: Principles of Operation, Constructional Details, Losses and Efficiency, Regulation of Transformer, Testing: OC & SC Tests.
Three Phase Induction Motors: Principle of Operation, Slip and Rotor Frequency, Torque (Simple Problems).
Alternators: Principle of Operation-Constructional Details-EMF Equation-Voltage Regulation by Synchronous Impedance Method.
OUTCOME:
After going through this course the student gets a thorough knowledge on basics of Electrical Circuits, DC Machines, Transformers, Induction motors & Alternators with which he/she can able to apply the above conceptual things to real-world problems and applications.

TEXT BOOKS:
1. Basic Electrical Engineering, M.S.Naidu and S. Kamakshiah, Mc Graw Hill Education.
2. Basic Electrical Engineering, T.K.Nagasarkar and M.S. Sukhija, Oxford University Press.
REFERENCES:
1. Theory and Problems of Basic Electrical Engineering, D.P.Kothari & I.J. Nagrath, PHI.
2. Principles of Electrical Engineering, V.K Mehta, S.Chand Publications.
3. Fundamentals of Electrical Electronics Engineering 5th Edition, T.Thyagarajan, SCITECH Publications 2007

4. Electrical and Electronic Technology, Hughes, Pearson Education.

PART – B

MECHANICAL TECHNOLOGY

UNIT – I

WELDING PROCESSES: Introduction to welding classification of welding processes, Oxyacetylene welding – equipment, welding fluxes and filler rods, Gas cutting, Introduction to are welding – Manual metal are welding. Submerged are welding, TIG and MIG processes, soldering and brazing Importance, comparison and applications.

UNIT - II

Description and working of steam engines and steam turbines (Prime movers) – impulse and Reaction turbines. Description and working of I.C. Engines – 4 stroke and 2 stroke engines – comparison – Gas Turbines – Closed and open type gas turbines.

Reciprocating Air compressors – description and working of single stage and multistage reciprocating air compressors – inter cooling. Transmission of power; Belt, Rope, Chain and gear drive-simple problems.

UNIT - III

Block diagram of a vapour compression refrigeration system. Names of common refrigerates. Basic principles of air-conditioning. Room and General air conditioning systems Ducting – Different types of ventilation system. Earth moving machinery and Mechanical handling equipment – bull dozers – power showels – Excavators – concrete mixer – Belt and bucket conveyers.

TEXT BOOKS :

1. Elements of Mechanical Engineering by S.N.Lal, Cengage Learning, 2013
2. Elements of Mechanical Engineering by S.Trymbaka Murthy, Universities Press, 2015
3. Manufacturing Technology, P.N. Rao, TMH

REFERENCE BOOKS

1. Pneumatics by Jagadeesha University Press,2015

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01301

II Year B.Tech (Civil Engineering) – I Semester **L P C**
4 0 4

STRENGTH OF MATERIALS - I

OBJECTIVE: *The subject provide the knowledge of simple stress strains flexural stresses in members, shear stresses and deflection in beams so that the concepts can be applied to the Engineering problems.*

UNIT – I

SIMPLE STRESSES AND STRAINS : – Deformable bodies - 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 moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses.

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 contra flexure – 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 and angle sections.

UNIT – IV

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-deflections of propped cantilevers for simple loading cases.

UNIT – V

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.

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.

TEXT BOOKS :

(1) Mechanics of Materials – Dr.B.C.Punmia, Ashok Kumar Jain, Arun Kumar Jain, Lakshmi Publications.

(2) Strength of Materials by R.K Rajput, S.Chand & Company Ltd.
(3) Strength of Materials by B.S.Basavarajaiah, Universities Press, Hyderabad.
(4) Strength of Materials by Dr.R.K.Bansal, Lakshmi Publications.

REFERENCES:

1. Strength of Materials by Ghosh & Datta, New Age Pubilishers
2. Strength of Materials by S.S.Bhavikatti, Vikas Publishing House Pvt. Ltd.
3. Strength of materials by A.R.Basu, Dhanpathi Rai & Co, New Delhi.
4. Strength of materials by Sadhu Singh, Khanna Pubilications, NewDelhi.
5. Strength of materials by Surendar Singh, CBS Pubilications.
6. Strength of Materials by – R.Subaramanian, Oxford university pubilishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01302

II Year B.Tech (Civil Engineering) – I Semester	**L**	**P**	**C**
	4	**0**	**4**

SURVEYING - I

OBJECTIVE: *To ensure that the student develops knowledge of the basic and conventional surveying instruments, principles behind them, working of the instruments, plotting of the area from the field measurements, determination of the area and the theory behind curves.*

UNIT – I

BASIC CONCEPTS: Surveying – History; Definition; primary divisions, Classification, Principles of surveying Plan and map; Basic Measurements; Instruments and Basic methods; units of measurement, Scales used for Maps and plans, Duties of a surveyor. Errors: Accuracy and Precision Sources and types of errors, theory of Probability, Rounding of numbers.

CHAIN SURVEYING: Instruments for chaining, Ranging out, chaining a line on a flat ground; Chaining on an uneven or a sloping ground; Chain & Tape corrections; Degree of accuracy. Principles of chain surveying; Basic definitions; Well-Conditioned Triangle, Field book, Field work; Offsets, Cross Staff survey; obstacles in chain survey-problems, Conventional signs.

UNIT-II

COMPASS SURVEY: Introduction, Bearings and angles, Designation of bearings, Conversion of bearings from one system to the other, fore bearing and back bearing, , Calculation of bearing from angles, Theory of Magnetic compass (i.e. Prismatic compass), Temporary adjustments of compass-Magnetic Declination, Local attraction-Related Problems-Errors in compass survey.

PLANE TABLE SURVEYING: Introduction, Accessories, Working operations, Methods of plane tabling, Three point problem-Mechanical method -Graphical method, Two point problem, Errors in plane tabling.

UNIT-III

LEVELLING: Introduction, basic definitions, methods of leveling, leveling instruments: dumpy level, levelling staff, Temporary adjustments of dumpy level, theory of simple and differential leveling, Level field book, Classification of direct leveling methods, Reciprocal leveling, Profile leveling and Cross sectioning, Curvature and Refraction, Difficulties in leveling, errors in leveling, Degree of Precision.

CONTOURING: Introduction, contour interval, Characteristics of contours Methods of locating contours - Direct and indirect methods; Interpolation and sketching of contours, Contour gradient-Uses of contour maps.

UNIT-IV

THEODOLITE: Vernier Theodolite: Basic definitions; Fundamental lines and desired relations; Temporary adjustments; Measurement of a horizontal angle; Repetition and Reiteration methods of horizontal angle measurement. Measurement of vertical angle; Sources of errors in Theodolite survey.

TRAVERSE SURVEYING: Introduction, Selection and marking of traverse stations, methods of traversing, traversing by free needle and fast needle method, traversing by direct observation of angles, checks in closed traverse, closing error, methods of balancing the traverse, Gale's traverse table, Omitted measurements.

UNIT-V

COMPUTATION OF AREAS AND VOLUMES: methods of determining areas, areas by sub-division into triangles, areas from offsets to a base line: regular and irregular intervals, area by double meridian distances, area by co-ordinates. embankments and cutting for a level section, two level sections, three level section and multi level section, volume of earth work from contour plan, capacity of a reservoir , volume of barrow pits.

MINOR INSTRUMENTS: uses and working of the minor instruments: hand level, line ranger, optical square, abney level, clinometers, pantagraph, sextant and planimeter.

TEXT BOOKS:

(1) Surveying (Vol – 1,2 &3), by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain – Laxmi Publications (P) Ltd., New Delhi
(2) Text book of surveying by C.Venkataramaiah, Universities Press.
(3) Advanced Surveying by Satheesh Gopi, R.Shanta Kumar and N.Madhu, Pearson education.

REFERENCES:

(1) Chandra AM, "Plane Surveying", New age International PVt.Ltd., Publishers, New Delhi, 2002
(2) Duggal S.K, "Surveying (Vol – 1 & 2), Tata McGraw Hill Publishing Co.Ltd. New Delhi, 2004.
(3) Arora K R "Surveying (Vol-1 & 2), Standard Book House, Delhi, 2004
(4) Surveying and Levelling by Kanetkar T.P., and Kulkarni, Vols. I and II, United Book Corporation, Pune, 1994
(5) Surveying and leveling by R.Subramaniah, Oxford university press, New Delhi.
(6) Surveying by Mimi Das Saikia, PHI Pubilications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01303

II Year B.Tech (Civil Engineering) – I Semester	**L**	**P**	**C**
	4	**0**	**4**

FLUID MECHANICS

OBJECTIVE: *This subject introduces the basic concepts of fluids, their behavioural properties, analyzing the fluid flows using primary equations. This subject further deals with various flow measuring devices and concepts of boundary layer flows.*

UNIT – I

INTRODUCTION: Dimensions and units – physical properties of fluids, specific gravity, viscosity, surface tension and capillarity, vapor pressure and their influences on fluid motion. Newtonian and non Newtonian fluids. Fluid Pressure at a Point; Pascal's law, Hydrostatic law, Atmospheric, Absolute and gauge pressure; Hydrostatic paradox, Pressure measurement manometers; Simple, differential and Micro Manometers

HYDROSTATIC FORCES ON SURFACES: Total Pressure and Centre of Pressure: on Horizontal Plane Surface; Vertical Plane Surface; Inclined Plane Surface and Curved Surfaces.

UNIT-II

BUOYANCY: Buoyancy; Buoyant Force and Centre of Buoyancy, Stability of submerged bodies and floating bodies; Metacentre and metacentric height, analytical method for metacentric height.

KINEMATICS OF FLUID MOTION: Methods of describing fluid motion; Classification of flow; Steady, unsteady, uniform and non-uniform flows; Laminar and turbulent flows; Three, two and one dimensional flows; Irrotational and rotational flows; Streamline; Pathline; Streakline; Equation for acceleration; Convective acceleration; Local acceleration; Continuity equation; Velocity potential and stream function; Flownet; Vortex flow – free vortex and forced vertex flow.

UNIT-III

DYNAMICS OF FLUID FLOW: Forces acting on a Fluid in Motion; Euler's equation of motion; .Bernoulli's equation ; Energy correction factor; Momentum principle; Force exerted on a pipe bend.

FLOW MEASUREMENTS IN PIPES: Discharge through Venturi Meter; Discharge through Orifice Meter; Discharge through flow nozzle; Measurement of velocity by Pitot tube,pitot-static tube.

UNIT-IV

FLOWTHROUGH ORIFICES AND MOUTHPIECES: Flow through Orifices: Classification of Orifices; Determination of coefficients for an Orifice Flow through large rectangular Orifice; Flow through submerged Orifice – fully sub-merged and Partially sub-merged. Classification of Mouthpieces; Flow through external and internal cylindrical Mouthpiece

FLOW OVER NOTCHES & WEIRS: Classification of Notches and Weirs; Flow through rectangular, triangular and trapezoidal notches and weirs; End contractions; Velocity of approach; Cipolletti weir, Broad crested weir.

UNIT-V

ANALYSIS OF PIPE FLOW: Energy losses in pipelines; Darcy – Weisbach equation; Minor losses in pipelines; Hydraulic Grade Line and Total Energy Line; Concept of equivalent length; Hydraulic power transmission through a pipe; Siphon; Pipes in series, parallel & branched pipes.

LAMINAR & TURBULENT FLOW IN PIPES: Reynolds's experiment; Characteristics of laminar flow; Steady laminar flow through a circular pipe(Hazen poiseuille equation). Characteristics of turbulent flow, Prandtl's mixing length theory, Hydro dynamically smooth and rough boundaries, Velocity distribution, Friction factor for pipe flow.

TEXT BOOKS:

(1) Fluid Mechanics by Modi and Seth, Standard book house.
(2) A text of Fluid mechanics and hydraulic machines by Dr.R.k.Bansal – Laxmi Publications (P) Ltd., New Delhi.
(3) Fluid Mechanics and Machinery by D.Rama Durgaiah, New Age International.

REFERENCES:

(1) Fluid Mechanics and Machinery, CSP Ojha, Oxford Higher Education
(2) Fluid mechanics and machinery by Garde, New Age Pubilishers.
(3) Theory and applications of fluid mechanics by K.Subramanyam, TMH Pubilications, New Delhi.
(4) Principles of Fluid Mechanics and Fluid Machines by M.Narayana Pillai, Universities Press.
(5) Introduction to Fluid Machines by S.K.Som & G.Biswas .Tata Mc.Grawhill publishers PVt.Ltd.
(6) Fluid Mechanics by A.K.Mohanty, Prentice Hall of India PVt.Ltd., New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01304

II Year B.Tech (Civil Engineering) II Semester	**L**	**P**	**C**
	4	**0**	**4**

BUILDING PLANNING AND DRAWING 15A01304

OBJECTIVE: *This subject provides the knowledge of building by laws, registration, planning of various types of buildings different sign convention of various Civil Engineering Materials, Doors, windows, tiles of roof, drawing of building plans etc.*

PART-A

UNIT -I

PLANING OF BUILDINGS: Types of buildings, types of residential buildings, site selection for residential building, orientation of buildings; aspect; prospect; privacy; furniture requirement;grouping;circulation;sanitation;lighting;ventilation;cleanliness;flexibility;eleganc y;Economy; practical considerations.

BUILDING BYELAWS AND REGULATIONS: Introduction- Terminology ;Objectives of building byelaws; Minimum plot sizes; Open space requirements ;Plinth area, floor area, carpet area; Floor area ratio (FAR), Floor space Index (FSI) ;areas for different units; Principles underlying building byelaws ; built up area limitations – Height of Buildings ,Wall thickness, lighting and ventilation requirement, safety from fire, drainage and sanitation; applicability of the bye-laws.

UNIT –II

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

PLANNING OF PUBLIC BUILDING: Planning of Educational institutions, Hospitals, Office buildings, Banks, Industrial buildings, Hotels and Motels, Hostels, Bus Station.

UNIT -III

BUILDINGS: SAFETY AND COMFORT: aspects of safety-structural, health, fire and constructional safety. Components of building automation system - HVAC, electrical lighting, Security, fire-fighting, communication etc. design for thermal comfort, ventilation comfort, air conditioning comfort, lighting comfort, noise and acoustic comfort.

PART-B

UNIT -IV

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

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

UNIT –V

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

1. Residential Building
2. Hospital
3. Schools
4. Post office
5. Corporate Office Building
6. Hotels
7. Bank buildings
8. Bus stations
9. Industrial buildings

FINAL EXAMINATION PATTERN: The end examination paper should consist of Part-A and Part-B. Part- A consists of three questions with either or choice from three units in planning portion .Each question carries 10 marks. Total marks for Part-A is 30 marks. Part- B consists of two questions with either or choice from drawing portion. Question from unit-IV carries 10 marks and question from unit-V carries 30 marks. Total marks for Part-B is 40 marks.

TEXT BOOKS:

1. Planning and Designing and Scheduling – Gurucharan Singh and Jagadish Singh- Standard publishers.
2. Building Planning and Design – N.Kumara Swamy and A.Kameswara Rao. Charotar publications.

REFERENCE:

1. Building by laws by state and Central Governments and Municipal corporations. National Building Code
2. Building drawing with an integrated approach to building environment-M.G.Saha, G.M.Kale, S.Y.patki-Tata Mc Graw Hill

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A54302

L	P	C
2	**0**	**0**

HUMAN VALUES AND PROFESSIONAL ETHICS

OBJECTIVE

- To create an awareness on Engineering Ethics and Human Values.
- To instill Moral and Social Values and Loyalty
- To appreciate the rights of Others

Students will be able to:

- identify and analyze an ethical issue in the subject matter under investigation or in a relevant field
- identify the multiple ethical interests at stake in a real-world situation or practice
- articulate what makes a particular course of action ethically defensible
- assess their own ethical values and the social context of problems
- identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects
- demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work
- integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research

Unit I: HUMAN VALUES

Morals, Values and Ethics-Integrity-Work Ethic-Service learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty - Courage- Co Operation – Commitment – Empathy –Self Confidence Character – Spirituality.

Unit II: ENGINEERING ETHICS

Senses of 'Engineering Ethics- Variety of moral issued – Types of inquiry – Moral dilemmas – Moral autonomy –Kohlberg's theory- Gilligan's theory- Consensus and controversy – Models of professional roles- Theories about right action- Self interest - Customs and religion –Uses of Ethical theories – Valuing time –Co operation – Commitment.

Unit III :ENGINEERING AS SOCIAL EXPERIMENTATION

Engineering As Social Experimentation – Framing the problem – Determining the facts – Codes of Ethics – Clarifying Concepts – Application issues – Common Ground - General Principles – Utilitarian thinking respect for persons.

UNIT IV: ENGINEERS RESPONSIBILITY FOR SAFETY AND RISK

Safety and risk – Assessment of safety and risk – Risk benefit analysis and reducing risk- Safety and the Engineer- Designing for the safety- Intellectual Property rights(IPR).

UINIT V: GLOBAL ISSUES

Globalization – Cross culture issues- Environmental Ethics – Computer Ethics – Computers as the instrument of Unethical behavior – Computers as the object of Unethical acts – Autonomous Computers- Computer codes of Ethics – Weapons Development - Ethics and Research – Analyzing Ethical Problems in research – Intellectual property Rights(IPR).

Text Books

1. "Engineering Ethics includes Human Values" by M.Govindarajan, S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd-2009.
2. "Engineering Ethics" by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009.
3. "Ethics in Engineering" by Mike W. Martin and Roland Schinzinger – Tata McGraw-Hill– 2003.
4. "Professional Ethics and Morals" by Prof.A.R.Aryasri, Dharanikota Suyodhana-Maruthi Publications.
5. "Professional Ethics and Human Values" by A.Alavudeen, R.Kalil Rahman and M.Jayakumaran- Laxmi
6. "Indian Culture, Values and Professional Ethics" by PSR Murthy-BS Publication. Publications.
7. "Professional Ethics and Human Values" by Prof.D.R.Kiran-

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01305

II Year B.Tech (Civil Engineering) – I Semester	**L**	**P**	**C**
	0	**4**	**2**

SURVEYING LAB-I

OBJECTIVE: *To impart the practical knowledge in the field, it is essential to introduce in curriculum. Drawing of Plans and Maps and determining the area are pre requisites before taking up any Civil Engineering works.*

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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01306

II Year B.Tech (Civil Engineering) – I Semester	**L**	**P**	**C**
	0	**4**	**2**

STRENGTH OF MATERIALS LAB

OBJECTIVE: *The object of the course to make the student to understand the behavior of materials under different types of loading for different types structures.*

LIST OF EXERCISES:

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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A51401

II Year B.Tech. II-Sem	**L**	**P**	**C**
	4	**0**	**4**

PROBABILITY AND STATISTICS
(Common for CE, ME, Ch.E,)

Objectives: To help the students in getting a thorough understanding of the fundamentals of probability and usage of statistical techniques like testing of hypothesis, Statistical Quality Control and Queuing theory

UNIT – I

Basic concepts of Probability – Random variables – Expectation – Discrete and continuous Distributions – Distribution functions. Binomial and poison distributions Normal distribution – Related properties.

UNIT – II

Test of Hypothesis: Population and Sample - Confidence interval of mean from Normal distribution - Statistical hypothesis - Null and Alternative hypothesis - Level of significance. Test of significance - Test based on normal distribution - Z test for means and proportions.

UNIT – III

Small samples - t- test for one sample and two sample problem and paired t-test, F-test and Chi-square test (testing of goodness of fit and independence).

UNIT – IV

Statistical Quality Control: Concept of quality of a manufactured product -Defects and Defectives - Causes of variations - Random and assignable - The principle of Shewhart Control Chart-Charts for attribute and variable quality characteristics- Constructions and operation of $\overline{X}$ - Chart, R-Chart,

p - Chart and C-Chart.

UNIT – V

Queuing Theory: Pure Birth and Death process, M/M/1 & M/M/S & their related simple problems.

TEXT BOOKS:

1. Probability & Statistics by E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.
2. Probability & Statistics for engineers by Dr. J. Ravichandran WILEY-INDIA publishers.

REFERENCES:

1. Probability & Statistics by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S.Chand publications.
2. Statistical methods by S.P. Gupta, S.Chand publications.
3. Probability & Statistics for Science and Engineering by G.Shanker Rao, Universities Press.
4. Probability and Statistics for Engineering and Sciences by Jay L.Devore, CENGAGE.
5. Probability and Statistics by R.A. Jhonson and Gupta C.B.

Outcomes: The student will be able to analyze the problems of engineering & industry using the techniques of testing of hypothesis, Statistical Quality Control and Queuing theory and draw appropriate inferences.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A54401

II Year B.Tech - II Semester

L	P	C
4	0	4

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(w.e.f the academic year: 2015-16.)

Course Objectives: The objective of this course is to equip the student with the basic inputs of Managerial Economics and Economic Environment of business and to impart analytical skills in helping them take sound financial decisions for achieving higher organizational productivity.

Unit I: INTRODUCTION TO MANAGERIAL ECONOMICS

Managerial Economics – Definition- Nature- Scope - Contemporary importance of Managerial Economics - Demand Analysis: Concept of Demand-Demand Function - Law of Demand - Elasticity of Demand- Significance - Types of Elasticity - Measurement of elasticity of demand - Demand Forecasting- factors governing demand forecasting- methods of demand forecasting -Relationship of Managerial Economics with Financial Accounting and Management.

UNIT II: THEORY OF PRODUCTION AND COST ANALYSIS

Production Function- Least cost combination- Short-run and Long- run production function- Isoquants and Isocosts, MRTS - Cobb-Douglas production function - Laws of returns - Internal and External economies of scale - **Cost Analysis**: Cost concepts and cost behavior- Break-Even Analysis (BEA) -Determination of Break Even Point (Simple Problems)- Managerial significance and limitations of Break- Even Point.

UNIT III: INTRODUCTION TO MARKETS AND NEW ECONOMIC ENVIRONMENT

Market structures: Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition- Monopoly-Monopolistic Competition-Oligopoly-Price-Output Determination - Pricing Methods and Strategies-Forms of Business Organizations- Sole Proprietorship- Partnership – Joint Stock Companies - Public Sector Enterprises – New Economic Environment- Economic Liberalization – Privatization - Globalization.

UNIT IV: CAPITAL AND CAPITAL BUDGETING

Concept of Capital - Over and Undercapitalization – Remedial Measures - Sources of Shot term and Long term Capital - Estimating Working Capital Requirements – Capital Budgeting – Features of Capital Budgeting Proposals – Methods and Evaluation of Capital Budgeting Projects – Pay Back Method – Accounting Rate of Return (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method (simple problems)

UNIT V: INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS

Financial Accounting – Concept - Emerging need and Importance - Double-Entry Book Keeping- Journal - Ledger – Trial Balance - Financial Statements - Trading Account – Profit & Loss Account – Balance Sheet (with simple adjustments). Financial Analysis – Ratios – Liquidity, Leverage, Profitability, and Activity Ratios (simple problems).

The students are required to submit any one of the following- two assignments/ a mini project/submission of any two case studies in the subject.

Learning Outcome: After completion of this course, the student will able to understand various aspects of Managerial Economics and analysis of financial statements and inputs therein will help them to make sound and effective decisions under different economic environment and market situations.

TEXT BOOKS:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2013.
2. Ahuja H.L Managerial economics. S.Chand, 3/e, 2013
3.

REFERENCES

1. Aryasri: Managerial Economics and Financial Analysis, 4/e, TMH, 2013
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International,. 2013.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage, 2013.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01401

II Year B.Tech (Civil Engineering) II Semester	**L**	**P**	**C**
	4	**0**	**4**

STRENGTH OF MATERIALS – II

OBJECTIVE: *Study of the subject provides the understanding of principal stress, strains, springs, columns and structures.*

UNIT – I

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

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

UNIT – II

THIN CYLINDERS & THICK 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.

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 – III

TORSION OF CIRCULAR SHAFTS – Theory of pure torsion – Derivation of Torsion equations: – Assumptions made in the theory 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 – IV

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

UNIT – V

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.

BEAMS CURVED IN PLAN : Introduction – circular beams loaded uniformly and supported on symmetrically placed Columns – Semicircular beam simply-supported on three equally spaced supports.

TEXT BOOKS:

(1) A Text book of Strength of materials by R.K.Bansal – Laxmi Publications (P) Ltd., New Delhi.
(2) Strength of Materials by S.S. Bhavikatti – Vikas publishers
(3) Strength of Materials by R.Subramanian, Oxford University Press.
(4) Strength of Materials by D.S. Prakasa rao, University press.

REFERENCES :

(1) Mechanics of Structures, by Ghosh& Datta, New Age Pubilishers
(2) Strength of Materials by B.C.Punmia.- Laxmi publications
(3) Strength of Materials by Schaum's out line series – Mc.Graw hill International Editions.
(4) Strength of Materials by S.Ramkrishna and R.Narayan – Dhanpat Rai Publications.
(5) Strength of Materials by L.S.Srinath et al., Macmillan India Ltd., Dew Delhi.
(6) Fundamentals of Solid Mechancis by M.L.Gambhir, PHI Learning Pvt. Ltd

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01402

II Year B.Tech (Civil Engineering) II Semester **L P C**

4 0 3

HYDRAULICS AND HYRAULIC MACHINERY

OBJECTIVE: *The main objective of this course is to deal with the concepts of flow through open channels and their applications and the principles of hydraulic machines and hydraulic models.*

UNIT – 1

OPEN CHANNEL FLOW-UNIFORM FLOW: Introduction, Classification of flows, Types of channels; Flow analysis: The Chezy equation, Empirical formulae for the Chezy constant, Hydraulically efficient channel sections: Rectangular, Trapezoidal, Triangular and Circular channels; Velocity distribution; Energy and momentum correction factors. Application of Bernoulli's equation to open channel flow.

OPEN CHANNEL FLOW- NON – UNIFORM FLOW: Concept of specific energy; Specific energy curves; Critical flow; Critical flow in a rectangular channel; Critical slope; discharge curve, Different slope conditions; Channel transitions- Reduction in width of a rectangular channel, Raised bottom in a rectangular channel, venture flume, Momentum principle applied to open channel flow; Specific force; Specific force curve.

UNIT – II

OPEN CHANNEL FLOW- GRADUALLY VARIED FLOW: Introduction, Dynamic equation; Dynamic equation for GVF in wide Rectangular channel, classification of channel bottom slopes, Surface Profiles; Characteristics of surface profiles, Back water Curves and Draw down curves; Examples of various types of water surface profiles; Control section, Computation of surface profiles by single step method.

OPEN CHANNEL FLOW- RAPIDLY VARIED FLOW: Hydraulic jump; Elements and characteristics of hydraulic jump; Hydraulic jump in rectangular channels, height and length of the jump, Energy loss in a hydraulic jump, Types of hydraulic jump; applications of hydraulic jump; Location of hydraulic jump,.

UNIT – III

IMPACT OF 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, Torque and head transferred in roto dynamic machines.

HYDRAULIC TURBINES-I: Introduction, head and efficiencies of hydraulic turbines, Classification of turbines; pelton wheel: parts, Velocity triangles, work done and efficiency, working proportions, design of pelton wheel. Radial flow reaction turbines: velocity triangles and work done for inward radial flow turbine, degree of reaction, discharge, speed ratio, flow ratio.

UNIT – IV

HYDRAULIC TURBINES-II: Francis turbine: main components and working, work done and efficiencies, design proportions; design of Francis turbine runner. Kaplan turbine: main

components and working, working proportions. Draft tube: theory and efficiency; specific speed, unit quantities, characteristic curves of hydraulic turbines. Cavitation: causes, effects.

CENTRIFUGAL PUMPS: Introduction, component parts and working of a centrifugal pump, work done by the impeller; heads, losses and efficiencies; minimum starting speed; Priming ;specific speed; limitation of suction lift, net positive suction head(NPSH);Performance and characteristic curves; Cavitation effects ;Multistage centrifugal pumps; troubles and remedies.

UNIT – V

DIMENSIONAL ANALYSIS AND SIMILITUDE: Introduction, dimensions; Dimensional homogeneity; Methods of dimensional analysis- Rayleigh's method; Buckingham – Pi theorem; model analysis; similitude-types of similarities; Dimensionless numbers; Model laws ;Partially submerged objects; types of models; Scale effect.

BOUNDARY LAYER THEORY& DRAG AND LIFT: Boundary layer – concepts, Prandtl's contribution, Characteristics of boundary layer along a thin flat plate, laminar and turbulent Boundary layers, separation of BL. expression for drag and lift; Lift and Drag Coefficients; pressure drag and friction drag; Streamlined and bluff bodies.

TEXT BOOKS :

(1) Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard book house.
(2) A text of Fluid mechanics and hydraulic machines by Dr.R.K.Bansal – Laxmi Publications (P) Ltd., New Delhi.

REFERENCES :

(1) Fluid Mechanics & Fluid Machines by Narayana Pillai, universities press.
(2) Open channel flow by srinivasan, Oxford University Press
(3) Fluid Mechanics And Machenary-Kothandaraman, New Age Pubilishers
(4) Open Channel flow by K.Subramanya.Tata Mc.Grawhill Publishers.
(5) Elements of Open channel flow by Ranga Raju, Tata MC.Graw Hill, Publications.
(6) Fluid mechanics and fluid machines by Rajput, S.Chand & Co.
(7) Open Channel flow by V.T.Chow, Mc.Graw Hill book company
(8) Hydraulic Machines by Banga & Sharma Khanna Publishers.
(9) Fluid Mechanics & Fluid Power Engineering by D.S. Kumar Kataria & Sons.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01403

II Year B.Tech (Civil Engineering) II Semester	**L**	**P**	**C**
	4	**0**	**4**

STRUCTURAL ANALYSIS – I

OBJECTIVE: *To make the students to understand the principles of analysis of structures of static and moving loads by various methods.*

UNIT – I

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

UNIT – II

ANALYSIS OF INDETERMINATE STRUCTURES : Indeterminate Structural Analysis – Determination of static and kinematic indeterminacies – Solution of trusses with upto two degrees of internal and external indeterminacies – Castigliano's theorem..

UNIT – III

FIXED BEAMS & CONTINUOUS BEAMS : Introduction to statically indeterminate beams with 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 – Deflection of fixed beams effect of sinking of support, effect of rotation of a support.

UNIT – IV

SLOPE-DEFLECTION: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports- Analysis of single bay, single storey, portal frame including side sway .

UNIT – V

MOMENT DISTRIBUTION METHOD Introduction to moment distribution method-application to continuous beams with and without settlement of supports. Analysis of single storey portal frames – including Sway

TEXT BOOKS :

(1) Analysis of Structures – Vol-I&II by V.N.Vazirani & M.M.Ratwani, Khanna Publications, New Delhi.
(2) Structural Analysis by S S Bhavikatti – Vikas Publishing House.
(3) Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi.

REFERENCES :

(1) Structural analysis – Hibbler – Pearson education
(2) Introduction to structural analysis by B.D.Nautiyal, New Age international publishers, New Delhi.
(3) Structural Analysis – D.S.Prakasa rao - Univeristy press.
(4) Introduction To Structural Analysis-Nautial- New Age Pubilishers
(5) Strength of Materials and Mechanics of Structures by B.C.Punmia, Khanna Publications, NewDelhi.
(6) Structual analysis Vol.I and II by Dr. R.Vaidyanathan and Dr.P Perumal – Laxmi publications.
(7) Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01404

II Year B.Tech (Civil Engineering) II Semester

L	P	C
4	0	4

SURVEYING – II

OBJECTIVE: *To ensure that the student develops knowledge in the working of advanced instruments, setting out of curves from the field measurements and basic knowledge on remote sensing*

UNIT-I

TRIGONOMETRIC LEVELLING : Introduction; Determination of the level of the top of an object, When its base is accessible and When its base is not accessible; Determination of the height of the object when the two instrument stations are not in the same vertical plane; Axis signal correction; Difference in elevation by single observation and reciprocal observations.

UNIT-II

TACHEOMETRIC SURVEYING: Definition, Advantages of Tacheometric surveying-Basic systems of tacheometric measurement , Principle of stadia measurements, Determination of constants K and C, Inclined sight with staff vertical; Inclined sight with staff normal to the line of sight, Movable hair method, Tangential method, Subtanse bar, Errors in Tacheometry.

UNIT-III

TRIANGULATION: Principles of triangulation, Uses of triangulation survey; Classification of triangulation; operations of triangulation survey; Signals and towers, Satellite station; Base line & Extension of the base line.

SETTING OUT WORKS: Introduction, Control stations; Horizontal control; Reference grid; Vertical control; Positioning of a structure; offset pegs, Setting out a foundation: reference pillars, batter boards, Setting out with a theodolite; Graded stakes; setting out a sewer; Setting out a culvert.

UNIT-IV

CURVES: Simple curves–Definitions and Notations, designation of a curve, Elements of simple curves, location of tangent points, selection of peg interval, Methods of setting simple curves(based on equipment) – Rankines method,Two theodolite method. Compound curves – Elements of compound curve, setting out compound curve. Reverse curves – Elements of reverse curve, relationship between various elements.

UNIT-V

ELECTRONIC DISTANCE MEASUREMENTS: Introduction, Basic concepts-electromagnetic waves, basic definitions, phase of the wave ,units, types of waves; distance from measurement of transit time, Computing the distance from the phase differences, , EDM instruments, electronic theodolites, total station-models, fundamental measurements, recording, traversing, data retrieval.

REMOTE SENSING: Introduction, Principle of Remote sensing, EM Radiation and the atmosphere, interaction of EM radiation with earth's surface, remote sensing observation platforms, sensors, applications of remote sensing. Geographical Information System: Introduction and principle of Geographical Information System,components of GIS, applications.

TEXT BOOKS:

1. Surveying Vol. 1 & II by Dr. K. R. Arora; Standard Book House;
2. Surveying Vol-I&II by B.C. Punmia ,Laxmi Publications
3. Higher Surveying by Chandra, New age Pubilishers

REFERENCE BOOKS:

1. Surveying Vol. 1and 2 – By S.K. Duggal. Tata Mc. Graw Hill Publishing Co.
2. Surveying and Levelling by Kanetkar T.P., and Kulkarni , Vols. I and II, United Book Corporation, Pune, 1994.
3.Principles of GIS for land resource assessment by P.A. Burrough –Clerendon Press, Oxford.
4. Advanced Surveying by Mahajan, Santhos K. Dhanpat Rai & Sons, Nai Sarak, Delhi, 1987.
5. Remote sensing and Image Interpretation by Lillesand,T.M.,and Kiefer R.W., John Wiley and Sons, Inc, New York,1997
6. Advanced Surveying: Total Station, GIS and remote Sensing by R. Sathikumar, Satheesh Gopi and N. Madhu, Pearson Education, India

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01405

II Year B.Tech (Civil Engineering) II Semester	**L**	**P**	**C**
	0	**3**	**2**

FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

OBJECTIVE: *The object of the course to make the students understand the fluid flow concepts and get familiarity with flow measuring devices.*

SYLLABUS :

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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01406

II Year B.Tech (Civil Engineering) II Semester	**L**	**P**	**C**
	0	**3**	**2**

SURVEYING LAB – II

OBJECTIVE: *To impart the practical knowledge in the field, it is essential to introduce in curriculum. Drawing of Plans and Maps and determining the area are pre requisites before taking up any Civil Engineering works.*

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 tachometric surveying (Two Exercises)
5. Curve setting – different methods. (Two Exercises)
6. Setting out works for buildings & pipe lines.
7. Determination of area using total station.
8. Traversing using total station.
9. Contouring using total station.
10. Determination of remote height using total station.
11. Distance, gradient, Diff. height between tow inaccessible points using total stations.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01501

L	P	C
4	0	4

B.Tech. III - I sem (C.E.)

DESIGN OF STEEL STRUCTURES

OBJECTIVE: *To understand design specifications, loading and design procedures of different steel structures as per BIS specifications.*

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
Plate Girder: Design consideration – I S Code recommendations Design of plate girder-Welded – Curtailment of flange plates stiffeners – splicings and connections.
Gantry Girder : Gantry girder impact factors – longitudinal forces, Design of Gantry girders.

Note: The students should prepare the following plates.
Plate 1 Detailing of simple beams
Plate 2 Detailing of Compound beams including curtailment of flange plates.
Plate 3 Detailing of Column including lacing and battens.
Plate 4 Detailing of Column bases – slab base and gusseted base
Plate 5 Detailing of steel roof trusses including particulars at joints.
Plate 6 Detailing of Plate girder including curtailment, splicing and stiffeners.

FINAL EXAMINATION PATTERN:
The end examination paper should consist of Part A and Part B. part A consist of two questions in Design and Drawing out of which one question is to be answered. Part B should consist of five questions on design out of which three are to be answered. Weightage for Part – A is 40% and Part- B is 60%.

TEXT BOOKS

1. limit state design of Steel Structures by Subramanyam.N, Oxford University press, New Delhi
2. Limit State Design of steel structures by S.K. Duggal, Tata Mcgraw Hill, New Delhi.

REFERENCES

1. Structural Design and Drawing by N.Krishna Raju, University Press, Hyderabad.
2. Structural design in steel by Sarwar Alam Raz, New Age International Publishers, New Delhi
3. Design of Steel Structures by Edwin Gaylord,Charles Gaylord,James Stallmeyer, Tata Mc.Graw-Hill, New Delhi.

Codes/Tables:

IS Codes:

1) IS -800 – 2007
2) IS – 875 – Part III
3) Steel Tables.
4) Railway Design Standards Code.

and **steel tables** to be permitted into the examination hall.

Outcomes :

On completion of course -

1. Apply the IS code of practice for the design of steel structural elements
2. Design compression and tension members using simple and built-up sections
3. Students will be able to explain the behaviour and modes of failure of tension members and different connections.
4. Students will be able to analyze and design tension members, bolted connections, welded connections, compression members and beams.
5. Design welded connections for both axial and eccentric forces

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COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01502

B.Tech. III - I sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

CONCRETE TECHNOLOGY

OBJECTIVE: *Lot of advances is taking place in the concrete technology as par with development taking place in the engineering. The present day industry needs the knowledge of concrete technology thoroughly. The subject is designed to give the basic knowledge as well as latest developments in concrete technology.*

UNIT I

CEMENTS & ADMIXTURES: Portland cement – chemical composition – Hydration, Setting of cement – Structure of hydrated cement – Test`s on physical properties – Different grades of cement – Admixtures – Mineral and chemical admixtures.

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 & HARDENED 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.Water / Cement ratio – Abram's Law – Gel space ratio – Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compressive & tensile strength - Curing.Compression tests – Tension tests – Factors affecting strength – Flexure tests – Splitting tests –

UNIT – III

SPECIAL CONCRETES: Light weight aggregates – Light weight aggregate concrete – Cellular concrete – No-fines concrete – High density concrete – Fibre reinforced concrete – Different types of fibres – Factors affecting properties of F.R.C – Applications – Polymer concrete – Types of Polymer concrete – Properties of polymer concrete – Applications – High performance concrete – Self consolidating concrete – SIFCON – Bacterial concrete(self healing concrete)

UNIT – IV

ELASTICITY, CREEP & SHRINKAGE:– Modulus of elasticity – Dynamic modulus of elasticity – Poisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – types of shrinkage. Introduction to Non-destructive testing methods – Rebound Hammer – Ultra Pulse Velocity method – Pullout - Codal provisions for NDT.

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 – ACI method & IS 10262 method

TEXT BOOKS:

1. Properties of Concrete by A.M.Neville – Pearson publication – 4th edition
2. Concrete Technology by M.S.Shetty. – S.Chand & Co. ; 2004

REFERENCES:

1. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi
2. Concrete: Micro structure, Properties and Materials – P.K.Mehta and J.M.Monteiro, Mc-Graw Hill Publishers
3. Design of Concrete Mix by Krishna Raju, CBS pubilishers.

Outcomes:

After completing the course, the student should be able to do the following:

1. The students should be able to check and recommend different constituent of concrete.
2. The students should be able to test strength and quality of plastic and set concrete.
3. The students should have understanding of application admixture and its effect on properties of concrete.
4. The students should be able to design mix of concrete according to availability of ingredients and design needs.
5. The students should be able to test various strength of concrete by destructive and non-destructive testing methods.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01503

B.Tech. III - I sem (C.E.)

L	P	C
4	0	4

ENVIRONMENTAL ENGINEERING

OBJECTIVE: *This subject provides the knowledge of water sources, water treatment, design of distribution system waste water treatment, and safe disposal methods. The topics of characteristics of waste water, sludge digestion are also included.*

UNIT – I

INTRODUCTION: Importance and Necessity of Protected Water Supply systems, Objectives of Protected water supply system, Flow chart of public water supply system, Role of Environmental Engineer.

WATER DEMAND AND QUANTITY STUDIES : Estimation of water demand for a town or city, Types of water demands, Per capita Demand, Factors affecting the Per Capita Demand, Variations in the Demand, Design Period, Factors affecting the Design period, Population Studies, Population Forecasting Studies.

QUALITY AND ANALYSIS OF WATER: Characteristics of water – Physical, Chemical and Biological. Analysis of Water – Physical, Chemical and Biological. Impurities in water, Water borne diseases. Drinking water quality standards.

UNIT - II

WATER TREATMENT: Layout and general outline of water treatment units – sedimentation – principles – design factors – coagulation-flocculation clarifier design – coagulants – feeding arrangements. Filtration and Chlorination**:** 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

WATER DISTRIBUTION : Distribution systems – Requirements, Layout of Water distribution systems - Design procedures- Hardy Cross and equivalent pipe methods service reservoirs – joints, valves such as sluice valves, air valves, scour valves and check valves water meters – laying and testing of pipe lines – pump house, waste detection and prevention.

UNIT – III

INTRODUCTION TO SANITATION :systems of sanitation – relative merits & demerits – collection and conveyance of waste water – sewerage – classification of sewerage systems- Estimation of sewage flow and storm water drainage – fluctuations – types of sewers – Hydraulics of sewers and storm drains– design of sewers – materials for sewers- appurtenances in sewerage – cleaning and ventilation of sewers .

WASTE WATER COLLECTION AND CHARACTERSTICS : Conservancy and water carriage systems – sewage and storm water estimation – time of concentration – storm water overflows combined flow – characteristics of sewage – cycles of decay – decomposition of sewage, examination of sewage – B.O.D. – C.O.D. equations.

UNIT IV

WASTE WATER TREATMENT: 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 of design – biological treatment – trickling filters – standard and high rate – Construction and design of Oxidation ponds.

SLUDGE TREATMENT: Sludge digestion – factors effecting – design of Digestion tank – Sludge disposal by drying – septic tanks and Imhoff Tanks, working principles and design – soak pits.

UNIT – V

SOLID WATE MANAGEMENT: Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management (reuse/ recycle, energy recovery, treatment and disposal).

AIR POLLUTION: Types of pollutants, their sources and impacts, air pollution meteorology, air pollution control, air quality standards and limits.

NOISE POLLUTION: Impacts of noise, permissible limits of noise pollution, measurement of noise and control of noise pollution.

TEXT BOOKS:

1. Water supply and sanitary Engineering by G.S. Birdi, Dhanpat Rai & Sons Publishers.
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. Environmental Engineering by Peavy, TMH Publishers.

REFERENCS :

1. Environmental Science and Engineering by J.G.Henry and G.W.Heinke – Person Education..
2. Waste water treatment- concepts and design approach by G.L. Karia and R.A. Christian, Prentice Hall of India
3. Elements of environmental engineering by K.N. Duggal, S. Chand Publishers.

OUTCOMES:

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

1. Identify the source of water and water demand
2. Apply the water treatment concept and methods
3. Apply water distribution processes and operation and maintenance of water supply
4. Prepare basic process designs of water and wastewater treatment plants collect, reduce, analyze, and evaluate basic water quality data
5. Determine the sewage characteristics and design various sewage treatment plants
6. Carry out municipal water and wastewater treatment system design and operation
7. Apply environmental treatment technologies and design processes

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01504

B.Tech. III - I sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

WATER RESOURCES ENGINEERING-I

OBJECTIVE:

To study the concepts of

i. *Engineering Hydrology and its applications like Runoff estimation, estimation of design discharge and flood routing.*
ii. *Irrigation Engineering – Water utilization for Crop growth, canals and their designs.*

UNIT – I

INTRODUCTION TO HYDROLOGY: Engineering hydrology and its applications; Hydrologic cycle; precipitation- types and forms, rainfall measurement, types of rain gauges, computation of average rainfall over a basin, presentation and interpretation of rainfall data.

DESCRIPTIVE HYDROLOGY: Evaporation- factors affecting evaporation, measurement of evaporation; Infiltration- factors affecting infiltration, measurement of infiltration, infiltration indices; Run off- Factors affecting run- off, Computation of run-off; Design Flood; Estimation of maximum rate of run-off; separation of base flow.

UNIT – II

HYDROGRAPH ANALYSIS: Hydrograph; Unit Hydrograph- construction and limitations of Unit hydrograph, Application of the unit hydrograph to the construction of a flood hydrograph resulting from rainfall of unit duration; S-hydrograph.

GROUND WATER: Introduction; Aquifer; Aquiclude; Aquifuge; aquifer parameters-porosity, Specific yield, Specific retention; Divisions of sub–surface water; Water table; Types of aquifers; storage coefficient-coefficient of permeability and transmissibility; well hydraulics- Darcy's law; Steady radial flow to a well –Dupuit's theory for confined and unconfined aquifers; Tube well; Open well; Yield of an open well–Constant level pumping test, Recuperation test.

UNIT – III

IRRIGATION: Introduction; Necessity and Importance of Irrigation; advantages and ill effects of Irrigation; types of Irrigation; methods of application of Irrigation water; quality for Irrigation water. Duty and delta; duty at various places; relation between duty and delta; factors affecting duty; methods of improving duty.

WATER REQUIREMENT OF CROPS: Types of soils, Indian agricultural soils, preparation of land for Irrigation; soil fertility; Soil-water-plant relationship; vertical distribution of soil moisture; soil moisture tension; soil moisture stress; various soil moisture constants; Limiting soil moisture conditions; Depth and frequency of irrigation; Gross command area; Culturable command area; Culturable cultivated and uncultivated area; Kor depth and Kor period; crop seasons and crop rotation; Irrigation efficiencies; Determination of irrigation requirements of crops; Assessment of Irrigation water. Consumptive use of water-factors affecting consumptive use, direct measurement and determination by use of equations (theory only)

UNIT – IV

CHANNELS – SILT THEORIES: Classification; Canal alignment; Inundation canals; Cross–section of an irrigation channel; Balancing depth; Borrow pit; Spoil bank; Land width; Silt theories–Kennedy's theory, Kennedy's method of channel design; Drawbacks in Kennedy's theory; Lacey's regime theory- Lacey's theory applied to channel design; Defects in Lacey's theory; Comparison of Kennedy's and Lacey's theory.

WATER LOGGING AND CANAL LINING: Water logging; Effects of water logging; Causes of water logging; Remedial measures; Saline and alkaline soils and their reclamation; Losses in canal; Lining of irrigation channels – necessity, advantages and disadvantages; Types of lining; Design of lined canal.

UNIT – V

DIVERSION HEAD WORKS: Types of diversion head works; Diversion and Storage head works; weirs and barrages; Layouts of diversion head works; components; Causes and failure of hydraulic structures on pereable foundations; Blighs creep theory; Khoslastheory; Determination of uplift pressure, impervious floors using Blighs and Khoslas theory; Exit gradient.

CANALOUTLETS: Introduction; types of outlet; flexibility, proportionality, setting ,hyper proportional outlet, sub-proportional outlet, sensitivity, efficiency of an outlet, drowning ratio, modular limit; pipe outlet; kennedy's gauge outlet; gibb's module; canal escape.

TEXT BOOKS:

1. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi
2. Irrigation Engineering and Hydraulic structures by S. K. Garg; Khanna Publishers, Delhi.

REFERENCES:

1. Engineering Hydrology by K.Subramanya, The Tata Mcgraw Hill Company, Delhi
2. Engineering Hydrology by Jayarami Reddy, Laxmi publications pvt. Ltd., New Delhi
3. Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House.

Outcomes :

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

1. To understand the basic types of irrigation, irrigation standards and crop water assessment
2. To study the different aspects of design of hydraulic structures

To provide knowledge on various hydraulic structures such as energy dissipaters, head and cross regulators, canal falls and structures involved in cross drainage works

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01505

B.Tech. III - I sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

STRUCTURAL ANALYSIS – II

OBJECTIVE: *Indeterminate structures are subjected to different loading with different supported conditions; hence it is necessary to study the behaviour of the structures.*

UNIT I

ARCHES : Three hinged arches, Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature- Determination of horizontal thrust bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, tied arches – fixed arches – (No analytical question).

UNIT-II

SLOPE-DEFLECTION & MOMENT DISTRIBUTION METHOD:-Analysis of single bay, single storey, portal frame including side sway– Stiffness and carry over factors – Distribution factors – Analysis of single storey portal frames – including Sway - Substitute frame analysis by two cycle method.

UNIT – III

KANI`S METHOD:-

Analysis of continuous beams – including settlement of supports and single bay, single storey portal frames with side sway by Kani's method.

UNI T – IV

FLEXIBILITY & STIFFNESS METHODS:-

Flexibility methods, Introduction, application to continuous beams including support settlements-Introduction to stiffness method and its application application to continuous beams including support settlements.

UNIT – V

PLASTIC ANALYSIS:

Introduction – Idealized stress – Strain diagram – shape factors for various sections – Moment curvature relationship – ultimate moment – Plastic hinge – lower and upper bound theorems – ultimate strength of fixed and continuous beams.

TEXT BOOKS:

1. Analysis of structures by Vazrani & Ratwani – Khanna Publications.
2. Theory of structures by Ramamuratam, jain book depot , New Delhi.

REFERENCES :

1. Structural Analysis (Matrix Approach) by Pundit and Gupta – Tata Mc.Graw Hill publishers.
2. Structural analysis by R.S.Khurmi, S.Chand Publications, New Delhi.

3. Basic Structural Analysis by K.U.Muthu *et al.,* I.K.International Publishing House Pvt.Ltd

Outcomes:

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

1. Apply the methods of indeterminate truss analysis
2. Demonstrate the behaviour of arches and their methods of analysis
3. Use various classical methods for analysis of indeterminate structures
4. Determine the effect of support settlements for indeterminate structures
5. Able to analyze the beam and frames for vertical and horizontal loads and draw SFD and BMD.
6. Able to calculate forces in members of truss due to load by stiffness method.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01506

B.Tech. III - I sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

ENGINEERING GEOLOGY

OBJECTIVES: *The objectives of this is to give the basic knowledge of Geology that is required for construction of various Civil Engineering Structures. The syllabus includes the basics of Geology. Geological hazard's and gives a suitable picture on the Geological aspects that are to be considered for the planning and construction of major Civil Engineering projects.*

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"

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: Feldspar , 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, Chrorite , Galena , Pyrolusite , Graphite, Magnesite, and Bauxite.

UNIT – II

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 study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

STRUCTURAL GEOLOGY :

Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults un conformities, and joints – their important types. Their importance Insitu and drift soils, common types of soils, their origin and occurrence in India

UNIT – III

GROUND WATER ,EARTH QUAKE &LAND SLIDES:-

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, their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, earth quakes and land slides.

UNIT –IV

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.

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.Chennkesavulu, Mc-Millan, India Ltd. 2005
2) Engineerring Geology by Vasudev Kanthi, Universities press, Hyderabad.

REFERENCES:

1. Engineerring geology by Prabin singh, Katson Pubilcations
2. Engineering geology by Duggal, TMH Publishers.
3. Engineering Geology by Subinoy Gangopadhyay, Oxford University press.
4. Principals of Engineering Geology by K.V.G.K. Gokhale – B.S publications

Outcomes

1. The students would have the knowledge of principles of engineering geology.
2. The students would have the knowledge of properties of soil, various rocks and minerals
3. The students would be able to judge the suitability of sites for various civil engineering structures.
4. The students would exhibit the ability to use the knowledge of geological strata in the analysis and design the civil engineering structures.
5. The students would have the knowledge for deciding the suitability of water and soil conservation projects.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01507

B.Tech. III - I sem (C.E.)	**L**	**P**	**C**
	0	**4**	**2**

ENGINEERING GEOLOGY LAB.

1. Study of physical properties and identification of minerals referred under theory.
2. Megascopic description and identification of rocks referred under theory.
3. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.
4. 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. Inter pretation of a Geological map along with a geological section.
4. Simple strike and Dip problems.

Text Books:-

1. **Elementary Exercises in Geology by CVRK Prasad, Universities press.**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01508

B.Tech. III - I sem (C.E.)	**L**	**P**	**C**
	0	**4**	**2**

CONCRETE TECHONOLOGY LAB

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. Specific Gravity and Water Absorption of Coarse aggregate.
8. Bulking of Fine aggregate.
9. Non-Destructive testing on concrete (for demonstration)

LIST OF EQUIPMENT:

1. Apparatus for aggregate crushing test.
2. Aggregate Impact testing machine
3. Pycnometers.
4. Los angles Abrasion test machine
5. Vicat's apparatus
6. Specific gravity bottle.
7. Lechatlier's apparatus.
8. Slump and compaction factor setups
9. Longitudinal compressor meter and 1
10. Rebound hammer, Pulse velocity machine.
11. Relevant IS Codes

Reference books:-

1. Concrete Manual by M.L.Gambhir, Dhanpat Rai&co., Fourth edition.
2. Building construction and materials(Lab Manual) by Gambhir , TMH publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A55501

B.Tech III- I Sem.	**L**	**P**	**C**
	0	**4**	**0**

Advanced Communications Skills Lab
(Compulsory Audit Course)

1. 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.

2. 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.

3. SYLLABUS:

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

UNIT-I: COMMUNICATIVE COMPETENCY

1. Reading Comprehension
2. Listening comprehension
3. Vocabulary for competitive purpose
4. Spotting errors

UNIT-II: TECHNICAL WRITING

1. Report writing
2. Curriculum vitae
3. E-mail writing
4. Abstract & Synopsis Writing
5. Reviewing (Book/Film)

UNIT-III: PRESENTATIONAL SKILLS

1. Oral presentation
2. Power point presentation
3. Poster presentation
4. Stage dynamics
5. Body Language

UNIT-IV: CORPORATE SKILLS

1. Telephonic skills
2. Net Etiquettes
3. SMART Goal setting
4. Time Management
5. Negotiation Skills

UNIT-V: GETTING READY FOR JOB

1. Group discussions-II
2. Interview skills
3. Answering Strategies
4. Mock Interviews

4. LEARNING OUTCOMES:

- Accomplishment of sound vocabulary and its proper use contextually
- Flair in Writing and felicity in written expression.
- Effective Speaking Abilities
- Enhanced job prospects.

5. MINIMUM REQUIREMENT:

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 60 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

6. SUGGESTED SOFTWARE:

The software consisting of the prescribed topics elaborated above should be procured and used.

1. **K-VAN SOLUTIONS-Advanced communication lab**
2. **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
3. **TOEFL & GRE**(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
4. **Train2success.com**

7. BOOKS RECOMMENDED:

1. **Objective English for Competitive Exams**, Hari Mohana Prasad, 4th edition, Tata Mc Graw Hill.
2. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, O U Press 2009.
3. Books on **TOEFL/GRE/GMAT/CAT/IELTS** by Barron's/DELTA/Cambridge University Press.2012.
4. **Soft Skills for Everyone,** Butterfield Jeff, Cengage Publications, 2011.
5. **Practice Psychometric Tests**: How to familiarize yourself with genuine recruitment tests, 2012.
6. **Management Shapers Series** by Universities Press (India) Pvt Ltd., Himayatnagar, Hyderabad 2008.
7. **Handbook for Technical Writing** by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
8. **English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hill 2009.**
9. **Word Power Made Handy,** Shalini Verma, S Chand Publications, 2011.
10. **Effective Technical Communication,** Ashrif Rizvi, TataMcGrahill, 2011.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
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Code:15A01601

B.Tech. III - II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

DESIGN OF REINFORCED CONCRETE STRUCTURES

OBJECTIVE: *Structural elements are subjected to different loading to with stand the structures, for external loading we need to design the structures for its safety and serviceability.*

UNIT –I
Concepts of RC. Design –Introduction to Working stress method - Limit State method – Material Stress- Strain Curves – Safety factors – Characteristic values. Stress Block parameters – IS: 456 – 2000.
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 – Dog legged and Open well.

NOTE : All the designs to be taught in Limit State Method
Following plates should be prepared by the students.
1. Reinforcement particulars of T-beams and L-beams.
2. Reinforcement detailing of continuous beams.
3. Reinforcement particulars of columns and footings.
4. Detailing of One way, Two way and continuous slabs

FINAL EXAMINATION PATTERN:
The end examination paper should consist of Part A and Part B. part A consist of two questions in Design and Drawing out of which one question is to be answered. Part B should consist of five questions on design out of which three are to be answered. Weightage for Part – A is 40% and Part- B is 60%.

TEXT BOOKS:
1. Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

2. Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age International Publishres, New Delhi

REFERENCES :

4. Structural Design and Drawing by N.Krishna Raju, University Press, Hyderabad
5. Analysis of skeletal structures by seetharamulu kaveti, TMH pubilications.
6. Limit state designed of reinforced concrete – P.C.Varghese, Printice Hall of India, New Delhi

Codes/Tables: IS 456-2000 and IS-800 code books to be permitted into the examinations Hall.

Outcome:

After completing the course, the student should be able to do the following:

1. Will be able to understand the basic concepts of reinforced concrete analysis and design.
2. Will be able to understand the behavior and various modes of failure of reinforced concrete members.
3. Will be able to analyze and design various reinforced concrete members.
4. Will be able to understand and analyze the effect of various support conditions on design of structures.
5. Will be able to implement the knowledge in using analysis and design softwares.

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B.Tech. III - II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

GEOTECHNICAL ENGINEERING – I

OBJECTIVE: *The object of this course is to make the student to understand the behaviour of soil under different loads and different conditions. This is necessary because the safety of any structure depends on soil on which it is going to be constructed.*

UNIT – I
INTRODUCTION: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass- volume relationship – Relative density.
INDEX PROPERTIES OF SOILS: Moisture Content, Specific Gravity, Insitu density, 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 systems.
SEEPAGE THROUGH SOILS: Total, neutral and effective stresses –quick sand condition – Seepage through soils – Flownets: Characteristics and Uses.

UNIT – III
STRESS DISTRIBUTION IN SOILS: Boussinesq's and Wester gaard's theories for point loads and areas of different shapes – Newmark's influence chart .
COMPACTION: Mechanism of compaction – factors affecting – effects of compaction on soil properties. – Field compaction Equipment – compaction 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. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.
2. Geotechnical Engineering by C. Venkataramiah, New age International Pvt . Ltd, (2002).

REFERENCES:

1. Soil Mechanics and Foundation by by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
2. Geotechnical Engineering by Iqbal H.Khan, PHI pubilishers.
3. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt . Ltd, New Delhi.

OUTCOMES:

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

1. carry out soil classification
2. solve any practical problems related to soil stresses estimation, permeability and seepage including flow net diagram
3. estimate the stresses under any system of foundation loads
4. solve practical problems related to consolidation settlement and time rate of settlement

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01603

B.Tech. III - II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

TRANSPORTATION ENGINEERING – I

OBJECTIVE: *It deal with different components of Transportation Engineering like highway, Railway & Airport Engineering. Emphasis is a Geometric Design of different elements in Transportation Engineering.*

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

UNIT – II
HIGHWAY 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:
Basic Parameters of Traffic-Volume, Speed and Density – Definitions and their inter relation – Highway capacity and level of service concept – factors affecting capacity and level of service - Traffic Volume Studies- Data Collection and Presentation-speed studies- Data Collection and Presentation- Parking Studies and Parking characteristics- Road Accidents-Causes and Preventive measures- Accident Data Recording – Condition Diagram and Collision Diagrams.

TRAFFIC REGULATION AND MANAGEMENT:
Road Traffic Signs – Types and Specifications – Road markings-Need for Road Markings-Types of Road Markings- Specifications - Design of Traffic Signals –Webster Method – Saturation flow – phasing and timing diagrams – Numerical problems.

UNIT – IV
INTERSECTION DESIGN:
Conflicts at Intersections- Channelisation: Objectives –Traffic Islands and Design criteria-Types of At-Grade Intersections – Types of Grade Separated Intersections- Rotary Intersection – Concept of Rotary and Design Criteria- Advantages and Disadvantages of Rotary Intersection.

UNIT – V
PAVEMENT DESIGN :
Types of pavements – Difference between flexible and rigid pavements – Pavement Components – Sub grade, Sub base, base and wearing course – Functions of pavement

components – Design Factors – Flexible pavement Design methods – G.I method, CBR Method, (as per IRC 37-2002) –Design of Rigid pavements – Critical load positions - Westergaard's stress equations – computing Radius of Relative stiffness and equivalent radius of resisting section – stresses in rigid pavements – Design of Expansion and contraction joints in CC pavements. Design of Dowel bars and Tie bars.

TEXT BOOKS:

1. Highway Engineering – S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000).
2. Traffic Engineering and Transportation planning by L.R.Kadiyali and Lal- Khanna Publications.

REFERENCES:

1. Principles and Practice of Highway Engineering Design – L.R.Kadiyali and Lal-Khanna Publications.
2. Text book of Highway Engineering by R.Srinivasa Kumar, Universities Press, Hyderabad.
3. Highway Engineering – Dr.S.K.Sharma, S.Chand Publishers

Outcomes :

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

1. carry out surveys involved in planning and highway alignment
2. design cross section elements, sight distance, horizontal and vertical alignment
3. implement traffic studies, traffic regulations and control, and intersection design
4. determine the characteristics of pavement materials
5. design flexible and rigid pavements as per IRC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01604

B.Tech. III - II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

WATER RESOURCES ENGINEERING-II

OBJECTIVE: *To study various head works canal structures and their design principles the subject also covers the river structures, their classifications, designs, etc.*

UNIT – 1

CANAL REGULATION WORKS: Canal falls: Necessity and location of falls; Types of falls; classification of falls; cistern design; roughening devices; design of sarada type fall. Canal regulators: off-take alignment; head regulators and cross-regulators; design of cross-regulator and distributary head regulator.

CROSS DRAINAGE WORKS: Introduction; types of cross drainage works; selection of suitable type of cross drainage work; classification of aqueducts and siphon aqueducts.

UNIT-II

STREAM GAUGING: Necessity; Selection of gauging sites; methods of DischargeMeasurementArea-Velocity method; Slope-Area method; Tracer method, Electromagnetic induction method,Ultrasonic method; Measurement of depth –Sounding rod, Echo-sounder; Measurement ofvelocity: Floats – Surface floats, Sub–surface float or Double float, Velocity rod; Pitot tube;Current meter- rating of current meter, measurement of velocity; chemical method; Measurementof stage-Staff gauge, wire gauge, water stage recorder, bubble gauge recorder; stage-dischargecurve.

RIVER ENGINEERING: Classification of rivers; Meandering; Causes of meandering; Basic factors controlling process of meandering; Aggrading type of river; Degrading type of River; River training: objectives, Classification of river training works; Types of River training works : Guide banks, Marginal embankments ,Groynes or spur, levees, bank protection, pitched islands.

UNIT-III

RESERVOIR PLANNING: Introduction; Investigations for reservoir planning; Selection ofsitefor a reservoir; Zones of storage in a reservoir; Storage capacity and yield; Mass inflow curveand demand curve; Calculation of reservoir capacity for a specified yield from the mass inflowcurve; Determination of safe yield from a reservoir of a given capacity; Sediment flow instreams:Reservoir sedimentation; Life of reservoir; Reservoir sediment control; Flood routing;Methodsof flood routing-Graphical Method (Inflow – storage discharge curves method).

DAMS :GENERAL: Introduction; Classification according to use; classification according to material- Gravity dams, Arch dams, Buttress dams, Steel dams, Timber dams, Earth dams and rock fill dams-advantages and disadvantages; Physical factors governing selection of type of dam ; selection of site for a dam.

UNIT-IV

GRAVITY DAMS: Introduction; Forces acting on a gravity dam; Combination of loading for design; Modes of failure: stability requirements; principal and shear stresses; Stability analysis; Elementary profile of a gravity dam; Practical profile of a gravity dam; Limiting height of a gravity dam- High and low gravity dams; Design of gravity dams–single step method; Galleries; Stability analysis of non–overflow section of Gravity dam.

EARTH DAMS: Introduction; Types of earth dams; Causes of failure of earth dams; Criteria for safe design of earth dams; Section of an earth dam; Design to suit available materials; Seepage control measures; Slope protection. Seepage through earth dam – graphical method

UNIT-V

SPILLWAYS: Introduction; Types of spillways; Profile of ogee spillway; Energy dissipation below spillways for relative positions of jump height curve and tail water curve; Stilling basins; Indian standards on criteria for design of hydraulic jump type stilling basins with horizontal aprons; Spillway crest gates-Types and description only.

WATER POWER ENGINEERING: Development of hydro power in India; Classification of hydel plants: runoff river plants, storage plants and pumped storage plants; low, medium and high head schemes ; Investigation and planning; components of hydel schemes – fore bay, intake structure, surge tanks, penstocks ,power house, turbines-selection of suitable type of turbine, Scroll casing .draft tube and tail race; assessment of available power; definition of gross head ,operating head ,effective head; Flow duration curve; Power duration curve; Load duration curve; Load curve ; primary power and secondary power; installed capacity, dependable capacity; firm power, secondary power; power factor ;load factor, capacity factor ,utilization factor and Diversity factor.

TEXT BOOKS:

4. Irrigation and Water Power Engineering by Dr. B.C.Punmia & Dr. Pande B.B. Lal; Laxmi Publications pvt. Ltd., New Delhi.
5. Irrigation Engineering and Hydraulic Structure by S. K. Garg; Khanna Publishers, Delhi.

REFERENCES:

1. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers
2. Irrigation, Waterpower and Water Resources Engineering by K R Arora; Standard Publication,New Delhi.
3. Water resources engineering by Satyanarayana Murthy. Challa, New Age International Publishers

outcomes:

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

1. Design various channel systems
2. Design head and cross regulator structures
3. Identify various types of reservoir and their design aspects
4. By the Establishes the understanding of cross drainage works and its design
5. Design different types of dams
6. Design gravity dam and earthen dam
7. Design the canal systems

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COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01605

B.Tech. III - II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

ESTIMATION, COSTING AND VALUATION

OBJECTIVE: *The objective of the course is to make the student to understand about estimation and valuations of different types of structures and their valuation as per standard schedule of rates.*

UNIT – I
INTRODUCTION : General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating. **STANDARDS SPECIFICATIONS :** Standard specifications for different items of building construction

UNIT – II
ESTIMATION OF BUILDINGS : Detailed Estimates of Buildings

UNIT – III
EARTHWORK ESTIMATION : Earthwork for roads and canals.
REINFORCEMENT ESTIMATION : Reinforcement bar bending and bar requirement schedules.

UNIT – IV
CONTRACTS AND TENDERS : Contracts – Types of contracts – Contract Documents – Conditions of contract – Types of Tenders – Requirement of Tendering.

UNIT – V
RATE ANALYSIS : Working out data for various items of work over head and contigent charges.
VALUATION : Valuation of buildings.

TEXT BOOKS
1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Contracts and estimations by B.S.Patil, Universities.Press, Hyderabad.

REFERENCES :
1. Estimation, Costing and Specifications by M. Chakraborthi; Laxmi publications.
2. Engineering construction cost by Peurifoy , TMH Publishers.
3. Standard Schedule of rates and standard data book by public works department.
4. I. S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S.)

Note : Standards scheduled of rates is permitted in the examination hall.

Outcomes :
On completion of the course, the students will be able to:
1. apply different types of estimates in different situations
2. carry out analysis of rates and bill preparation at different locations
3. demonstrate the concepts of specification writing
4. carry out valuation of assets

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COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01606a

B.Tech. III - II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

EXPERIMENTAL STRESS ANALYSIS
(OPEN ELECTIVE)

Objective:-
To bring awareness on experimental method of finding the response of the structure to different types of load.

1. **PRINCIPLES OF EXPERIMENTAL APPROACH :-**
   Merits of Experimental Analysis Introduction, uses of experimental stress analysis advantages of experimental stress analysis, Different methods –Simplification of problems.
2. **STRAIN MEASUREMENT USING STRAIN GAUGES :-**
   Definition of strain and its relation of experimental Determinations Properties of Strain-Gauge Systems-Types of Strain Gauges –Mechanical, Acoustic and Optical Strain Gauges. Introduction to Electrical strain gauges - Inductance strain gauges – LVDT – Resistance strain gauges – various types –Gauge factor – Materials of adhesion base..
3. **STRAIN ROSSETTES AND NON – DESTRUCTIVE TESTING OF CONCRETE:-**
   Introduction – the three elements Rectangular Rosette – The Delta Rosette Corrections for Transverse Strain Gauge.
   Ultrasonic Pulse Velocity method –Application to Concrete. Hammer Test – Application to Concrete.
4. **THEORY OF PHOTOELASTICITY** :-
   Introduction –Temporary Double refraction – The stress Optic Law –Effects of stressed model in a polariscope for various arrangements – Fringe Sharpening. Brewster's Stress Optic law.
5. **TWO DIMENSIONAL PHOTOELASTICITY :-**
   Introduction – Isochramic Fringe patterns- Isoclinic Fringe patterns passage of light through plane Polariscope and Circular polariscope Isoclinic Fringe patterns – Compensation techniques – Calibration methods – Separation methods – Scaling Model to prototype Stresses – Materials for photo – Elasticity Properties of Photoelastic Materials.

Reference Books :-

1.Experimental stress analysis by J.W.Dally and W.F.Riley, College House Enterprises
2. Experimental stress analysis by Dr.Sadhu Singh.khanna Publishers
3.Experimental Stress analysis by U.C.Jindal, Pearson Pubilications.
4. Experimental Stress Analysis by L.S.Srinath, MC.Graw Hill Company Publishers.

OUTCOMES:
After completion of the course

1. **The student** will be able to understand different methods of experimental stress analysis
2. **The student** will be able to understand the use of strain gauges for measurement of strain
3. **The student** will be exposed to different Non destructive methods of concrete
4. **The student** will be able to understand the theory of photo elasticity and its applications in analysis of structures

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01606b

B.Tech. III - II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

ENVIRONMENTAL IMPACT ASSESTMENT & MANAGEMENT
(OPEN ELECTIVE)

Objective:-

This course is aimed at exposing the student to the concept of environmental impact assessment and methodologies used for the same. The student will also be imparted the knowledge about the various laws related to EIA and also methods of EIA audit.

UNIT – I

INTRODUCTION:-

Basic concept of EIA : Initial environmental Examination, Elements of EIA, - factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters.

UNIT – II

EIA METHODOLOGIES:-

E I A Methodologies: introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods and cost/benefit Analysis.

UNIT – III

IMPACT OF DEVELOPMENTAL ACTIVITIES AND LAND USE:-

Introduction and Methodology for the assessment of soil and ground water, Delineation of study area, Identification of actives. Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures. E I A in surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, Air pollution sources, Generalized approach for assessment of Air pollution Impact.

UNIT – IV

ASSEMENT OF IMPACT ON VEGETATION AND WILDLIFE :

Introduction - Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

ENVIRONEMNTAL AUDIT :

Introduction - Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, Audit protocel, stages of

Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report.

UNIT-V

ENVIRONEMENTAL ACTS (PROTECTION AND PREVENTION)

Post Audit activities, The Environmental protection Act, The water preventation Act, The Air (Prevention & Control of pollution Act.), Wild life Act.Case studies and preparation of Environmental Impact assessment statement for various Industries.

TEXT BOOKS:

1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, Hyderabad.
2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers

REFERENCES:

1. Environmental Science and Engineering, by Suresh K. Dhaneja – S.K.,Katari & Sons Publication., New Delhi.
2. Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi

Outcomes :-

After completion of this course the student will be able to

1. Understand the concept of Environmental impact
2. Understand the methodologies related to EIA
3. Appreciate various laws related to environmental protection
4. Prepare the environmental impact assessment statement and to evaluate it.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01606c

B.Tech. III - II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

INDUSTRIAL WASTE AND WASTE WATER MANAGEMENT
(OPEN ELECTIVE)

Objectives:

- To familiarize student with the knowledge of theory and design of Industrial waste water treatment.
- To produce civil engineering graduates who have strong fundamental knowledge about the treatment of effluents from food and chemical industries.

UNIT – I:

Quality requirements of boiler and cooling waters - Quality requirements of process water for Textile - Food processing and Brewery Industries - Special Treatment processes.

UNIT – II:

Basic Theories of Industrial Waste water Management - Volume reduction - Strength reduction - Neutralization - Equalization and proportioning. Joint treatment of industrial wastes and domestic sewage - consequent problems.

UNIT –III:

Industrial wastewater discharges into streams. Lakes and oceans and problems.

UNIT – IV:

Recirculation of Industrial Wastes - Use of Municipal Waste Water in Industries. .

UNIT – V:

Industrial Wastes - Special characteristics & Treatment of Liquid Wastes from the following industries: Textile, Tannery, Paper and Pulp, Distilleries, Dairy, Fertilizer Plant, Sugar Mill, Steel plants, oil Refineries -Pharmaceutical plants - thermal power plants.

TEXT BOOKS:

1. Waste Water Treatment by Rao and Dutta. IBH Publishers
2. Metcalf and Eddy. "Waste water Engineering – Collection, Treatment, Disposal and Reuse", Mc Graw Hill Pub. Co., 1995.
3. Water and Waste Water technology by Mark J. Hammer and Mark J. Hammer (Jr)

Course Outcomes:

- Student will be able to identify and analyse the waste from various sources.
- Student will be able to understand about Industrial processes –Origin of waste water – various treatment methods, code of practices – management.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

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B.Tech. III - II sem (C.E.)	**L**	**P**	**C**
	0	**4**	**2**

GEOTECHNICAL ENGINEERING LAB

OBJECTIVE: *To obtain the properties of soils by conducting experiments, it is necessary for students to understand the behavior of soil under various loads and conditions.*

LIST OF EXPERIMENTS

1. Atterberg's Limits.
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

Any eight experiments may be completed.

LIST OF EQUIPMENT:

1. Casagrande's liquid limit apparatus.
2. Apparatus for plastic and Shrinkage limits
3. Field Density apparatus for
    a) Core cutter method
    b) Sand Replacement method

4. Set of sieves: 4.75mm, 2mm, 1mm, 0.6mm, 0.42mm, 0.3mm, 5.15mm, and 0.075mm.
6. Hydrometer
7. Permeability Apparatus for
    a) Constant Head test
    b) Variable Head test
8. Universal Auto compactor for I.S light and heavy compaction tests.
9. Apparatus for CBR test
10. Sampling tubes and sample extractors.
11. 10 tons loading frame with proving rings of 0.5 tons and 5 tons capacity
12. One dimensional consolation test apparatus with all accessories.
13. Tri-axial cell with provision for accommodating 38 mm dia specimens.
14. Box shear test apparatus
15. Laboratory vane shear apparatus.
16. Hot Air ovens (Range of Temperature 50-150^{0}C
17. Moisture cans – 2 dozens.
18. Electronic balances pf 500 g capacity with 0.01g least count and 5 kg capacity with least count of 1gm

19. Measuring Jars - 1000CC- 6
    - 100CC- 4
20. Mercury - 500 g
21. Rammers - 2
    Crow bars - 2

TEXT BOOKS:

1.Soil Testing Lab Manual by K.V.S. Appa Rao & V.C.C.Rao,University Science Press , Laxmi Publication.
2.Soil Testing for Engineers by S.Mittal and J.P.Shukla, Kahna Publishers, New Delhi.
3. Relevant IS Codes.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01608

B.Tech. III - II sem (C.E.)	**L**	**P**	**C**
	0	**4**	**2**

ENVIRONMENTAL ENGINEERING LAB

OBJECTIVE: *The laboratory provides knowledge of estimating various parameters like PH, Chlorides, Sulphates, Nitrates in water. For effective water treatment, the determination of optimum dosage of coagulant and chloride demand are also included. The estimation status of Industrial effluents will also be taught in the laboratory by estimating BOD and COD of effluent.*

LIST OF EXPERIMENTS

1. Determination of pH and Turbidity
2. Determination of Conductivity and Total dissolved solids.
3. Determination of Alkalinity/Acidity.
4. Determination of Chlorides.
5. Determination and Estimation of total solids, organic solids and inorganic solids.
6. Determination of iron.
7. Determination of Dissolved Oxygen.
8. Determination of Nitrogen.
9. Determination of total Phosphorous.
10. Determination of B.O.D
11. Determination of C.O.D
12. Determination of Optimum coagulant dose.
13. Determination of Chlorine demand.
14. Presumptive coliform test.

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

LIST OF EQUIPMENT

1) pH meter,
2) Turbidity meter,
3) Conductivity meter,
4) Hot air oven,
5) Muffle furnace,
6) Dissolved Oxygen meter,
7) U – V visible spectrophotometer,
8) Reflux Apparatus,
9) Jar Test Apparatus,
10) BOD incubator.
11) COD Extraction apparatus

TEXT BOOKS:

1. Chemistry for Environmental Engineering by Sawyer and Mc. Carty
2. Standard Methods for Analysis of water and Waste Water – APHA
3. Environmental Engineering Lab Manual by Dr.G.Kotaiah and Dr.N.Kumara Swamy, Charotar Publishers, Anand.

REFERENCE

1. Relevant IS Codes.

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COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01701

B.Tech. IV - I sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

FINITE ELEMENT ANALYSIS

OBJECTIVE: *To familiarize the student with the latest developments in analysis for Civil Engineering problems.*

UNIT –I

INTRODUCTION: Concepts of FEM – Steps involved – merits & demerits – energy principles – Discretization – Rayleigh –Ritz method of functional approximation.

PRINCIPLES OF ELASTICITY: Equilibrium equations – strain displacement relationships in matrix form – Constitutive relationships for plane stress, plane strain and Axi-symmetric bodies of revolution with axi-symmetric loading.

UNIT –II

ONE DIMENSIONAL & TWO DIMENSIONAL ELEMENTS: Stiffness matrix for bar element – shape functions for one dimensional elements – one dimensional problems .Two Dimensional Elements - Different types of elements for plane stress and plane strain analysis – Displacement models – generalized coordinates – shape functions – convergent and compatibility requirements – Geometric invariance – Natural coordinate system – area and volume coordinates

UNIT –III

GENERATION OF ELEMENT : Generation of element stiffness and nodal load matrices for 3-node triangular element and four noded rectangular elements.

UNIT –IV

ISOPARAMETRIC FORMULATION :

Concepts of, isoparametric elements for 2D analysis –formulation of CST element, 4 – Noded and 8-noded iso-parametric quadrilateral elements –Lagrangian and Serendipity elements.

AXI-SYMMETRIC ANALYSIS: Basic principles-Formulation of 4-noded iso-parametric axi-symmetric element

UNIT-V

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

TEXT BOOK:

1. Finite Element Analysis for Engineering and Technology, Tirupathi R Chandraputla, Universities Press Pvt Ltd, Hyderabad. 2003.
2. Finite Element analysis – Theory & Programming by C.S.Krishna Murthy- Tata Mc.Graw Hill Publishers

REFERENCES:

1. Finite element analysis and procedures in engineering by H.V.Lakshminaryana, 3rd edition, universities press, Hyderabad.
2. 3.. Finite element analysis in Engineering Design by S.Rajasekharan, S.Chand Publications, New Delhi.
3. Finite element analysis by S.S. Bhavakatti-New age international publishers

outcomes:

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

1. demonstrate the differential equilibrium equations and their relationship
2. apply numerical methods to FEM
3. demonstrate the displacement models and load vectors
4. compute the stiffness matrix for isoperimetric elements
5. analyze plane stress and plane strain problems

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01702

B.Tech. IV - I sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

BRIDGE ENGINEERING

OBJECTIVE: *It deal with different types of Bridges like deck slab bridge, T – Beam Bridge e.t.c and gives a god knowledge on different components of bridges.*

UNIT - I
INTRODUCTION:
Importance of site investigation in Bridge design. Highway Bridge loading standards. Impact factor. Railway Bridge loading standards (B.G. ML Bridge) various loads in bridges.
BOX CULVERT : General aspects. Design loads, Design of Box culvert subjected to RC class AA tracked vehicle only.
BRIDGE BEARINGS :
General features – Types of Bearings – Design principles of steel Rocker & Roller Bearings – Design of a steel Rocker Bearing – Design of Elastometric pad Bearing.

UNIT - II
DECK SLAB BRIDGE :
Introduction – Effective width method of Analysis Design of deck slab bridge (Simply supported) subjected to class AA Tracked Vehicle only.

UNIT - III
BEAM & SLAB BRIDGE (T-BEAM BRIDGE)
General features – Design of interior panel of slab – Pigeauds method – Design of a T-beam bridge subjected to class AA tracked vehicle only.

UNIT – IV
PLATE GIRDER BRIDGE :
Introduction – elements of a plate girder and their design. Design of a Deck type welded plate girder – Bridge of single line B.G.
COMPOSITE BRIDGES :
Introduction – Advantages – Design of Composite Bridges consisting of RCC slabs over steel girders' including shear connectors

UNIT V
PIERS & ABUTMENTS:
General features – Bed Block – Materials piers & Abutments Types of piers – Forces acting on piers – Stability analysis of piers – General features of Abutments – forces acting on abutments – Stability analysis of abutments – Types of wing walls – Approaches – Types of Bridge foundations (excluding Design).

TEXT BOOKS :

1. Bridge Engineering by Ponnu Swamy, TATA Mcgraw Hill Company, New Delhi.
2. Design of Bridges by N.Krishnam Raju, Oxford & IBH, Publishing Company Pvt.ltd., Delhi.
3. Relevant – IRC & Railway bridge Codes.

REFERENCE :-

1. Design of Steel structures, by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi Publications, New Delhi.
2. Design of Bridges Structure by D.J.Victor
3. Design of Steel structures by Ramachandra.
4. Design of R.C.C. structures B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi Publications, New Delhi.
5. Design of Bridges Structure by T.R.Jagadish & M.A.Jayaram Prentice Hall of India Pvt., Delhi.

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Code:15A01703

B.Tech. IV - I sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

GEOTECHNICAL ENGINEERING – II

Objective: *To use the principles of Soil mechanics to design the foundations, Earth retaining structures and slope stability safely and economically knowledge of the subject is essential.*

UNIT – I

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

UNIT – II

EARTH 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 in layered soils – Coulomb's earth pressure theory – Rebhann's and Culmann's graphical method

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

UNIT – IV

SHALLOW FOUNDATIONS: Types – choice of foundation – Location of depth – Safe Bearing Capacity – Terzaghi`s, Meyerhoff's and Skempton`s Methods

ALLOWABLE BEARING PRESSURE : Safe bearing pressure based on N- value – allowable bearing pressure; safe bearing capacity and settlement from plate load test – allowable settlements of structures – Settlement Analysis

UNIT –V

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

WELL FOUNDATIONS: Types – Different shapes of wells – Components of wells – functions and Design Criteria – Sinking of wells – Tilts and shifts.

TEXT BOOKS:

1. Geotechnical Engineering by C.Venkataramaiah, New Age Pubilications.
2. Soil Mechanics and Foundation Engineering by Arora, Standard Publishers and Distributors, Delhi
3. Soil Mechanics and Foundations by – by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

REFERENCES:

1. Soil Mechanics and Foundation Engineering by Purushtoma Raj, Pearson Pubilications
2. Das, B.M., - (1999) Principles of Foundation Engineering –6th edition (Indian edition) Thomson Engineering
3. Foundation Engineering by Varghese,P.C., Prentice Hall of India., New Delhi.
4. Foundation Engineering by V.N.S.Murthy, CRC Press, New Delhi.

5. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork.
6. Geotechnical Engineering by Manoj Dutta & Gulati S.K – Tata Mc.Grawhill Publishers New Delhi.

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B.Tech. IV - I sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

TRANSPORTATION ENGINEERING - II

OBJECTIVE: *It deal with different components of Transportation Engineering like Railway , Airport Engineering & harbours. Sound knowledge can acquire on components of airports, docks and harbours.*

Unit – I

Railway Engineering:

Introduction – permanent way components – cross section of permanent way – functions and requirements of rails, sleepers and ballast – types of gauges – creep of rails – theories related to creep – coning of wheels – adzing of sleepers – rail fastenings.

Unit – II

Geometric design of railway track

Gradients – grade compensation – cant and negative super elevation – cant deficiency – degree of curves – safe speed on railway track – points and crossings – layout and functioning of left hand turn out and right hand turn outs – station yards – signaling and interlocking.

Unit –III

Airport Engineering

Airport site selection – factors affecting site selection and surveys- runway orientation – wind rose diagram – basic runway length – correction for runway length – terminal area – layout and functions – concepts of terminal building – simple building , linear concept, pier concept and satellite concept – typical layouts .

Unit – IV

Geometric design of runways and taxiways

Aircraft characteristics – influence of characteristics on airport planning and design – geometric design elements of runway – standards and specifications as per - functions of taxiways – taxiway geometric design – geometric elements and standard specifications – runway and taxiway lighting.

Unit – V

Ports and Harbours

Requirements of ports and harbours – types of ports – classification of harbours – docks and types of docks – dry docks, wharves and jetties – breakwaters: layouts of different types of harbours and docks – dredging operations – navigation aids.

Text books:

1. A Text Book of Railway Engineering-S.C.Saxena and S.Arora, Dhanpatrai and Sons, New Delhi.
2. Satish Chandra and Agarwal, M.M. (2007) “Railway Engineering” Oxford Higher Education, University Press New Delhi.

3. Airport Planning and Design- S.K. Khanna and M.G Arora, Nemchand Bros.
4. A Text book of Transportation Engineering – S.P.Chandola – S.Chand & Co. Ltd. – (2001).
5. Railway Track Engineering by J.S.Mundrey

References:

1. Highway, railway, Airport and Harbour Engineering – K.P. Subramanian, Scitech pubilishers.
2. Harbour, Dock and Tunnel Engineering – R. Srinivasan, Charotar Publishing House Pvt. Limited, 2009
3. Dock and Harbour Engineering – Hasmukh P Oza, Gutam H Oza, Chartor Publishers pvt ltd.

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Code:15A01705

B.Tech. IV - I sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

Cost Effective Housing Techniques

UNIT-I: a) **Housing Scenario**

Introducing - Status of urban housing - Status of Rural Housing

b) Housing Finance:

Introducing - Existing finance system in India - Government role as facilitator - Status at Rural Housing Finance - Impedimently in housing finance and related issues

a**) Land use and physical planning for housing**

introduction - Planning of urban land - Urban land ceiling and regulation act - Efficiency of building bye lass - Residential Densities

b) Housing the urban poor

Introduction - Living conditions in slums - Approaches and strategies for housing urban poor

UNIT-II: Development and adoption of low cost housing technology

Introduction - Adoption of innovative cost effective construction techniques - Adoption of precast elements in partial prefatroices - Adopting of total prefactcation of mass housing in India- General remarks on pre cast rooting/flooring systems - Economical wall system - Single Brick thick loading bearing wall - 19cm thick load bearing masonery walls - Half brick thick load bearing wall - Flyash grypsym thick for masonry - Stone Block masonery - Adoption of precast R.C. plank and join system for roof/floor in the building

UNIT-III: Alternative building materials for low cost housing

Introduction - Substitute for scarce materials – Ferrocement - Gypsum boards - Timber substitutions - Industrial wastes - Agricultural wastes - Fitire starateru; for ,p,topm of alternative building maintenance

Low cost Infrastructure services:

Introduce - Present status - Technological options - Low cost sanitation - Domestic wall - Water supply, energy

UNIT-IV: Rural Housing:

Introduction traditional practice of rural housing continuous - Mud Housing technology

Mud roofs - Characteristics of mud - Fire treatment for thatch roof - Soil stabilization - Rural Housing programs

UNIT-V: Housing in Disaster prone areas:

Introduction – Earthquake - Damages to houses - Traditional prone areas - Type of Damages and Railways of non-engineered buildings - Repair and restore action of earthquake Damaged non-engineered buildings recommendations for future constructions. Requirement's of structural safety of thin precost roofing units against Earthquake forcesStatus of R& D in earthquake strengthening measures - Floods, cyclone, future safety

TEXT BOOKS

1. Building materials for low –income houses – International council for building research studies and documentation.
2. Hand book of low cost housing by A.K.Lal – Newage international publishers.
3. Properties of concrete – Neville A.m. Pitman Publishing Limited, London.
4. Light weight concrete, Academic Kiado, Rudhai.G – Publishing home of Hungarian Academy of Sciences 1963.
5. Low cost Housing – G.C. Mathur.
6. Modern trends in housing in developing countries – A.G. Madhava Rao, D.S. Ramachandra Murthy & G.Annamalai.

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Code:15A01707

B.Tech. IV - I sem (C.E.)	**L**	**P**	**C**
	0	**4**	**2**

CAD LAB.

CAD:
SOFTWARE:
1. STAAD PRO or Equivalent

EXCERCISIES:
1. 2-D Frame Analysis and Design
2. Steel Tabular Truss Analysis and Design
3. 3-D Frame Analysis and Design
4. Retaining Wall Analysis and Design
5. Simple tower Analysis and Design
6. One Way Slab Analysis & Design
7. Two Way Slab Analysis & Design
8. Column Analysis & Design

TEXT BOOK:
1.Computer Aided Design Lab Manual by Dr.M.N.Sesha Prakash And Dr.C.S.Suresh

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COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01708

B.Tech. IV - I sem (C.E.)	**L**	**P**	**C**
	0	**4**	**2**

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.

LIST OF EQUIPMENT:

1. Apparatus for aggregate crushing test.
2. Aggregate Impact testing machine
3. Pycnometers.
4. Los angles Abrasion test machine
5. Deval's Attrition test machine
6. Length and elongation gauges
7. Bitumen penetration test setup.
8. Bitumen Ductility test setup.
9. Ring and ball apparatus
10. Penskey – Morten's apparatus
11. Relevant IS Codes

TEXT BOOKS:-

1. Lab manual in High way Engineering by Ajay.K.Duggal & Vijay .P.Puri, New Age pubilications,New Delhi

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Code:15A01801a

B.Tech. IV -II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

ADVANCED STRUCTURAL ENGINEERING
(ELECTIVE-II)

OBJECTIVE: *To make the student more conversant with the design principals of multistoried buildings, roof system, foundation and other important structures.*

1. Design of a flat slab(Interior panel only)
2. Design of concrete bunkers of circular shape – (excluding staging) – Introduction to silos
3. Design of concrete chimney
4. Design of circular and rectangular water tank resting on the ground
5. Design of cantilever and counter forte retaining wall with horizontal back fill

FINAL EXAMINATION PATTERN:

The question paper shall contain 2 questions of either or type covering all the syllabus where each question carries 35 marks out of 35 marks, 20 marks shall be for the design and 15 marks are for the drawing.

TEXT BOOKS :-

1. Structural Design and drawing (RCC and steel) by Krishnam Raju, Universites .Press , New Delhi
3. R.C.C Structures by Dr. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, Laxmi Publications, New Delhi
4. Advanced RCC by Varghese , PHI Publications, New Delhi.
5. Design of RCC structures by M.L.Gambhir P.H.I. Publications, New Delhi.

Reference books :-

1. R.C.C Designs by Sushil kumar , standard publishing house.
2. Fundamentals of RCC by N.C.Sinha and S.K.Roy, S.Chand Publications, New Delhi.

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Code:15A01801b

B.Tech. IV -II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

BUILDING CONSTRUCTION & MANGEMENT
(ELECTIVE-II)

Objective: The objective of the course is to make the student to understand about fundamentals of construction management and techniques to be used to perform and complete the construction works intime by saving time and money.

UNIT - I

FUNDAMENTALS OF CONSTRUCTION TECHNOLOGY :

Definitions and Discussion – Construction Activities – Construction Processes - Construction Works – Construction Estimating – Construction Schedule – Productivity and Mechanized Construction – Construction Documents – Construction Records – Quality – Safety – Codes and Regulations.

PREPARATORY WORK AND IMPLEMENTATION

Site layout – Infrastructure Development – Construction Methods – Construction Materials – Deployment of Construction Equipment – Prefabrication in Construction – Falsework and Temporary Works.

UNIT - II

EARTHWORK :

Classification of Soils – Project Site – Development – Setting Out - Mechanized Excavation – Groundwater Control – Trenchless (No-dig) Technology – Grading – Dredging.Rock Excavation – Basic Mechanics of Breakage – Blasting Theory – Drillability of Rocks – Kinds of Drilling – Selection of the Drilling Method and Equipment – Explosives – Blasting Patterns and Firing Sequence – Smooth Blasting – Environmental Effect of Blasting.

UNIT - III

PROJECT MANAGEMENT AND BAR CHARTS AND MILESTONE CHARTS :

Introduction – Project planning – Scheduling – Controlling – Role of decision in project management – Techniques for analyzing alternatives Operation research – Methods of planning and programming problems – Development of bar chart – Illustrative examples – Shortcomings of bar charts and remedial measures – Milestone charts – Development of PERT net work problems.

UNIT - IV

ELEMENTS OF NETWORK AND DEVELOPMENT OF NETWORK :

Introduction – Event – Activity – Dummy – Network rules – Graphical guidelines for network – Common partial situations in network – Numbering the events – Cycles Problems – Planning for network construction – Modes of network construction – Steps in development of network – Work breakdown structure –Hierarchies – Illustrative examples – Problems.

UNIT - V

PERT AND CPM: TIME COMPUTATIONS & NETWORK ANALYSIS

Introduction – Uncertainties : Use of PERT – Time estimates – Frequency distribution – Mean, variance and standard deviation – Probability distribution – Beta distribution –

Expected time Problems -Earliest expected time – Formulation for T_E - Latest allowable occurrence time – Formulation for T_L - Combined tabular computations for T_E and T_L problems.Introduction - Slack – Critical path – Illustrative examples – Probability of meeting scheduled date Problems – CPM : process – CPM : Networks – Activity time estimate – Earliest event time – Latest allowable occurrence time – Combined tabular computations for T_E and T_L - Start and f inish times of activity – Float – Critical activities and critical path – Illustrative examples Problems.

TEXT BOOKS :

1. Construction project management by Jha ,Pearson pubilications,New Delhi.
2. Construction Technology by Subir K.Sarkar and Subhajit Saraswati – Oxford Higher Education- Univ.Press, Delhi.
3. Project Planning and Control with PERT and CPM by Dr.B.C.Punmia, K.K.Khandelwal, Lakshmi Publications New Delhi.

REFERENCES:

1. Optimal design of water distribution networks P.R.Bhave, Narosa Publishing house 2003.
2. Total Project management, the Indian context- by : P.K.JOY- Mac Millan Publishers India Limited.

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Code:15A01801c

B.Tech. IV -II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

WATER HARVESTING AND CONSERVATION
(ELECTIVE-II)

OBJECTIVE:
The main aim of this course is to discuss various aspects of water resources development and management on watershed basis. The various sections in the course will focus on the technical aspects of watershed management; perspectives on water management; skills of analyzing the complex issues in water management and on specific knowledge on issues of watershed management.

Unit – I
Water Harvesting: Principles of water harvesting-methods of rainwater harvesting-design of rainwater harvesting structures-Purification Techniques for direct use- Harvesting of surface runoff-onsite detention basin - ponds - types - Recycling of harvested water

Unit – II
Water Recovery and Reuse: Perspective on recycle and reuse- factors affecting the development of water reclamation and reuse criteria- elements/components of water reclamation and reuse criteria / guidelines- sewage irrigation- Waste water reclamation-waste water recharge for reuse – Treatment Requirements for Water Reuse-methods

Unit – III
Sustainable Watershed Approach & Watershed Management Practices: Concept of watershed-Introduction to watershed management- Integrated water resources management-natural resources management-agricultural practices-integrated farming-Conjunctive use of water resources-Community participation-Watershed Management Practices in Arid and Semiarid Regions-Case studies-Short term and long term strategic planning.

Unit – IV
Watershed Modeling: Standard modeling approaches and classifications, system concept for watershed modeling, overall description of different hydrologic processes, modeling of rainfall- runoff process, subsurface flows and groundwater flow.

Unit – V
Soil and Water Conservation: Scope of soil and water conservation-Mechanics and types of erosion-their causes-Soil erosion control measures - bank protection-vegetative barriers-contour bund- contour trenches-contour stone walls-contour ditches-terraces-outlets and grassed waterways-Gully control structures - temporary and permanent - design of permanent soil conservation structures-Design of farm ponds and percolation ponds.

Text books and Reference books:

1. Pierce, F.J. and Frye, W. W. (1998): Advances in Soil and Water Conservation, Ann Arbor Press, Michigan.
2. Schwab, G. O., Fangmeier, D. D., Elliot, W. J. and Frevert, R. K. (1993): Soil and Water Conservation Engineering, 4th Ed. John Wiley and Sons Inc., USA
3. Murty, J.V.S. "Watershed Management", New Age Intl., New Delhi 1998.
4. Murthy, J.V.S., Watershed Management in India, Wiley Eastern, New Delhi, 1994 .
5. 5.Dilip Kumar Majumdar, Irrigation water management - Principles and Practice, PHI Pvt.Ltd.NewDelhi-1.
6. Madan Mohan Das&Mimi Das Saikia, Irrigation and water power Engineering,PHI learning pvt. Ltd., NewDelhi-1
7. Chatterjee, S. N., Water Resources Conservation and Management, Atlantic Publishers, 2008

OUTCOMES:

After completion of this course the student will be able to understand various concepts related to

1. Water harvesting methods and principles
2. Water recovery and reuse
3. Sustainable watershed management practices
4. Watershed modeling techniques
5. Methods of soil and water conservation

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COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01802a

B.Tech. IV -II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

DESIGN AND DRAWING OF IRRIGATION STRUCTURES
(ELECTIVE-III)

Design and drawing of the following irrigation structures.

1. Sloping glacis weir
2. Surplus weir.
3. Tank sluice with tower head
4. Type III Syphon aqueduct.
5. Canal regulator.

Final Examination pattern: Any two questions of the above Five designs may be asked out of which the candidate has to answer one question. The duration of examination will be three hours.

TEXT BOOKS:

1. Design of minor irrigation and canal structures by C.Satyanarayana Murthy, Wiley eastern Ltd.
2. Irrigation engineering and Hydraulic structures by S.K.Garg, Standard Book House.

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COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01802b

B.Tech. IV -II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

ADVANCED FOUNDATION ENGINEERING
(ELECTIVE –III)

UNIT - I

SHALLOW FOUNDATIONS-I:

General requirements of foundations. Types of shallow foundations and the factors governing the selection of a type of shallow foundation. Bearing capacity of shallow foundations by Terzaghi's theory and Meyerhof's theory (derivation of expressions and solution to problems based on these theories). Local shear and general shear failure and their identification.

Bearing capacity of isolated footing subjected to eccentric and inclined loads. Bearing capacity of isolated footing resting on stratified soils-Button's theory and Siva Reddy analysis.

UNIT - II

ANALYSIS AND STRUCTURAL DESIGN OF R.C.C. FOOTINGS:

Analysis and structural design of R.C.C. isolated, combined and strap footings.

UNIT - III

DEEPFOUNDATIONS:

Pile foundations-types of pile foundations. Estimation of bearing capacity of pile foundation by dynamic and static formulae. Bearing capacity and settlement analysis of pile groups. Negative skin Friction, Pile load tests. Well foundations – elements of well foundation. Forces acting a on a well foundation. Depth and bearing capacity of well foundation. Design of individual components of well foundation (only forces acting and principles of design). Problems associated with well sinking.

UNIT - IV

SHEET PILE WALLS:

Cantilever sheet piles and anchored bulkheads, Earth Pressure diagram, Determination of depth of embedment in sands and clays-Timbering of Trenches – Earth Pressure Diagrams – Forces in struts.

DESIGN OF UNDER REAMED PILES FOUNDATIONS:

Under reamed piles-principle of functioning of under reamed pile-Analysis and structural design of under reamed pile.

UNIT - V

FOUNDATIONS IN PROBLEMATIC SOILS :

Foundations in black cotton soils- basic foundation problems associated with black cotton soils. Lime column techniques – Principles and execution. Use of Cohesive Non Swelling (CNS) layer below shallow foundations.

TEXT/ REFERENCE BOOKS :

1. Analysis and Design of Foundations and Retaining Structures- Shamsher Prakash, Gopal Ranjan and Swami Saran.
2. Soil Mechanics and Foundation Engineering by Purushtoma Raj, Pearson Pubilications
3.Geotechnical Engg. – C.Venkatramaiah. New age International Pvt . Ltd, (2002).

REFERENCES:-

1. Analysis and Design of Foundations – E.W.Bowles.
2. Foundation engineering by Brije.M.Das, Cengage pubilications,New Delhi.
3. Foundations Design and Construction – Tomlinson.
4. Foundation Design-Teng.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01802c

B.Tech. IV -II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

ARCHITECTURE AND TOWN PLANNING
(ELECTIVE-III)

Objective:- To know the western architecture and Indian architecture and also to gain knowledge on the principles of architectural design and historical background of town planning.

A) ARCHITECTURE:

UNIT-I

History of Architecture:

a) **Western Architecture:** Egyptian, Greek, Roman Architectures; influences-Comparative Analysis Orders.

b) **Indian Architecture:** Vedic age - Indus Valley civilization - Buddhist period; stambas, Slenstas. Roranas, Chaityans, Viharas with one example for each Hindu temples - Evaluation of Dravidian and Indo Aryan Styles - Principle factors. Temple of Aibole, Mahabalipuram, Madurai, Deograph, Bhuvaneshwar, Mount Abu.

c) Indo - Sarsanic Architecture; Mosque - Place- Fort Tomb.

UNIT - II

Architectural Design:

a) **Principle of designing** : Composition of plan Relationship between plan and elevation elements, form, surface Mass, Texture, Color, Tone.

b) **Principle of Compositions:** Unity, contrast, proportion, scale, Bab Rhuthm, character.

Principles of Planning a Residence; Site Orientation prospect, Grouping, circulation, privacy, services and other factors.

UNIT – III

Introduction of Post-classic Architecture and contribution of eminent architects to modern period.

Brief summary of post - classic architecture - Indian and Western Architectural contribution of Edward Lutyens, Le Corbusier), Frank Lloyd Wrigt, Walter Groping, Vender Rohe, Caarihan, Nervi, Oscar Niemyer, Edward Durell stone.

B) TOWN PLANNING:

UNIT – IV

Historical Back Ground:

Town planning in India - town plans of Magad - town plans of ancient Indian towns; Mourya, Pataliputra vijayanagara, Delhi.Town planning in the West-town plans of Acropolis, Rome, Paris, London.

UNIT – V

Components of Planning;

a) Zoning
b) Roads and road Traffic.
a) Housing-Slums, Parks, Play grounds.
b) Public Utility Services.
c) Surveys and maps for planning.
d) Neighbourhood Planning.

Planning New town, planning standards, National and regional Planning, town planning and legislation.

Garden cities and satellite town

REFERENCES:

A) ARCHITECTURE

1. Indian Architecture – Vol:- I and II by Percy Brown, Taraporevala Publications, Bombay.
2. Planning and 'Design of Building -Section of Architecture by Y.S.Sane.
3. Modern Architecture and Design by Nikolans, Pevshar.
4. Modern Ideal Hol11nes for India by R.S.Deshpande.

B) TOWN PLANNING

1. Town and Country .Planning - A.J.Brown and H.M.Sherrard.
2. Town Design .- Federik Gibbard, Architectural press, London.
3. National Building Code of India.
4. Town Planning in India - Town and Country Planning Organisation, New Delhi 1962.
5. Regional Planning - Misra R.P., Mysore University.
6. Urban and Regional Planning; Principles and case studies by K.S.Rama Gouda, Mysore University Publications.
7. Town and Country Planning - P. Abercrombe, Oxford University press.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Code:15A01803a

B.Tech. IV - II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

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. Concrete Technology by A.R. Santakumar, Oxford University press
2. Maintenance and Repair of Civil Structures, B.L. Gupta and Amit Gupta, Standard Publications.

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).

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B.Tech. IV -II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

URBAN TRANSPORTATION PLANNING
(ELECTIVE –IV)

UNIT -I

Concept Of Travel Demand; Travel Characteristics - Origin, Destination, Route, Mode, Purpose; Travel Demand As A Function Of Independent Variables; Assumptions In Demand Estimation Relation Between Land Use And Travel; Four Step Process Of Transportation Planning.

UNIT - II

Transportation Planning Process; General Concept Of Trip; Trip Generation; Trip Distribution, Traffic Assignment And Mode Split, Aggregate And Disaggregate Models. Date Collection And Sequential And Sequential Recursive Models. Date Collection And Inverntories; Definition Of Study Area; Zoning Principles; Types And Sources Of Date, Home Interview Surveys; Road Side Interview Surveys; Goods. Taxi, IPT Surveys; Sampling Techniques; Expansion Factors And Accuracy Check; Desire Line Diagram And Use.

UNIT - III

Trip Generation Models; Factors Governing Trip Generation And Attraction; Multiple Linear Regression Models, Category Analysis, Trip Distribution Models Methods Of Trip Distribution; Growth Factor Models Uniform Growth Factor Method; Average Growth Factor Method; Factor Method; Furnes Method; Limitation Of Growth Factor Models Concept Of Gravity Model.

UNIT -IV

Traffic assignment and Mode Split; Purpose of Assignment and General Principles; Assignment Techniques - All - or- nothing. Assignment; Multiple route assignment, Capacity restraint method. Minimum path trees; Diversion Curves. Factors affecting mode split; probit, logit and discriminant Analysis.

UNIT - V

Economic Evaluation of Transportation plans; Costs And Benefits Of Transportation Projects; Vehicle Operating Cost; Timesaving Accident Costs. Methods Of Economic Evaluation - Benefit Cost Ratio Method; Net Present Value Method; Internal Rate Of Return Method.

REFERENCES:

1. L.R.Kadiyalli; Traffic Engineering and Transporation Planning Khanna Publishers, Delhi.
2. Papa Costas C.S.; Fundamentals of Transportation Engineering, Prentice Hall, India.
3. Khistry C.J.Transportation Engineering -An Introduction Prentic Hall.

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REMOTE SENSING AND GIS
(ELECTIVE –IV)

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, fiducially points, parallax measurement using fiducially line.

UNIT – II
REMOTE SENSING :
Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units. Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

UNIT – III
GEOGRAPHIC INFORMATION SYSTEM:
Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.
TYPES OF DATA REPRESENTATION:
Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS – File management, Spatial data – Layer based GIS, Feature based GIS mapping.

UNIT – IV
GIS SPATIAL ANALYSIS:
Computational Analysis Methods(CAM), Visual Analysis Methods (VAM), Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data.

UNIT – V
WATER RESOURCES APPLICATIONS:
Land use/Land cover in water resources, Surface water mapping and inventory, Rainfall – Runoff relations and runoff potential indices of watersheds, Flood and Drought impact assessment and monitoring, Watershed management for sustainable development and Watershed characteristics.
Reservoir sedimentation, Fluvial Geomorphology, water resources management and monitoring, Ground Water Targeting, Identification of sites for artificial Recharge structures, Drainage Morphometry, Inland water quality survey and management, water depth estimation and bathymetry.

TEXT BOOKS:

1 Remote Sensing and GIS by B.Bhatta, Oxford University Press,New Delhi.
2 Advanced surveying : Total station GIS and remote sensing – Satheesh Gopi – Pearson publication.

REFERENCES:

1. Fundamentals of remote sensing by gorge Joseph , Universities press, Hyderabad.
2. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.
3. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.
4. Remote sensing and GIS by M.Anji reddy ,B.S.Pubiliications,New Delhi.
5. Remote Sensing and its applications by LRA Narayana University Press 1999.
6. GIS by Kang – tsung chang, TMH Publications & Co.,
7. Principals of Geo physical Information Systems – Peter A Burragh and Rachael Mc Donnell, Oxford Publishers 2004

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B.Tech. IV -II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

AIR POLLUTION AND CONTROL
(ELECTIVE –V)

UNIT – I

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

EFFECTS OF AIR POLLUTION : 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

THERMODYNAMIC OF AIR POLLUTION:

Thermodynamics and Kinetics of Air-pollution – Applications in the removal of gases like Sox, Nox, CO, HC etc., air-fuel ratio. Computation and Control of products of combustion.

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

UNIT-III

POLLUTANT DISPERSION MODELS : Lapse Rates, Pressure Systems, Winds and moisture plume behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.

CONTROL OF PARTICULATES : 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, Electrostatic precipitators.

UNIT – IV

CONTROL OF GASEOUS POLLUTANTS : General Methods of Control of Nox and Sox emissions – In-plant Control Measures, process changes, dry and wet methods of removal and recycling.

UNIT – V

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

TEXT BOOKS:

1. Air Quality by Thod godish, Levis Publishers, Special India Edition, New Delhi
2. Air pollution By M.N.Rao and H.V.N.Rao – Tata Mc.Graw Hill Company.
3. 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.
2. Air Pollution and Control by K.V.S.G.Murali Krishna, Kousal & Co. Publications, New Delhi.
3. Enivronmental meteorology by S.Padmanabham murthy , I.K.Internationals Pvt Ltd,New Delhi.

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B.Tech. IV -II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

PRESTRESSED CONCRETE
(ELECTIVE –V)

UNIT – I

INTRODUCTION:

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

METHODS OF PRESTRESSING:-

Methods and Systems of Prestressing; Pre-tensioning and post tensioning methods – Analysis of post tensioning - Different systems of prestressing like Hoyer System, Magnel System Freyssinet system and Gifford – Udall System.

UNIT – II

LOSSES OF PRESTRESS:-

Loss of prestress in pre-tensioned and post-tensioned members due to various causes like elastic shortening of concrete, shrinkage of concrete, creep of concrete, Relaxation of stress in steel, slip in anchorage ,bending of member and wobble frictional losses.

UNIT – III

ANALYSIS & DESIGN OF SECTIONS FOR FLEXURE;-

Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons.Allowable stress, Design criteria as per I.S.Code – Elastic design of simple rectangular and I-section for flexure – Kern – lines, cable profile.

UNIT – IV

DESIGN OF SECTION FOR SHEAR :

Shear and Principal Stresses – Design for Shear in beams.

COMPOSITE SECTION:

Introduction – Analysis of stress – Differential shrinkage – General designs considerations.

UNIT – V

DEFLECTIONS OF PRESTRESSED CONCRETE BEAMS:

Importance of control of deflections – factors influencing deflections – short term deflections of uncracked members prediction of long term deflections.

TEXT BOOKS:

1. Prestressed Concrete by N. Krishna Raju; - Tata Mc.Graw HillPublications.
2. Prestressed Concrete by Ramamrutham,Dhanpatrai Publications
3. Prestressed Concrete design Praveen Nagrajan, Pearson publications, 2013 editions.

REFERENCES:

1. Design of Prestressed concrete structures (Third Edition) by T.Y. Lin & Ned H.Burns, John Wiley & Sons.
2. Pre stressed concrete by E.G.Nawy

Codes/Tables:

Codes: BIS code on prestressed concrete, IS 1343 to be permitted into the examination Hall.

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B.Tech. IV - II sem (C.E.)	**L**	**P**	**C**
	4	**0**	**4**

EARTHQUAKE RESISTANT STRUCTURES
(ELECTIVE – V)

UNIT – I

Introduction to Structural Dynamics : – Theory of vibrations – Lumped mass and continuous mass systems – Single Degree of Freedom (SDOF) Systems – Formulation of equations of motion – Undamped and damped free vibration – Damping – Response to harmonic excitation – Concept of response spectrum.

UNIT – II

Multi-Degree of Freedom (MDOF) Systems : - Formulation of equations of motion – Free vibration – Determination of natural frequencies of vibration and mode shapes – Orthogonal properties of normal modes – Mode superposition method of obtaining response.

UNIT – III

Earthquake Analysis : - Introduction – Rigid base excitation – Formulation of equations of motion for SDOF and MDOF Systems – Earthquake response analysis of single and multi-storyed buildings – Use of response spectra.Review of the latest Indian seismic code IS:1893 – 2002 (Part-I) provisions for buildings – Earthquake design philosophy – Assumptions – Design by seismic coefficient and response spectrum methods – Displacements and drift requirements – Provisions for torsion.

UNIT – IV

Earthquake Engineering : - Engineering Seismology – Earthquake phenomenon – Causes and effects of earthquakes – Faults – Structure of earth – Plate Tectonics – Elastic Rebound Theory – Earthquake Terminology – Source, Focus, Epicenter etc – Earthquake size – Magnitude and intensity of earthquakes – Classification of earthquakes – Seismic waves – Seismic zones – Seismic Zoning Map of India – Seismograms and Accelegrams.Review of the latest Indian Seismic codes IS:4326 and IS:13920 provisions for ductile detailing of R.C buildings – Beam, column and joints

UNIT – V

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

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

TEXT BOOKS:

1. Dynamics of Structures by A.K.Chopra – Pearson Education, Indian Branch, Delhi.
2. Dynamics of Structures – Clough & Penzien, McGraw Hill – International Edition.
3. Earthquake Resistant Design of Structures by S.K.Duggal, Oxford University press, New Delhi

REFERENCES:

1. Structural Dynamics by Mario Paaz , Academic Pubilishers.
2. Earthquake Resistant Design of Structures – Pankaj Agarwal & Manish Shrikhande – Printice Hall of India, New Delhi
3. Earthquake Tips by C.V.R.Murty, I.I.T. Kanpur.

4. Earthquake Hazardous Mitijation by R.Ayothiraman and Hemanth Hazarika, I.K.International Publishing House Pvt.Ltd., New Delhi.

Codes/Tables:
IS Codes: IS:1893, IS:4326 and IS:13920 to be permitted into the examinations Hall.