GODAVARI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

Approved by AICTE, Accredited by NBA & NAAC 'A' Grade, Recognized under 2(f) and 12(b) of UGC, Permanently Affiliated to JNTUK, Kakinada.

COURSE STRUCTURE

CIVIL ENGINEERING

I YEAR: I SEMESTER

S. No.	Subject Code	Subject Title	Lecture	Tutorial	Practical
1.	14198101	English – I	4	-	-
2.	14198102	Mathematics-I	4	-	-
3.	14198103	Mathematics-II (Mathematical Methods)	4	-	-
4.	14198104	Engineering Physics	4	-	-
5.	14198105	Computer Programming	4	-	-
6.	14198106	Environmental Studies	4	-	-
7.	14198111	English Communication Skills Lab I	-	-	3
8.	14198112	Engineering Physics Lab	-	-	3
9.	14198113	Computer Programming Lab	-	-	3

COURSE STRUCTURE

CIVIL ENGINEERING

I YEAR: II SEMESTER

S. No.	Subject Code	Subject Title	Lecture	Tutorial	Practical	D
1.	14198201	English – II	4	-	-	
2.	14198202	Mathematics-III	4	-	-	
3.	14198203	Engineering Chemistry	4	-	-	
4.	14198204	Engineering Mechanics	4	-	-	
5.	14198205	Engineering Drawing	-	-	-	4
6.	14198291	Professional Ethics and human values*	4	-	-	
7.	14198211	English Communication Skills Lab II	-	-	3	
8.	14198212	Engineering Chemistry Lab	-	-	3	
9.	14198213	Engineering work shop & IT work shop	-	-	3	

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COURSE STRUCTURE

CIVIL ENGINEERING

II YEAR: I SEMESTER

S. No.	Subject Code	Subject Title	Lecture	Tutorial	Practical
1.	14119301	Probability & Statistics	4	-	-
2.	14110302	Building Materials and Constructions	4	-	-
3.	14110303	Building Planning & Drawing	4	-	-
4.	14110304	Strength of Materials-I	4	-	-
5.	14110305	Surveying	4	-	-
6.	14110306	Fluid Mechanics	4	-	-
7.	14110381	Surveying - Field Work	-	-	3
8.	14110312	Strength of Materials Lab	-	-	3
9.	14110377	Computer Aided Engineering Drawing Practice	-	-	3

COURSE STRUCTURE

CIVIL ENGINEERING

II YEAR: II SEMESTER

S. No.	Subject Code	Subject Title	Lecture	Tutorial	Practical
1.	14112403	Basic Electrical & Electronics Engineering	4	-	-
2.	14110401	Strength of Materials-II	4	-	-
3.	14110402	Hydraulics and Hydraulic Machinery	4	-	-
4.	14110404	Concrete Technology	4	-	-
5.	14110405	Structural Analysis - I	4	-	-
6.	14110406	Environmental Engineering - I	4	-	-
7.	14110411	Fluid Mechanics and Hydraulic Machinery Lab	-	-	3
8.	14110412	Concrete Technology Lab	-	-	3
9.	14119491	Soft Skills -I*	1	3	-

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COURSE STRUCTURE

CIVIL ENGINEERING

III YEAR: I SEMESTER

S. No.	Subject Code	Subject Title	Lecture	Tutorial	Practical
1	14119501	Managerial Economics and Financial Analysis	4	-	-
2	14110502	Design of Reinforced Concrete Structures	4	-	-
3	14110503	Structural Analysis - II	4	-	-
4	14110504	Soil Mechanics	4	-	-
5	14110505	Transportation Engineering - I	4	-	-
6	14110506	Engineering Geology	4	-	-
7	14110511	Geotechnical Engineering Lab	-	-	3
8	14110512	Transportation Engineering Lab	-	-	3
9	14110521	Mini Project / Study Project	-	-	-

COURSE STRUCTURE

CIVIL ENGINEERING

III YEAR: II SEMESTER

S. No.	Subject Code	Subject Title	Lecture	Tutorial	Practical
1.	14110601	Design of Steel Structures	4	-	-
2.	14110602	Foundation Engineering	4	-	-
3.	14110603	Transportation Engineering - II	4	-	-
4.	14110604	Environmental Engineering - II	4	-	-
5.	14110605	Water Resources Engineering -I	4	-	-
6.	14110666	**OPEN ELECTIVE**	4	-	-
7.	14110611	Environmental Engineering Lab	-	-	3
8.	14110612	Engineering Geology Lab	-	-	3
9.	14119697	Soft Skills -II*	-	-	-

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COURSE STRUCTURE

CIVIL ENGINEERING

IV YEAR: I SEMESTER

S. No.	Subject Code	Subject Title	Lecture	Tutorial	Practical
1.	14110701	Water Resource Engineering -II	4	-	-
2.	14110702	Construction Technology and Management	4	-	-
3.	14110703	Prestressed Concrete	4	-	-
4.	14110704	Remote Sensing and GIS Applications	4	-	-
5.	14110765	**ELECTIVE-I**	4	-	-
6.	14110711	Design and Detailing Lab	-	-	3
7.	14110712	GIS & CAD Lab	-	-	3
8.	14110731	Summer Internship / Training	-	-	-

COURSE STRUCTURE

CIVIL ENGINEERING

IV YEAR: II SEMESTER

S. No.	Subject Code	Subject Title	Lecture	Tutorial	Practical
1.	14110801	Estimating, Specifications & Contracts	4	-	-
2.	14110862	**ELECTIVE-II**	4	-	-
3.	14110863	**ELECTIVE-III**	4	-	-
4.	14110864	**ELECTIVE-IV**	4	-	-
5.	14110841	Project Work	-	-	-
6.	14119895	Intellectual Property Rights	4	-	-

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LIST OF ELECTIVES

Open Electives:

Sl. No	Subject Code	Subject Name
1	14110666a	Environmental Pollution and Control
2	14110666b	Disaster Management
3	14110666c	Architecture and Town Planning
4	14110666d	Green Technologies

Department Elective 1:

Sl. No	Subject Code	Subject Name
1	14110765a	Ground Improvement Techniques
2	14110765b	Bridge Engineering
3	14110765c	Urban Hydrology
4	14110765d	Advanced Surveying

Department Elective 2:

Sl. No	Subject Code	Subject Name
1	14110862a	Environmental Impact Assessment and Management
2	14110862b	Advanced Structural Engineering
3	14110862c	Design and Drawing of Irrigation structures
4	14110862d	Traffic Engineering

Department Elective 3:

Sl. No	Subject Code	Subject Name
1	14110863a	Advanced foundation Engineering
2	14110863b	Earthquake Resistant Design
3	14110863c	Solid waste Management
4	14110863d	Pavement Analysis & Design and Evaluation

Department Elective 4:

Sl. No	Subject Code	Subject Name
1	14110864a	Soil Dynamics and Machine Foundations
2	14110864b	Repair and Rehabilitation of Structures
3	14110864c	Water Resources System Planning
4	14110864d	Urban Transportation Planning

MOOCS:

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B. Tech. I Year – I Sem.

ENGLISH -I *(Common to all branches)*

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

- Understand doing self introspection and self vigilance
- Achieve high quality of life, strength and sovereignty of a developed nation
- Understand the importance of writing skills and its techniques
- Envision the dangers of scientific and technological innovations
- Improve the exposure to universal happenings
- Communicate the necessity to exercise humour in the daily life

DETAILED TEXT-I English Essentials: Recommended Topics :

1. **IN LONDON: M.K.GANDHI**
   OBJECTIVE: To apprise the learner how Gandhi spent a period of three years in London as a student.
2. **THE KNOWLEDGE SOCIETY- APJ KALAM**
   OBJECTIVE: To make the learners rediscover India as a land of Knowledge.
3. **THE SCIENTIFIC POINT OF VIEW- J.B.S. HALDANE**
   OBJECTIVE: This essay discusses how scientific point of view seeks to arrive at the truth without being biased by emotion.
4. **PRINCIPLES OF GOOD WRITING:**
   OBJECTIVE: To inform the learners how to write clearly and logically.
5. **MAN'S PERIL**
   OBJECTIVE: To inform the learner that all men are in peril.
6. **THE DYING SUN—SIR JAMES JEANS**
   OBJECTIVE: This excerpt from the book "The Mysterious Universe" presents the mysterious nature of the Universe and the stars which present numerous problems to the scientific mind. Sir James Jeans uses a poetic approach to discuss the scientific phenomena.
7. **LUCK—MARK TWAIN**
   OBJECTIVE: This is a short story about a man's public image and his true nature. The theme of the story is that luck can be a factor of life, so that even if one is incompetent but lucky, one can still succeed.

Prescribed Text Book: "**English Essentials**" by Ravindra Publications

Course outcomes: **At the end of the semester the student will be able to**

- **Take inspiration by reading autobiographies**
- **Help the common man and achieve the social cause**
- **Aspire for the useful innovations to improve living**
- **Achieve the target without compromise**

NON-DETAILED TEXT:

(From Modern Trailblazers of Orient Blackswan)
(Common single Text book for two semesters)
(Semester II (5 to 8 lessons)

1. **G.D.Naidu**

OBJECTIVE: To inspire the learners by G.D.Naidu‟s example of inventions and contributions.

2. **G.R.Gopinath**

OBJECTIVE: To inspire the learners by his example of inventions.

3. **Sudhamurthy**

OBJECTIVE: To inspire the learners by the unique interests and contributions of Sudha Murthy.

4. **Vijay Bhatkar**

OBJECTIVE: To inspire the learner by his work and studies in different fields of engineering and science.

Text Book : "Trail Blazers" by Orient Black Swan Pvt. Ltd. Publishers

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B. Tech. I Year – I Sem.

MATHEMATICS – I(DIFFERENTIAL EQUATIONS)

(Common to all branches)

Course outcome: *"At the end of the course the student will be able to*

- *solve first and higher order ordinary differential equations(ODE) with applications by various techniques.*
- *apply Laplace Transforms to solve Initial Value Problems and evaluate Infinite Integrals.*
- *apply Partial Differentiation to solve Inequalities and to find Maxima and Minima.*
- *solve First and Higher order PDE with their applications to Heat equation, Wave equation, Laplace equation*

UNIT I: Differential equations of first order and first degree:
Objective: *Solution of First order and First degree ODE with applications*
Linear-Bernoulli-Exact-Reducible to exact.
Applications: Newton's Law of cooling-Law of natural growth and decay-orthogonal trajectories.

UNIT II: Linear differential equations of higher order:
Objective: *Solution of Higher order Linear ODE with applications.*
Non-homogeneous equations of 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).
Applications: LCR circuit, Simple Harmonic motion.

UNIT III Laplace transforms:
Objective: *Application of Laplace Transform to Solution of IVP and Evaluation of Integrals*
Laplace transforms of standard functions-Shifting Theorems, Transforms of derivatives and integrals – Unit step function –Dirac's delta function- Inverse Laplace transforms– Convolution theorem (with out proof).
Applications: Solutions of ordinary differential equations using Laplace transforms.

UNIT IV Partial differentiation:
Objective: *Mean Value Theorems and their applications to solve Inequalities and Maxima and Minima*
Introduction- Total derivative-Chain rule-Generalized Mean Value theorem for single variable (without proof)-Taylors and Mc Laurent's series for two variables– Functional dependence- Jacobian.
Applications: Maxima and Minima of functions of two variables with constraints and without constraints.

UNIT V First order Partial Differential Equations:
Objective:*Formation and Solution of First order PDE*
Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations.

UNIT VI Higher order Partial differential equations:
Objective: *Solution and applications of Higher order PDE***.**
Solutions of Linear Partial differential equations with constant coefficients- Method of separation of Variables
Applications: One- dimensional Wave, Heat equations - two-dimensional Laplace Equation.

Books:

1. **B.S.GREWAL,** Higher Engineering Mathematics, 42nd Edition, Khanna Publishers
2. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, 9th Edition, Wiley-India
3. **GREENBERG,** Advanced Engineering Mathematics, 2nd edition, Pearson edn
4. **DEAN G. DUFFY,** Advanced engineering mathematics with MATLAB, CRC Press
5. **PETER O'NEIL,** advanced Engineering Mathematics, Cengage Learning.

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B. Tech. I Year – I Sem.

MATHEMATICS –II (Numerical Methods and Integral Transforms)

(Common to AME, CE, ME, MM)

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

- Apply Numerical Techniques to solve *Algebraic and Transcendental Equations and also Initial Value Problems and ODE.*
- *To interpolate the tabulated data at the given values using various interpolation techniques.*
- *Express a given function satisfying certain conditions in Fourier Series.*
- *Use finite and infinite Fourier Integral Transforms to solve BVPs.*
- *Solve Difference Equations using Z-Transforms.*

UNIT I: Solution of Algebraic and Transcendental Equations

Objective: *To enable the student to solve Algebraic and Transcendental equations by Numerical Methods*

Introduction- Bisection Method – Method of False Position – Iteration Method – Newton-Raphson Method.

UNIT II: Interpolation

Objective:*To enable the student to use Interpolation Techniques for a given tabulated data*

Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences-Backward differences –Central differences – Symbolic relations and separation of symbols-Differences of a polynomial-Newton‟s formulae for interpolation – Interpolation with unevenly spaced points - Lagrange‟s Interpolation formula

UNIT III: Numerical solution of Ordinary Differential equations

Objective:*To enable the student to use Numerical Techniques to solve IVPs in ODE*

Solution by Taylor‟s series-Picard‟s Method of successive Approximations-Euler‟s Method-Runge-Kutta Methods

UNIT IV: Fourier Series

Objective:*To enable the student to expand a function in Fourier Series.*

Introduction- Determination of Fourier coefficients – even and odd functions –change of interval– Half-range sine and cosine series

application: Amplitude, spectrum of a periodic function

UNIT V: Fourier Transforms

Objective:*To enable the student to use Fourier Integral Theorem and Trnasforms to BVPs.*

Fourier integral theorem (only statement) – Fourier sine and cosine integrals - sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms

UNIT VI: Z-transform

Objective:*To enable the student to use Z-Transform to solve Difference Equations.*

Introduction– properties – Damping rule – Shifting rule – Initial and final value theorems - Inverse z transform- -Convolution theorem – Solution of difference equation by Z -transforms.

REFERENCE BOOKS:

1. **B.S. GREWAL,** Higher Engineering Mathematics, 42nd Edition, Khanna Publishers
2. **DEAN G. DUFFY,** Advanced Engineering Mathematics with MATLAB, CRC Press
3. **V.RAVINDRANATH and P. VIJAYALAXMI,** Mathematical Methods, Himalaya Publishing House
4. **ERWYN KREYSZIG,** Advanced Engineering Mathematics, 9th Edition, Wiley-India

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ENGINEERING PHYSICS *(Common to all branches)*

Course outcomes: At the end of the course the student able to

- ***understand*** *applications of optics using basic fundamentals of Physics*
- ***Explain*** *the Modern Physics Concepts*
- ***familiar*** *with Basic Elements of Quantum Theory*
- ***knowledge*** *about dual nature of wave function, Applications of Schrodinger wave equation Fermi-Dirac probability function, Position of Fermi level in intrinsic and extrinsic semiconductors, Semiconductor conductivity*
- ***Identify*** *the appropriate solid state materials for engineering applications*
- ***formulate*** *and solve the engineering problems on light and optics, Electromagnetism, wave mechanics*
- ***correlate*** *Advanced Topics in Physics with Engineering Applications*
- ***Get acquainted*** *with Current Trends in Physics*

UNIT-1:

PHYSICAL OPTICS FOR INSTRUMENTS

Course Objective: *"Designing an instrument and enhancing the resolution for its operation would be effect as achieved through study of application aspects of physical Optics"*

INTERFERENCE: Introduction – Interference in thin films by reflection – Newton‟s rings. (4)

DIFFRACTION: Introduction – Fraunhofer diffraction - Fraunhofer diffraction at double slit(qualitative) – Diffraction grating – Grating spectrum – Resolving power of a grating Rayleigh‟s criterion for resolving power. (3)

POLARIZATION: Introduction – Types of Polarization – Double refraction – Quarter wave plate and Half Wave plate. (3)

UNIT-II:

COHERENT OPTICS – COMMUNICATIONS AND STRUCTURE OF MATERIALS

Course Objective*: "lasers are trusted Non-linear coherent sources establishing for the fitness of Instrumentation, establishing a structure property relationship for materials requires allotment of an equivalent footing in convening the physics knowledge base".*

LASERS: Introduction – coherent sources – Characteristics of lasers – Spontaneous and Stimulated emission of radiation – Einstein‟s coefficients – Population inversion – Three and Four level pumping schemes – Ruby laser – Helium Neon laser. (3) **FIBER OPTICS:** Introduction – Principle of wave propagation in Optical Fiber – Acceptance angle and acceptance cone- Numerical apertutre. (4)

CRYSTALLOGRAPHY: Introduction – Space lattice – Basis – Unit Cell – Lattice parameters – Bravais lattices – Crystal systems – Structures and packing fractions of SC,BCC and FCC (5)

X-RAY DIFRACTION TECHNIQUES: Directions and planes in crystals – Miller indices – Separation between successive (h k l) planes – Bragg‟s law. (3)

UNIT-1II:

MAGNETIC, ELECTRIC FIELD RESPONSE OF MATERIALS & SUPERCONDUCTIVITY

Course Objective*: "many of the Electrical or Electronic gadgets are designed basing on the response of naturally abundant and artificially made materials, while their response to E- or H- fields controls their performance".*

MAGNETIC PROPERTIES: Magnetic permeability – Magnetization – Organ or magnetic moment– Classification of Magnetic materials – Dia, para, Ferro, anti ferro and ferri-magnetism – Hysteresis curve. (5)

DIELECTRIC PROPERTIES: Introduction – Dielectric constant – Electronic, ionic and orientational polarization – internal fields – Clausius – Mossotti equation – Dielectric loss, Breakdown and Strength. (4)

SUPERCONDUCTIVITY: General properties – Meissner effect – Type I and Type II superconductors– BCS Theory Flux quantization London‟s equations – Penetration depth – DC and AC Josephson effects– SQUIDS. (4)

UNIT – IV:

ACQUSTICS AND EM – FIELDS

Course Objective: *"**The utility and nuances of ever pervading SHM and its consequences would be the first handonto as it clearly conveyed through the detailed studies of Acoustics of Buildings, while vectorial concepts of EM fields paves the student to gear – up for a deeper understanding"*.

ACOUSTICS: Sound absorption, absorption coefficient and its measurements, Reverberations time – Sabine‟s formula, Eyring‟s formula. (3)

ELECTRO-MAGENTIC FIELDS: Gauss and stokes theorems (qualitative) – Fundamental laws of electromagnetism – Maxwell‟s Electromagnetic Equations (Calculus approach). (3)

UNIT – V:

QUANTUM MECHANICS FOR ELECTRONIC TRANSPORT

Course Objective: *"The discrepancy between classical estimates and laboratory observations of physical properties exhibited by materials would be lifted out through the understanding quantum picture of sub-atomic world dominated by electron and its presence".*

QUANTUM MECHANICS: Introduction to matter waves – Schrodinger Time Independent and Time Dependent wave equations – Particle in a box. (4)

FREE ELECTRON THEORY: Classical free electron theory – electrical conductivity–Mean free path–Relaxation time and drifty velocity–Quantum free electron theory - Fermi-Dirac (analytical) and its dependence on temperature–Fermi energy–density of states–derivations for current density. (6)

BAND THEORY OF SOLIDS: Bloch theorem (qualitative) – Kronig – Penney model – Origin of energy band formation in solids – Classification of materials into conductors, semi – conductors & insulators – Concepts of effective mass of electron - concept of hole. (5)

UNIT – VI:

SEMICONDUCTOR PHYSICS

Course Objective: *"In the wake of ever increasing demand for the space and power the watch word "small is beautiful", understanding the physics of electronic transport as underlying mechanism for appliances would provide a knowledge base".*

Introduction: Intrinsic semiconductor and carrier concentration – Equation for conductivity – Extrinsic semiconductor and carrier concentration – Drift and diffusion – Einstein‟s equation – Hall Effect – direct & indirect band gap semiconductors – Electronic transport Mechanism for LEDs, Photo conductors and solar cells. (6)

TEXT BOOKS

1. Solid state Physics by A.J. Dekker (Mc Millan India Ltd)
2. A text book of Engineering Physics by M.N.Avadhanulu & P.G.Kshirasagar (S.Chand publications)
3. Engineering Physics by M.R. Srinivasan (New Age international publishers)

REFERENCE BOOKS

1. Introduction to solid state physics‟ by Charles Kittle (Willey India Pvt.Ltd)
2. Applied Physics‟ by T. Bhimasenkaram (BSP BH Publications)
3. Applied Physics‟ by M.Arumugam (Anuradha Agencies)
4. Engineering Physics‟ by Palanisamy (Scitech Publishers)
5. Engineering Physics‟ by D.K.Bhattacharya (Oxford University press)
6. Engineering Physics‟ by Mani Naidu S (Pearson Publications)

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B. Tech. I Year – I Sem.

Computer Proramming

(Common to AME, CE, ME, MM)

Unit – 1: Introduction to Computers

Introduction to computer programming, Computer languages- Machine level, Assembly level and High-level language.

Number System: Representation of characters, integers, fractions, hexadecimal representation, conversions- decimal, binary, octal, hexadecimal.

Importance of C, Program development steps.

Unit – 2: Introduction – 'C' Fundamentals

Structure of a C-program, Algorithm, flow chart, C-character set, C Tokens, keywords and identifiers, constants, variables, data types and sizes.

Operators, Arithmetic expressions, type conversion, operator precedence and associativity.

Unit - 3: I-O statements, Decision making and branching

Header files, Standard I/O library functions, formatted I/O functions, simple if, if-else, nested if-else, else-if ladder, switch-case statements and sample programs.

Unit – 4: Decision making and Looping

Iterative- while, do, for statements, jump statements- goto, break, continue, structured programming, looping applications: summation, powers, smallest and largest.

Unit – 5: Arrays and Strings

Arrays- declaration, initialization, accessing and storing elements of 1-D, 2-D and multi-dimensional arrays, array applications- addition, multiplication, transpose, symmetry of a matrix.

Strings- declaration, initialization, reading and writing characters and strings, string operations, character and string manipulation functions.

Unit - 6: Functions

Functions- declaration, definition, prototype, function call, return statement, types of functions, parameter passing, scope of variables, storage classes, sample programs

Text Books

1. ***"Programming in C"*** by Ashok N. Kamthane, 2/e Pearson, 2013.
2. "***The C – Programming language***" B.W.Kernighan, Dennis M. Ritchie.PHI.
3. ***"Let Us C"***, *12th Edition* by Yashavant P. Kanetkar online in India.

Reference Books

1. ***"Programming in C"*** by Ajay Mittal, Pearson.
2. Programming with C, Bichkar, Universities press.
3. Programming in C, Reema Thareja, OXFORD.

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B. Tech. I Year – I Sem.

Environmental Studies
(Common to AME, CE, ME, MM)

COURSE OUTCOMES:

1. Demonstrate a scientific understanding of the physical and biological dynamics of global ecologies including first-hand knowledge of local and regional ecosystems
2. Analyze the social, economic, and political and policy dynamics involved in both the emergence and the resolution of environmental problems
3. Explain and analyze the historical development, ethical implications, and religious dimensions of the human relationship with the nonhuman world
4. Understand the complex relationships between natural and human systems.
5. Understand Industrial designs must be correlate with the government rules and policies.

UNIT I: Objective: Understand fundamental physical and biological principles that govern natural processes.

Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance – Sustainability: Stockholm and Rio Summit–Global Environmental Challenges: Global warming and climate change, acid rains, ozone layer depletion, population growth and explosion, effects.

Role of information Technology in Environment and human health.

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 Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems.

UNIT II: Objective: Demonstrate an integrative approach to environmental issues with a focus on sustainability of Natural resource utilisation. .Natural Resources: Natural resources and associated problems Forest resources – Use and over – exploitation, deforestation – 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

Food resources: World food problems, changes caused by non-agriculture activities-effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources.

Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT III: Objective: Basic understanding of the ecosystem diversity and its conservation.
Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity-classification - Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels. India as a mega-diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts. - Endangered and endemic species of India – Conservation of biodiversity: conservation of biodiversity.
UNIT IV: Objective: Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities.
Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies.
Solid Waste Management: Sources, classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products.
UNIT V: Objective: Integrate and apply perspectives from across the natural sciences, social sciences, and the humanities in the context of complex environmental problems.
Social Issues and the Environment: Urban problems related to energy -Water conservation, rain water harvesting-Resettlement and rehabilitation of people; its problems and concerns.
Environmental ethics: Issues and possible solutions. Environmental 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 VI: Objective: Provide students with technical and analytical skills that enable them to find employment in federal and state resource agencies, consulting firms, community-based education, and industrial firms tasked with environmental compliance.
Environmental Management: Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS, Environmental audit. Ecotourism. The student should submit a report individually on any issues related to Environmental Studies course and make a power point presentation.

TEXT BOOKS:

1. Environmental Studies by R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
2. A Textbook of Environmental Studies by Shaashi Chawla, TMH, New Delhi
3. Environmental Studies by P.N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

REFERENCE BOOKS:

1. Text Book of Environmental Studies by Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.
2. Environmental Studies by K.V.S.G. Murali Krishna, VGS Publishers, Vijayawada
3. Environmental Studies by Benny Joseph, Tata McGraw Hill Co, New Delhi
4. Environmental Studies by Piyush Malaviya, Pratibha Singh, Anoop singh: Acme Learning, New Delhi

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B. Tech. I Year – I Sem.

ENGLISH COMMUNICATION SKILLS LAB

(Common to AME, CE, ME, MM)

S. No.	UNIT	TOPIC
1	I	A:Greetings,introducing and taking leave B:Pure vowels
2	II	A:Giving Information and asking Information B: Diphthongs
3	III	A:Inviting,Accepting and Declining Invitations B:Consonants
4	IV	A:Commands,Instructions and Requests B:Accent and rhythm
5	V	A:Suggestions and Opinions B:Intonation

Suggested Text Book: Strengthen Your Communication Skills by Maruthi Publishing House
Suggested Software: English in Mind, Pronunciation Power by Hi-Class software solutions

B. Tech. I Year – I Sem.

Engineering Physics Lab

(Common to AME, CE, ME, MM)

List of Experiments

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence
2. Newton s rings –Radius of ‟ Curvature of Plano_Convex Lens.
3. Determination of thickness of a thin object using parallel interference fringes.
4. Determination of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
6. Melde‟s experiment – Transverse and Longitudinal modes.
7. Verification of laws of stretched string – Sonometer.
8. Determination of velocity of sound – Volume resonator.
9. L C R Senes Resonance Circuit
10. Study of I/V Characteristics of Semiconductor diode
11. I/V characteristics of Zener diode
12. Thermistor characteristics – Temperature Coefficient
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee‟s apparatus.
14. Energy Band gap of a Semiconductor p-n junction.
15. Hall Effect for semiconductor.

Virtual Lab

I Year B. Tech – I Semester

C PROGRAMMING LAB

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(Common to ME,CE,AME, MIN)

Exercise l

a) Write a C Program to calculate the area of triangle using the formula
area = (s (s-a) (s-b)(s-c))1/2
where s= (a+b+c)/2

b) Write a C program to find the largest of three numbers using ternary operator.

c) Write a C Program to swap two numbers without using a temporary variable.

Exercise 2

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

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

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

Exercise 3

a) Write a C program to find the sum of individual digits of a positive integer and find the reverse of the given number.

b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequenceUse the summing series method to compute the value of SIN(x),COS(x) and e^x

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

Exercise 4

a) Write a C Program to print the multiplication table of a given number n up to a given value, where n is entered by the user.

b) Write a C Program to enter a decimal number, and calculate and display the binary equivalent of that number.

c) Write a C Program to check whether the given number is Armstrong number or not.

Exercise 5

a) Write a C program to interchange the largest and smallest numbers in the array.

b) Write a C program to implement a liner search.

c) Write a C program to implement binary search.

Exercise 6

a) Write a C function to find both the largest and smallest number of an array of integers.

b) Write C programs illustrating call by value and call by reference concepts.

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B. Tech. I Year – II Sem.

English – II

(Common to all branches)

Course outcomes: At the end of the semester the student will be able to

1. Understand the proposed technology is people's technology and its service to the humanity instead of making them servant of machines.
2. Understand that climate must be preserved
3. Adopt the applications of modern technologies such as nanotechnology.
4. Understand that water is the elixir of life
5. Learn to work hard with devotion and dedication.
6. Understand the advantages of work. They will overcome their personal problems and address themselves to national and other problems.

Detailed Study:

UNIT-1: TECHNOLGY WITH A HUMAN FACE

Objective: To make the learner understand how modern life has been shaped by technology.

UNIT II: CLIMATE CHANGE AND HUMAN STRATEGY

Objective: To make the learner understand how the unequal heating of earth's surface by the Sun, an atmospheric circulation pattern is developed and maintained.

UNIT III: EMRGING TECHNOLOGIES

Objective: To introduce the technologies of the 20th century and 21st centuries to the learners.

UNIT IV: WATER- THE ELIXIR OF LIFE

Objective: To inform the learner of the various advantages and characteristics of water.

UNIT V: THE SECRET OF WORK

Objective: In this lesson, Swami Vivekananda highlights the importance of work for any development.

UNIT VI: WORK BRINGS SOLACE

Objective: In this lesson Abdul Kalam highlights the advantage of work.

PRESCRIBED TEXT BOOK: "Sure Outcomes" by Orient Black Swan Pvt. Ltd. Publishers

Non - Detailed Study:

Course outcomes: At the end of the semester the student will be able to

- Be inspired by Bose's achievements so that he may start his own original work
- Be inspired by Bhabha's achievements so as to make his own experiments.
- Realize that development is impossible without scientific research.
- Appreciate the art of writing a short story and try his hand at it.

UNIT V: J.C. Bose

Objective: To apprise of J.C.Bose's original contributions.

UNIT VI: Homi Jahangir Bhaba

Objective: To show Bhabha as the originator of nuclear experiments in India

UNIT VII: Vikram Sarabhai

Objective: To inform the learner of the pioneering experiments conducted by Sarabhai in nuclear
energy and relevance of space programmes.

UNIT VIII: A Shadow- R.K.Narayan

Objective: To expose the reader to the pleasure of the humorous story.

PRESCRIBED TEXT BOOK: "Trail Blazers"by Orient Black Swan Pvt. Ltd. Publisher

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B. Tech. I Year – II Sem.

MATHEMATICS –III (LINEAR ALGEBRA & VECTOR CALCULUS)

(Common to all branches)

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

- Use matrix theory to solve linear system of equations
- Find eigen values and Eigen vectors and use Cayley Hamilton theorem to find Inverse and Powers of a Matrix and also reduce a given Quadratic form to Canonical form.
- Learn applications of Integration and evaluation of Multiple Integrals.
- Use Beta, Gamma functions to evaluate Improper Integrals.
- Use vector differentiation and integration with vector integral theorems

UNIT I: Linear systems of equations

Objective:*To enable the student to use Matrix theory to solve linear system of equations***.**

Rank-Echelon form, Normal form – Solution of Linear Systems – Direct Methods- Gauss Elimination - Gauss Jordon and Gauss Seidal Methods.

Application: Finding the current in a electrical circuit.

UNIT II: Eigen values - Eigen vectors and Quadratic forms

Objective: *To enable the student to find Eigen values and Eigen vectors of a matrix and apply Cayley Hamilton theorem.*

Eigen values - Eigen vectors– Properties – Cayley-Hamilton Theorem – **without proof** Inverse and powers of a Matrix by using Cayley-Hamilton theorem- Quadratic forms- Reduction of quadratic form to Canonical form – Rank - Positive, negative definite - semi definite - index – signature.

Application: Free vibration of a two-mass system.

UNIT III: Multiple integrals

Objective*: To enable the student to apply integration to find length, volume and surface areas. Also the student will learn evaluations of multiple integrals.*

Review concepts of Curve tracing (Cartesian - Polar and Parametric curves)- **No question from this part**

Applications of Integration to Lengths, Volumes and Surface areas of revolution in Cartesian and Polar Coordinates.

Multiple integrals - double and triple integrals – change of variables – Change of order of Integration

Application: Moments of inertia

UNIT IV: Special functions

Objective: *To enable the student to evaluate improper integrals using Beta, Gamma functions***.**

Beta and Gamma functions- Properties - Relation between Beta and Gamma functions- Evaluation of improper integrals

Application: Evaluation of integrals

UNIT V: Vector Differentiation

Objective: *To enable the student to apply vector differentiation to physical and engineering situations.*

Gradient- Divergence- Curl - Laplacian and second order operators -Vector identities Application: Equation of continuity, potential surfaces

UNIT VI: Vector Integration

Objective: *To enable the student to apply vector integration to find work done and force applied.*

Line integral – work done – Potential function – area- surface and volume integrals Vector integral theorems: Greens, Stokes and Gauss Divergence Theorems (Without proof) and related problems.

application: work done, Force

REFERENCE BOOKS:

1. **GREENBERG,** Advanced Engineering Mathematics, 9th Edition, Wiley-India
2. **B.V. RAMANA,** Higher Engineering Mathematics, Tata McGraw-Hill
3. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, 9th Edition, Wiley-India
4. **PETER O'NEIL,** Advanced Engineering Mathematics, Cengage Learning
5. **D.W. JORDAN AND T. SMITH,** Mathematical Techniques, Oxford University Press

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B. Tech. I Year – II Sem.

Engineering Chemistry

(Common to ME,CE,AME,MIN)

Course Outcome: Students can able to

- Compare and contrast the chemical behaviour and physical properties of common substances.
- Understand the conventional and modern methods of processing of water for industrial and domestic use.
- Estimate the mixture of constituents present in industrial waste using conductometric and potentiometric titrations
- Classification of corrosion and factors effecting corrosion.
- Study the production and utility of polymers.
- Define a fuel and classify them on the basis of their physical state.
- Perform laboratory experiments that illustrate basic chemical principles

UNIT-1: Water technology

Objective: *"For prospective engineers knowledge about water used in industries (boilers etc.) and for drinking purposes is useful; hence chemistry of water of hard water, boiler troubles and modern methods of softening hard water is introduced."*

Hard water: Estimation of hardness by hardness by EDTA method – Potable water – Sterilization and Disinfection – Boiler feed water – Boiler troubles – Priming and forming, scale formation, corrosion, caustic embrittlement, turbine deposits – Softening of water – Lime soda, Zeolite processes – Reverse osmosis – Electro Dialysis, Ion exchange process.

UNIT II: Electrochemistry

Objective*: "Knowledge of galvanic cells, electrode potentials, and concentration cells is necessary for enginees to understand corrosion problem and its control; also this knowledge helps in understanding modern bio-sensors, fuel cells and improves them."*

Concept of Ionic mobilities – Applications of Kohlrausch law – Conductometic titrations – Galvanic cells – Elctrode potentials – Nernst equation – Electrochemical series – Potentiometric titrations – Concentration cells – Ion selective electrode: Batteries and Fuel cells.

UNIT III: Corrosion

Objective: *"The problems associated with corrosion are well known and the engineers must be aware of these problems and also how to counter them".*

Causes and effects of corrosion – theories of corrosion (dry, chemical and electrochemical corrosion) – Factors effecting corrosion – Corrosion control methods – Cathode protection – Sacrificial Anodic, Impressed current methods – Surface coating – Methods of application on metals (Hot dipping, Galvanizing, tinning, Cladding, Electroplating, Electro less, plating) – Organic surface coatings – Paints – Their constituents and their functions.

UNIT IV: High polymers

Objective: "*Plastics are materials used very widely an engineering materials. An understanding of properties particularly physical and mechanical properties of polymers / plastics / elastomers helps in selecting suitable materials for different purpose "*.

Types of Polymerization – Stereo Polymers – Physical and mechanical properties of polymers – Plastics – Thermoplastics and thermo setting plastics – Compounding and Fabrication of plastics – preparation and properties of Polyethylene, PVC and Bakelite – Elastomers – Rubber and Vulcanization – Styrene butadiene rubber – Thiokol – applications.

UNIT V: Fuels

Objective: *"A board understanding of the more important fuels employed on a large scale is necessary for all engineer to understand energy – related problems and solve them".*

Coal – Proximate and ultimate analysis – Numerical problems based on analysis – Calorific value – HCV and LVC – Problems based calorific values; petroleum – Refining – Cracking – Petrol – Diesel knocking: Gaseous fuels – Natural gas – LPG, CNG – Combustion – Problems on air requirements.

UNIT VI: Chemistry of advanced materials

Objective: *"With the knowledge available now, future engineers should know at least some of the advanced materials that are becoming available. Hence some of them are introduced here. ".*

Nanomaterials (Preparation of carbon nanotubes and fullerences – Properties of nanomaterials – Engineering applications) – Liquid crystals (Types – Application in LCD and Engineering Applications) – Fiber reinforced plastics – Biodegradable polymers – Conducting polymers – Solar cells (Solar heaters – Photo voltaic cells – Solar reflectors – Green house concepts – Green chemistry (Methods for green synthesis and Applications) – Cement – Hardening and setting Deterioration of cement concrete.

STANDARD BOOKS

1. Jain and Jain (Latest Edition), Engineering Chemistry, Dhanpat Rai Publishing company Ltd.,
2. N. Y. S. Murthy, V. Anuradha, K. RamaRao, "A Text Book of Engineering Chemistry" Maruthi Publications.
3. C. Parameswara Murthy, C. V. Agarwal, Adhra Naidu (2006) Text Book of Engineering Chemistry, B. S. Publications.
4. B. Sivasankar (2010), Engineering Chemistry, McGraw-Hill companies.
5. Ch. Venkata Ramana Reddy and Rama devi (2013), Engineering Chemistry, Cengage Learning.

REFERENCES

1. S. S. Dara (2013) Text Book of Engineering Chemistry, S. Chand Technical Series.
2. K. Sesha Maheswaeamma and Mridula Chugh (2013), Engineering Chemistry, Pearson Publications.
3. R. Gopalan, D. Venkatappayya, Sulochana, Nagarajan (2011), Text Book of Engineering Chemistry, Vikas Publications.
4. B. Viswanathan and M. Aulice Scibioh (2009), Fuel cells, Principals and applications.

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B.Tech. I Year– II Sem.

ENIGINEERING MECHANICS

(Common to ME, CE, AME, MIN)

Course Objectives: The students completing this course are expected to understand the concepts of forces and its resolution in different planes, resultant of force system, Forces acting on a body, their free body diagrams using graphical methods. They are required to understand the concepts of centre of gravity and moments of inertia and their application, Analysis of frames and trusses, different types of motion, friction and application of work - energy method.

UNIT – I

Learning objectives: To understand the concepts of forces and its resolution in different planes.

Introduction to Engg. Mechanics – Basic Concepts.

Systems of Forces : Coplanar Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems. Introduction**,** limiting friction and impending motion, coulomb's laws of dry friction, coefficient of friction, cone of friction.

UNIT II

Learning objectives: To understand the concepts of Equilibrium of Systems of Forces, law of Triangle of forces and converse of the law of polygon of forces.

Equilibrium of Systems of Forces: Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, Spatial Systems for concurrent forces. Lamis Theorm, Graphical method for the equilibrium of coplanar forces, Converse of the law of Triangle of forces, converse of the law of polygon of forces condition of equilibrium.

UNIT – III

Learning objectives: To understand the concepts of Centroid, Centre of Gravity law of Triangle of forces and pappus theorem.

Centroid: Centroids of simple figures (from basic principles) – Centroids of Composite Figures.

Centre of Gravity: Centre of gravity of simple body (from basic principles), centre of gravity of composite bodies, pappus theorem.

UNIT IV

Learning objectives: To understand the concepts of Area moments of Inertia, Mass Moment of Inertia.

Area moments of Inertia: Definition – Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product

of Inertia. Mass Moment of Inertia: Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, mass moment of inertia of composite bodies.

UNIT – V

Learning objectives: To understand the concepts of Rectilinear and Curvilinear motions, Analysis as a Particle and Analysis as a Rigid Body in Translation.

Kinematics: Rectilinear and Curvilinear motions – Velocity and Acceleration – Motion of Rigid Body – Types and their Analysis in Planar Motion. **Kinetics:** Analysis as a Particle and Analysis as a Rigid Body in Translation – Central Force Motion – Equations of Plane Motion – Fixed Axis Rotation – Rolling Bodies.

UNIT – VI

Learning objectives: To understand the concepts of Equations for Translation, D'Alembert's principle in rotation.

Work – Energy Method: Equations for Translation, Work-Energy Applications to Particle Motion, Connected System-Fixed Axis Rotation and Plane Motion. Impulse momentum method.

Torsional vibration- The compound pendulum- General case of moment proportional to angle of rotation- D'Alembert's principle in rotation.

TEXT BOOKS:

1. Engg. Mechanics - S.Timoshenko & D.H.Young., 4th Edn - , Mc Graw Hill publications.
2. Engineering Mechanics statics and dynamics:A Nelson , Mc Graw Hill publications
3. Engineering Mechanics: GS Sawhney, PHI Learning Pvt. Ltd.
4. Engineering Mechanics: Basudeb Bhattacharyya, Oxford University Press

REFERENCES:

1. Engineering Mechanics: statics and dynamics – I.H.Shames, – Pearson Publ.
2. Mechanics For Engineers, dynamics: - F.P.Beer & E.R.Johnston –5th Edn Mc Graw Hill Publ.
3. Engineering Mechanics: Fedinand . L. Singer , Harper – Collins

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B.Tech. I Year – II Sem.

ENGINEERING DRAWING
(Common to ME,CE,AME,MIN)

Course Objectives: Engineering drawing being the principle method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

UNIT I

Learning objectives: To understand the concepts and use of drawing Instruments and Curves used in Engineering Practice.

Introduction to drawing Instruments and uses. Lettering.

Polygons : Construction of regular polygons using given length of a side; Curves used in Engineering Practice, conic sections, construction of conics by different methods, cycloidal curves, epi and hypo-cycloids. Involutes.

UNIT II

Learning objectives: To understand the concepts of Vernier and Diagonal scales and concepts of orthographic projections.

Scales : Vernier and Diagonal scales.

Introduction to orthographic projections; projections of points; projections of straight lines parallel to both the planes; projections of straight lines – parallel to one plane and inclined to the other plane.

UNIT III

Learning objectives: To understand the concepts of projections of straight lines and traces.

Projections of straight lines inclined to both the planes, determination of true lengths and angle of inclinations and traces.

UNIT IV

Learning objectives: To understand the concepts of Projections of planes.

Projections of planes: Regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes.

UNIT V

Learning objectives: To understand the concepts of Projections of various solids.

Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes.

UNIT VI

Learning objectives: To understand the concepts of Projections of isometric views to orthographic views.

Conversion of isometric views to orthographic views; Conversion of orthographic views to

isometric views.

TEXT BOOKS:

1. Engineering Graphics by PI Varghese, McGrawHill Publishers
2. Engineering Drawing by N.D. Butt, Chariot Publications
3. Engineering Drawing by K.L.Narayana & P. Kannaiah, Scitech Publishers.

REFERENCE BOOKS:

1. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publishers
2. Engineering Drawing by Shah & Rana, Pearson Publishers
3. Engineering Drawing + AutoCad – K Venugopal, V. Prabhu Raja, New Age Publishers

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B.Tech. I Year – II Sem.

Professional Ethics and Human Values
(Common to ME,CE,AME,MIN)

COURSE OUTCOMES:

Upon completion of this course, students should have

- Understood the core values that shape the ethical behaviour of an engineer
- Exposed awareness on professional ethics and human values.
- Known their role in technological development.
- A knowledge of contemporary issues related to human and professional Interactions at workplace which helps students to understand practically the importance of trust, mutually satisfying human behaviour and enriching interaction with nature

UNIT I: Human values

Objective: To understand the moral values that ought to guide the Engineering profession. It is intended to developed a set of beliefs, attitudes, and habits that engineers should display concerning morality.

Morals, Values and Ethics – Integrity – Work Ethics – Service Learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty –Courage – Value time – Co-operation – Commitment – Empathy – Self-confidence – Spirituality- Character.

UNIT II: Engineering ethics

Objective: Important goal of engineering ethics is the discovery of the set of justified moral principles of obligation, rights and ideals that ought to be endorsed by the engineers and apply them to concrete situations.

The History of Ethics-Purposes for Engineering Ethics-Engineering Ethics-Consensus and Controversy –Professional and Professionalism –Professional Roles to be played by an Engineer –Self Interest, Customs and Religion-Uses of Ethical Theories-Professional Ethics-Types of Inquiry – Engineering and Ethics-Kohlberg‟s Theory – Gilligan‟s Argument – Heinz's Dilemma.

UNIT III: Engineering as social experimentation

Objective: To impart reasoning and analytical skills need to apply ethical concept to engineering decisions

Comparison with Standard Experiments – Knowledge gained – Conscientiousness – Relevant Information – Learning from the Past – Engineers as Managers, Consultants, and Leaders – Accountability – Role of Codes – Codes and Experimental Nature of Engineering.

UNIT IV: Engineers' responsibility for safety and risk

Objective: To make the students aware of the safety concepts, risk factors and risk benefit analysis

Safety and Risk, Concept of Safety – Types of Risks – Voluntary v/s Involuntary Risk- Short term v/s Long term Consequences – Expected Probability - Reversible Effects- Threshold Levels for Risk- Delayed v/s Immediate Risk – Safety and the Engineer - Designing for Safety – Risk - Benefit Analysis-Accidents

UNIT V: Engineer's responsibilities and rights

Objective: To identify the moral issues involved in both management and engineering areas, An understanding of the Engineer's Rights such as collegiality, Conflict of interest, Collective Bargaining.

Collegiality - Techniques for Achieving Collegiality –Two Senses of Loyalty-obligations of Loyalty – misguided – Loyalty - professionalism and Loyalty- Professional Rights –Professional Responsibilities – confidential and proprietary information-Conflict of Interest-solving conflict problems – Self Interest , Customs and Religion- Ethical egoism-Collective bargaining Confidentiality Acceptance of Bribes/Gifts-when is a Gift and a Bribe-examples of Gifts v/s Bribes-problem solving-interests in other companies-Occupational in other companies-Occupational - price fixing-endangering lives- Whistle Blowing-types of whistle blowing-when should it be attempted-preventing whistle blowing.

UNIT VI: Global issues

Objective: To Provide an understanding of interface between social technological and natural environments on global issues

Globalization- Cross-culture Issues-Environmental Ethics-Computer Ethics-computers as the Instrument of Unethical behaviour-computers as the object of Unethical Acts-autonomous Computers-computer codes of Ethics-Weapons Development-Ethics and Research-Analysing Ethical Problems in Research-Intellectual Property Rights.

TEXT BOOKS

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

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B.Tech. I Year – II Sem

ENGLISH COMMUNICATION SKILLS LAB-II

Course outcomes: At the end of the semester the student will be able to

- Understand the benefits of learning kinesics
- Make the social life comfortable with conversational ability
- Adopt employability skills
- Develop coordinating skills
- Exhibit good argumentative skills

Course objectives:

- To make the learner industry ready
- To enlighten the importance of non-verbal skills along with verbal
- To equip with good conversational abilities
- To improve public speaking ability

S. No.	UNIT	TOPIC
1	I	Body Language
2	II	Dialogues
3	III	Interviews and Telephonic Interviews
4	IV	Group Discussions
5	V	Presentation Skills
6	VI	Debates

Prescribed Text Book: Strengthen Your Communication Skills-By Maruthi Publishing House
Suggested Software: Strengthen Your Communication Skills-By Maruthi Publishing House

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B.Tech. I Year – II Sem.

ENGINEERING CHEMISTRY LABORATORY

(Common to ME,CE,AME,MIN)

List of Experiments:

1. Introduction to chemistry laboratory - Molarity, Normality, Primary, Secondary standard solutions,

Volumetric titrations, Quantitative analysis, Quantitative analysis etc.,

2. Trial experiment – Estimation of HCl using standard Na2CO3 solution.
3. Estimation of KMnO4 using standard Oxalic acid solution.
4. Estimation of Ferric ion using standard K2Cr2O7 solution.
5. Estimation of Copper using standard K2Cr2O7 solution.
6. Estimation of Total Hardness water using standard EDTA solution.
7. Estimation of Copper using standard EDTA solution.
8. Estimation of Copper using Colorimeter.
9. Estimation of pH of the given sample solution using pH meter.
10. Conductometric Titrations between strong acid and strong base.
11. Conductometric Titrations between strong acid and weak base.
12. Potentiometric Titrations between strong acid and strong base.
13. Potentiometric Titrations between strong acid and weak base.
14. Estimation of Zinc using standard potassium ferrocyanide solution.
15. Estimation of Vitamin – C

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Approved by AICTE, Accredited by NBA & NAAC 'A' Grade, Recognized under 2(f) and 12(b) of UGC, Permanently Affiliated to JNTUK, Kakinada.

B.Tech. I Year – II Sem.

Engineering Workshop & IT Workshop
(Common to ME,CE,AME,MIN)

ENGINEERING WORKSHOP

Course Objective: To impart hands-on practice on basic engineering trades and skills.

Note: At least two exercises to be done from each trade.

Trade:

Carpentry

1. T-Lap Joint
2. Cross Lap Joint
3. Dovetail Joint
4. Mortise and Tennon Joint

Fitting

1. Vee Fit
2. Square Fit
3. Half Round Fit
4. Dovetail Fit

Black Smithy

1. Round rod to Square
2. S-Hook
3. Round Rod to Flat Ring
4. Round Rod to Square headed bolt

House Wiring

1. Parallel / Series Connection of three bulbs
2. Stair Case wiring
3. Florescent Lamp Fitting
4. Measurement of Earth Resistance

Tin Smithy

1. Taper Tray
2. Square Box without lid
3. Open Scoop
4. Funnel

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IT WORKSHOP

Objectives: The IT Workshop for engineers is a 6 training lab course spread over 45 hours .The modules include training on PC hardware ,Internet and WWW and Productivity tools including MSWord, Excel,Powerpoint and Publisher.

1. Identify the components of a computer, components in a CPU and its functions. Draw block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

2. Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a viva.

3. Every student should individually install windows XP on the personal computer. Lab instructors should verify the installation and follow it up with a viva.

4. Every student should install Linux on the computer. This computer should have windows installed .The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a viva.

5. Several mini tasks would be that covers Basic commands in Linux and Basic system administration in Linux which includes: Basic Linux commands in Bash, Create hard and symbolic links .Text processing, using wildcards.

6. Web Browsers and Surfing the web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and popup blockers.also, plugins like Macromedia Flash and JRE for Applets should be configured.

7. Search Engines and Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google.This should be demonstrated to the instructors.

8. Cyber Hygiene: Students would be exposed to the various threats on then internet and would be asked to configure their computer to be safe on the internet. They need to first install an anti virus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block popups, block activeX downloads to avoid virus and/or worms.

9. Creating Project Abstract features to be covered: Formatting styles, inserting table, bullets and numbering, changing text direction ,cell alignment, footnote, hyperlink, symbols, spell check, track changes.

10. Creating A NewsLetter: Features to be covered-table of content, news paper coloums, images from files and clipart, drawing toolbar and wordart, formatting images, textboxes and paragraphs.

11. Excel orientation: The mentor needs to tell the importance of Ms-Excel as a spreadsheet tool, give the details of the four tasks and features that would be covered in each using Excel-Accessing, Overview of toolbars, saving Excel files, using help and resources.

12. Students will be working on basic power point utilities and tools which help them create a basic power point presentation.

13. PPT orientation slide layouts, inserting text, wordart, formatting text, bullets and numbering auto shapes lines and arrows in both Latex and Power point.

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II Year B.Tech. (CE). – I Semester

Probability & Statistics

UNIT -I:

Objective: To impart the basic concepts of Probability with the help of theorems.

Probability:

Introduction: Sample point, sample space, event, mutually exclusive, independent and exhaustive events, probability axioms, addition theorem, multiplication theorem, and other basic theorems on probability, conditional probability, pair-wise independence, Baye's theorem

UNIT -II:

Objective: To gain the knowledge of random variables and its types with respective distributions as modern tools for engineering practices

Random variables and Distributions:

Introduction- Random variables- Distribution function- Discrete distributions - Binomial and Poisson distributions -Continuous distributions:
Normal, Normal approximation to Binomial distribution, Gamma and Weibull distributions

UNIT III

Objective: To understand and identify the generating functions of various distributions and solve engineering problems.

Moments and Generating functions:

Introduction-Mathematical expectation and properties - Moment generating function - Moments of standard distributions (Binomial, Poisson and Normal distributions) – Properties.

UNIT IV

Objective: To be familiar with types of sampling and estimation techniques and impart problem – solving skills in various engineering Applications.

Sampling Theory:

Introduction - Population and samples- Sampling distribution of mean for large and small samples (with known and unknown variance) – Proportion sums and differences of means -Sampling distribution of variance –Point and interval estimators for mean and proportions-
Chebyshev's Inequality.

UNIT V

Objective: To understand the multi-disciplinary inferential statistics, design of experiments and try to find out the solutions for global economical, social and economical issues.

Tests of Hypothesis:

Introduction - Type I and Type II errors - Maximum error - One tail, two-tail test - Tests concerning one mean and proportion, two means- Proportions and their differences using Z-test, Student's t-test - F-test and Chi –square test - ANOVA for one-way and two-way classified data.

UNIT VI

Objective: To understand and analyse fitting of linear and non-linear with statistical tools and impart techniques for Practicing the correlation – regression by identifying the formulae.

Curve fitting and Correlation:
Introduction - Simple Correlation and Regression - Rank correlation - Multiple regression-Fitting a straight line -Second degree curveexponential curve- power curve by method of least squares.

Text Books:

1. 1. Probability and Statistics for Engineers: Miller and John E. Freund, Prentice Hall of India
2. 2. Probability and Statistics for Engineers and Scientists: Ronald E. Walpole, Sharon L. Mayers and Keying Ye: Pearson
3. 3. Probability, Statistics and Random Processes, Murugesan, Anuradha Publishers, Chennai:

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II Year B. Tech. (CE) – I Sem.

Building Materials and Construction

Course Learning Objectives:

The objective of the course is to expose to the student to

a. ***The Various construction materials and products used in the building industry, their nature, characteristics, variety and applications.***
b. ***Various components of civil building/ structure.***
c. ***The various construction methods/ Techniques to build the structures with the above materials.***

UNIT-I

Stones, Bricks and Tiles

Properties of building stones-relation to their structural requirements, classification of stones – stone quarrying - precautions in blasting, dressing of stone, composition of good brick earth, various methods of manufacturing of bricks. Characteristics of good tile – manufacturing methods, types of tiles. Uses of materials like Aluminium, Gypsum, Glass and Bituminous materials - their quality structural glazing.

UNIT-II

Masonry and Wood : Types of masonry, English and Flemish bonds, Rubble and Ashlar Masonry. Cavity and partition walls.

WOOD: Structure - Properties- Seasoning of timber- Classification of various types of woods used in buildings- Defects in timber. Alternative materials for wood - Galvanized Iron, Fiber – Reinforced Plastics, Steel, Aluminium.

UNIT-III

Lime and Cement : Lime: Various, ingredients of lime - Constituents of lime stone classification of lime - various methods of manufacture of lime.

Cement: Portland cement- Chemical Composition - Hydration, setting and fineness of cement. Various types of cement and their properties.

A Various field and laboratory tests for Cement. Various ingredients of cement concrete and their importance various tests for concrete.

UNIT-IV

Building Components : Lintels, arches, vaults, stair cases - types. Different types of floors - Concrete, Mosaic, Terrazzo floors, Pitched, flat roofs. Lean to roof, Coupled Roofs. Trussed roofs - King and Queen post Trusses. R.C.C Roofs, Madras Terrace and Pre fabricated roofs.

UNIT-V

Finishings : Damp Proofing and water proofing materials- and uses- Plastering Pointing, white washing and distempering

Paints: Constituents of a paint - Types of paints - Painting of new old wood- Varnish.

Form Works and Scaffoldings.

UNIT-VI

Aggregates: Classification of aggregate - Coarse and fine aggregates- particle shape and texture - Bond and Strength of aggregate - Specific gravity- Bulk Density, porosity and absorption - Moisture content of Aggregate- Bulking of sand - Sieve analysis introduction to geosynthetics and geotextiles.

Course Outcomes

Upon the successful completion of this course, the students will have to be able to:

1. Describe the types and properties of various building materials -stones, clay products, Timber, metals, cement and concrete and their applications in building industry.
2. Select the appropriate' building materials to suit to the structural requirements including exposure conditions.
3. Describe the various components of buildings.
4. Select the appropriate construction methods to meet the local conditions.
5. Describe the various types of stairs and stair cases and their locations, sizes and materials including fire escapes and also lifts and escalators.
6. Describe the various methods of shuttering, scaffolding and centering.
7. Describe the various types expansion and construction joints and their construction.

Text Books :

1. "Engineering Materials", Rangwala, S.C, (36th edition),Anand Charotar Publishing House, 2009.
2. "Building construction", (10th edition), Punmia, B. C. Laxmi Publications, Bangalore, 2009.

References:

1. "Building Materials", S.K.Duggal, New Age International Publications.
2. "Building Materials", P.C.Verghese, PHI learning (P) Ltd., 2009.
3. "Building Materials", M.L.Gambhir, Tata McGraw Hill Publishing Co. Ltd. New Delhi.
4. "Building construction", P.C.Verghese, PHI Learning (P) Ltd.
5. "Building construction and construction materials", Birdie, G.S. and Ahuja, T.D., Dhanpath Rai Publishing company, "New Delhi, 1986.
6. "Building Materials", S.S. Bhavikatti, Vikas publications House private ltd.
7. "Building Construction", S.S. Bhavikatti, Vilras publications House Pvt. ltd.
8. "Building Materia1s", B.C. Punmia, Laxmi Publications Pvt. Ltd.

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II Year B. Tech. (CE) – I Sem.

Building Planning & Drawing

Course Learning Objectives:

The objective of the course is impart the knowledge of

- ***The principles of building planning***
- ***Building Byelaws and regulations, various components of buildings***
- ***Functional planning and design of residential and public buildings for different activities incorporating climatic design principles***

UNIT-I

Introduction to Building Planning and Drawing – Types of Buildings

Residential Buildings: - Minimum standards for various parts of buildings-requirements of different rooms and their grouping- characteristics of various types residential buildings.

UNIT-II

Public Buildings: Planning of educational institutions, hospitals, dispensaries, office buildings, banks, industrial buildings, hotels & motels, buildings for recreation.

UNIT- III

Building Byelaws and Regulations: Introduction- terminology- objectives of building byelaws- floor area ratio floor space index- principles under laying building bye laws- classification of buildings- open space requirements – built up area limitations- height of buildings- wall thickness – lightening and ventilation requirements.

UNIT -IV

Sign Conventions and Bonds: Brick, stone, plaster, sand filling, concrete, glass, steel, cast iron, copper alloys, aluminium alloys etc., lead, zinc, tin etc., earth, rock, timber and marbles.

English bond and Flemish bond- odd and even courses for one, one-half, two and two & half brick walls in thickness at the junction of a corner.

UNIT –V

Doors – Windows - Ventilators and Roofs: Panelled door, panelled and glassed door, glassed windows, paneled windows, swing ventilators, fixed ventilators, coupled roof, collar roofs.

King Post truss, Queen Post truss

Sloped and flat roof buildings : drawing plans, Elevations and Cross Sections of given sloped roof buildings.

UNIT –VI

Planning Drawing and Schematic Design of Buildings: Draw the Plan, Elevation and sections of a Residential & Public buildings from the given line diagram.

Course Outcomes

Upon successful completion of this course, a student will be able to

1. Explain principles of building planning
2. Explain the procedure of building planning incorporating climatic and functional aspects.
3. Design/compose various rooms in a building considering the functional requirements.
4. Design and draw the plans, sections and elevations of residential and simple public buildings.

Text books:

1. "Building planning and drawing", (3rd edition), Kumara swami & Kameswara rao, N., Anand Charotar Publishing House Pvt Ltd, 2010.
2. Building planning and drawing by M. Chakravarthi.

References:

1. Building drawing by Shah and Kale
2. Planning and Design of buildings by Y.S. Sane
3. Planning, designing and Scheduling by Gurucharan Singh and Jagadish Singh
4. 'A' Series & 'B' Series of JNTU Engineering College, Anantapur, "Building byelaws", of state and Central Governments and Municipal corporations, 2011.

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II Year B. Tech. (CE) – I Sem.

Strength of Materials-I

Course Learning Objectives:

The objective of the course is to expose to the student to

a. ***To impart preliminary concepts of Strength of Materials and Principles of Elasticity and Plasticity Stress-strain behavior of materials and their governing laws. Introduce student the moduli of Elasticity and their relations, Poisson's ratio, principle of superposition.***
b. ***To impart concepts of Bending Moment and Shear force for beams with different boundary and loading conditions and to draw SFD and BMD in beams.***
c. ***To inculcate concepts of stresses developed in the cross section and bending equations calculation of section modulus of sections with different cross sections***
d. ***The impart the knowledge of determination of deflections in beams under various loading and support conditions***
e. ***To classify cylinders based on their thickness/ stress distribution acroos thickness and to derive equations for determination of stresses in cylinders subjected to both internal and external pressure.***

Unit- I

Simple Stresses and Strain s and Strain Energy: Elasticity and plasticity - Types of stresses and strains - Hooke's law stress - strain diagram for mild steel Q 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, u.d.l., uniformly varying loads and combination of these loads - Point of contraflexure Relation between SA.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 bending stresses section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections - Design of simple beam sections.

Unit-IV

Shear Stresses: Derivation of formula - Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections, built up beams, shear centre.

Unit-V

Deflection of Beams: Bending into a circular arc - slope, deflection and radius of curvature Differential equation for the elastic line of a beam – Double integration and Macaulay's methods » Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, - U;D.L. Uniformly

varying load. Mohr's theorems - Moment area method - application to simple cases including overhanging beams.

Unit-VI

Thin and Thick Cylinders: Thin seamless cylindrical shells - Derivation of formula for longitudinal and circumferential stresses - hoop, longitudinal and Volumetric strains changes in diameter, and volume of thin cylinders Thin spherical Sheng.

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

Course Outcomes

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

1. Understand the basic materials behavior under the influence of different external loading conditions and the support conditions
2. Draw the diagrams indicating the variation of the key performance features like bending moment and shear forces.
3. Have knowledge of bending concepts and calculation of section modulus and for determination of stressed developed in the beans due to various loading conditions
4. Assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the internal pressure
5. Apply Green's theorem top for determination of forces beams subjected to distributed loads

Text Books:

1. "Strength of Materials", part 1 and 2, B.C. Punmia, Laxmi Publication.
2. "Strength of Materials" (3"' Edition), S. S. Bhavakatti, Vikas Publishing House Pvt. Ltd., New Delhi, 2008.

References:

1. "Strength of Materials", S.S. Rattan, Tata McGraw Hill Education Pvt., Ltd.,
2. "Strength of materials" R.K. Rajput (5th edition), S. Chand & Co, New Delhi, 2012.
3. Strength of Materials", LS Srininath, Prakash Desayi, N Srinivasa Murthy and S. Anantha Ramu, Macmillan India Ldt.
4. "Strength of Materials" Rarnamrutham, S. and Narayan, R., (16th edition), DhanpatRaiPLtb1ications, 2010.
5. Basu. A.R. Strength of Materials, (2nd edition), Dhanpat Rai and Co, Nai sarah, New Delhi, 2010.
6. "Strength of Materials" R.Subrarnanian, (Sixth Edition) Oxford University Press, 2009.
7. "Strength of materials" Part 1 & 2, Stephen Timoshenko, CBS Publishers & Distributors, New Delhi.
8. "Strength of Materials and Structures" John Case, Lord Chilver & Carl T.F.Ross, Elsevier, Publisher.

Web references:

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2. http://npte1.iitm.ac.in/courses/IIT-MADRAS/Strength_of_Materia1s/Pdfs/ 1_1 .pdf
3. npxel. dce. edu/section/CE/som. php Q.
4. onlinevideolecture. com/civil. . ./nptel-iit. _ ./strength-ofmaterials/?course I.

5. www.nptel. iitgnac. in/v1deo.php?subjectIdiI05106116
6. http://npteliitm.ac.in/courses/Webcoursgwcontents/I1TDe1hi/ Mechanics%200i%20So1ids/index_htm
7. httpI//npteliitrn.ac.in/courses/Webcourse-contents/IIT-Delhi/ Mechanics%200f%20So1ids/index.htm
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II Year B. Tech. CE – I Sem.

Surveying

Course Learning Objectives:

The objectives of the course are to enable the student to learn

a. ***The basic principles of surveying, various methods of linear and angles measuring instruments.***
b. ***Be able to use various surveying equipment's / instruments, viz., levelling instrument, Theodolite, and tachometric principle.***
c. ***Measure linear angular distances, types of curves, set both horizontal and vertical curves.***
d. ***Prepare contours, area and volume calculations.***

Unit-I

Introduction: Definition-Uses of surveying- overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications - Errors in survey measurements.

Unit-II

Distances and Direction: Distance measurement conventions and methods; use of chain and tape, Electronic distance measurements (EDM)- principles of electro optical EDM-errors and corrections to linear measurements- compass survey- Meridians, Azimuths and Bearings, declination, computation of angle.

Traversing-Purpose-types of traverse-traverse computation-traverse adjustments-omitted measurements.

Unit-III

Levelling and Contouring: Concept and Terminology, Levelling Instruments and their Temporary and permanent adjustments- method of levelling. Characteristics and Uses of contours- methods of conducting contour surveys and their plotting.

Unit-IV

Theodolite: Theodolite, description, principles-uses and adjustments - temporary and permanent, measurement of horizontal and vertical angles. Principles of Electronic Theodolite – Trigonometrical leveling.

Tacheometric Surveying: Stadia and tangential methods of Tacheometry. Distance and Elevation formulae for Staff vertical position.

Unit-V

Curves: Types of curves, design and setting out - simple and compound curves- transition curves. Introduction to geodetic surveying, Total Station and Global positioning system

Unit-VI

Computation of Areas and Volumes: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.

Course Outcomes:

Upon successful completion ofthe course, the student will be able to

1. Demonstrate the basic surveying skills
2. Use various surveying instruments.
3. Perform different methods of surveying
4. Compute various data required for various methods of surveying.
5. To integrate the knowledge and produce topographical map.

Text Books:

1. Surveying (Vol No. 1, 2 & 3) B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P)Ltd. , New Delhi.
2. "Surveying and levelling", R. Subramanian, Oxford University press.

References:

1. "Textbook of Su17veying", S.K. Duggal (Vol No. l&2), Tata McGraw Hill Publishing Co. Ltd. New Delhi.
2. "Text book of Surveying" Arora (Vol No. 1&2), Standard Book House, Delhi.
3. "Higher Surveying", A.M. Chandra, New Age International Pvt.Ltd.
4. "Fundamentals ofsurveying", S.K. Roy - PHI learning (P) ltd.
5. "Plane Surveying", Alak de, S. Chand & Company, New Delhi.
6. "Advance Surveying", Satish Gopi, R. Sathi Kumar and N.Madhu, Pearson Publications.
7. "Text book of Surveying", C. Venkataramaiah, University press, India

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II Year B. Tech. (CE) – I Sem.

Fluid Mechanics

Course Learning Objectives:

Objectives of the course is to impart the knowledge of

a. ***Properties bf fluids, Flow measurements, Hydrostatic forces exerted by fluids, on different objects, estimation of pipe flow losses.***
b. ***Description of flow, types of flows, continuity equation/law of conservation of mass***
c. ***Fluid dynamics, momentum equation and its applications.***
d. ***Boundary layer theory/ concepts in an engineering application, flow around submerged objects.***
e. ***Laminar and turbulent flows, fluid friction, losses in pipes, Energy lines, Hydraulic gradient, application in pipe network.***

Unit-I

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

Unit-II

Hydrostatics: Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces - Center of pressure. Derivations and problems.

Fluid Kinematics: Description of fluid flow, Stream line, path line and streak lines and stream tube.

Classification of flows: Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows - Equation of continuity for one, two , three dimensional flows - stream and velocity potential functions, flow net analysis.

Unit-III

Fluid Dynamics: Surface and body forces - Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, Navier – Stokes equations (Explanationary) Momentum equation and its application - forces on pipe bend.

Unit-IV

Boundary Layer Theory: Boundary layer - concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarmen momentum integral equation, laminar and turbulent Boundary layers, no derivations BL in transition, separation of BL, Control of BL, flow around submerged objects- Drag and Lift- Magnus effect.

Unit-V

Laminar Flow: Reynold's experiment; Characteristics of Laminar & Turbulent flows. Flow between parallel plates, Flow through long tubes, flow through inclined tubes.

Closed Conduit Flow: Laws of Fluid friction - Darcy's equation, Minor losses - pipes in series - pipes in parallel - Total energy line and hydraulic gradient line. Pipe network problems, variation of friction factor with Reynold's number - Moody's Chart.

Unit-VI

Measurement of flow: Pitot tube, Venturi meter and Orifice meter and mouth piece - classification of orifices, small orifice and large orifice, flow over rectangular, 'triangular and trapezoidal and Stepped notches Broad crested weirs current meter.

Course Outcomes/ Generic Skills:

Upon successful completion of this course, student will have to be able to

1. Solve manometer problems, and calculate force on submerged bodies.
2. Use conservation of mass principle to calculate flow rates through control volumes.
3. Use Bernoulli's equation to solve simple problems
4. calculate the lift and drag forces for various objects
5. Apply appropriate equations and principles to analyze a variety of pipe flow situations.
6. Predict the flow 'rate in a pipe by use of common flow meters.

Text Books:

1. "Fluid Mechanics", Modi and Seth, Standard book house Publisher.
2. "A text of Fluid mechanics and hydraulic machines", Dr. R.K. Bansal- Laxmi Publications (P) ltd., New Delhi

References:

1. "Fluid Mechanics", Merie C. potter and David C. Wiggert, Cengage learning
2. "Introduction to Fluid Machines" Edward J. Shaughnessy; Jr Ira M.Katz and James P. Schaffer, Oxford University Press, New Delhi
3. "Fluid Mechanics' A.K. Mohanty, Prentice 'Hall of India Pvt. Ltd., New Delhi
4. "Introduction to Fluid Machines", S.K. Sorn & G. Biswas, Tata McGraw Hill Pvt. Ltd.

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II Year B. Tech. (CE) – I Sem.

Surveying Field Work

Course Learning Objectives:

To introduce various surveying instruments (linear as well as angle measuring instruments) to the students to conduct different types of engineering surveys using these survey instruments

List of Field Works:

1. Survey in an area by chain survey (Closed circuit)
2. Finding the area of the given boundary using compass (Closed Traverse)
3. Plane table survey; finding the area of a given boundary by the method of Radiation and intersection.
4. Fly levelling: Height of the instrument method (differential levelling) and rise and fall method.
5. Theodolite Survey: Determining the Horizontal and Vertical Angles by the method of repetition method.
6. Theodolite Survey: Finding the height of far object.
7. One Exercise on Curve setting.
8. One Exercise on contours.
9. Total Station : Determination of area using total station
10. Total Station : Determination of Remote height.

Course out comes

Upon successful completion of the course, the student will be able:

1. To demonstrate the basic surveying skills
2. To use various surveying instruments.
3. To perform different methods of surveying
4. To compute various data required for various methods of surveying.
5. To integrate the knowledge and produce topographical map.

References:

1. Surveying (Vol .No. 1, 2 & 3) B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P)Ltd. , New Delhi.
2. GIET Lab Manuals

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II Year B. Tech. (CE) – I Sem.

Strength of Materials Lab

Course Learning Objectives:

The objectives of the course are

a. ***To introduce various strength and strain/ deflection measuring instruments to the students.***
b. ***Determine various physical and mechanical properties and strength of various engineering materials.***
c. ***Determine/verify constitutive model (stress-strain curve) of engineering material the laboratory.***

List of Experiments

1. Tension test on Steel bar
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.

Course Outcomes:

Upon successful completion of the course, the student will be able

1. To determine the engineering properties of materials in the laboratory.
2. To conduct laboratory tests to verify the suitability of the engineering materials for the given purpose.
3. To verify the basic principles of behavior of materials.
4. To verify the quality of materials through laboratory tests.

References:

GIET Lab Manuals

Web-Resources: www.nptel.com

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II Year B. Tech. (CE) – I Sem.

Computer Aided Engineering Drawing Practice

Part-A

Development and Interprenetration of Solids: Deveopment of surface of Right Regular Solids - Prims, Cylinder, Pyramid Cone and their parts. Interprenetration of Right Regular Solids-Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

Transformation of Projections: Conversion of Isometric Views to Orthographic Views- Conventions

Part-B

1. Introduction to computer aided drafting : Generation of points, lines, curves, polygons, dimensioning.
2. Types of modelling : object selection commands – edit, zoom, cross hatching, pattern filling, utility commands.
3. 2D wire frame modelling.
4. 3D wire frame modelling.
5. View points and view ports : view point coordinates and view (s) displayed.
6. Examples to exercise different options like save, restore, delete, joint, single option.
7. Computer aided solid modelling : Isometric projections.
8. Orthographic projections of isometric projections.
9. Modelling of simple solids.
10. Drawing of building plans and elevations.
11. Drawing of building components.

Note: At least, a minimum of 9 shall be conducted from Part-B.

References:

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II Year B. Tech. (CE) – II Sem.

Basic Electrical and Electronics Engineering

Preamble:

This course covers topics related to analysis of various electrical circuits, operation of various electrical machines, various electronic components to, perform well in their respective fields.

Course Learning Objectives:

a. ***To learn the basic principles ol electrical law's and analysis of networks.***
b. ***To understand the principle of operation and construction details of DC machines.***
c. ***To understand the principle of operation and construction details of transformer.***
d. ***To understand the principle of operation and construction details of alternator and 3-Phase induction motor.***
e. ***To study the operation of PN junction diode, half wave, full Wave rectifiers and OP-AMPS.***
f. ***To learn the operation of PNP and NPN transistors and various amplifiers.***

Unit-I

Electrical Circuits: Basic definitions, Types of network elements, Ohm's Law, Kirchhoff's Laws, inductive networks, capacitive networks, series, parallel circuits and star-delta and delta- star transformations.

Unit-II

DC Machines: Principle of operation of DC generator- emf equation n - types - DC motor types –torque equation - applications – three point starter, swinburn's Test, speed control methods.

Unit-III

Transformers: Principle of operation of single phase transformers - e.m.f equation -losses –efficiency and regulation.

Unit-IV

AC Machines: Principle of operation of alternators regulation by synchronous impedance method - principle of operation of 3-Phase induction motor - slip-torque characteristics - efficiency - applications.

Unit-V

Rectifiers & Linear ICs: PN junction diodes, diode applications (Half wave and bridge rectifiers). Characteristics of operation amplifiers (OP-AMP) - application of ' OP-AMPS (inverting, non inverting, integrator and differentiator).

Unit-VI:

Transistors: PNP and NPN junction transistor, transistor as an amplifier, single stage CE Amplifier, Frequency response of CE amplifier, concepts of feedback amplifier.

Course Outcomes

1. Able to analyse the various electrical networks.
2. Able to understand the operation of DC generators,3-point starter and conduct the Swinbume's Test.
3. Able to analyse the performance of transformer.
4. Able to explain the operation of 3-phase alternator and 3-phase induction motors.
5. Able to analyse the operation of half Wave, full wave rectifiers and OP=AMPs.

6. Able to explain the single stage CE amplifier and concept of feedback amplifier

Text Books:

1. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky, 9th edition, PEI/PHI 2006.
2. Electrical Technology by Surinder Pal Bali, Pearson Publications.
3. Electrical Circuit Theory and Technology by John Bird, Routledge Taylor &Francis Group

Reference Books:

1. Basic Electrical Engineering by M.S.Naidu and S.Ka1nakshiah, TMH Publications
2. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI Publications, 2th edition
3. Basic Electrical Engineering by Nagsarlcar,Sukhija, Oxford Publications,2nd edition
4. Industrial Electronics by GK. Mittal, PHI

Web-Resources: www.nptel.com

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II Year B. Tech. (CE) – II Sem.

Strength of Materials – II

Course Learning Objectives:

a. ***To give preliminary concepts of Principal stresses and strains developed in cross section of the beams analytically as well as graphically due to stresses acting on the cross section and stresses on any inclined plane. To impart concepts of failures in the material considering different theories.***
b. ***To give concepts of torsion and governing torsion equation, and there by calculate the power transmitted by shafts and springs and design the cross section when subjected to loading using different theories of failures.***
c. ***To classify columns and calculation of load carrying capacity using different empirical formulas and to assess stresses due to axial and lateral loads for different edge conditions and to calculate combined effect of direct and bending stresses with different engineering structures.***
d. ***Introduce the concept of unsymmetrical bending in beams Location of neutral axis Deflection of beams under unsymmetrical bending.***
e. ***Impart concepts for determination of Forces in members of plane, pin-jointed, perfect trusses by different*** methods.

Unit-I

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

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

Unit –II

Torsion of Circular Shafts and Springs:

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

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

Unit –III

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.

Laterally loaded struts – subjected to uniformly distributed and concentrated loads – Maximum B.M. and stress due to transverse and lateral loading.

Unit –IV

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

Unit –V

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

Unit –VI

Analysis of Pin-Jointed Plane Frames: Determination of Forces in members of plane, pin-jointed, perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever and simply supported trusses by method of joints, method of sections.

Course Outcomes:

Upon successful completion of this course

1. The student will be able to understand the basic concepts of Principal stresses developed when subjected to stresses along different axes and design the sections.
2. The student can asses stresses in different engineering applications like shafts, springs, columns and struts subjected to different loading conditions .
3. The student will be able to assess forces in different types of trusses used in construction.

Text Books:

1. Strength of materials by Punmia, B.C., Standard Publishers Distributors, 1991.
2. Strength of materials by S. S. Bhavakatti
3. Design of steel structures Volume –II by Ramachandra.

References:

1. Fundamentals of Solid Mechanics M.L. Gambhir, PHI Learning Pvt. Ltd., New Delhi.
2. Introduction to text book of Strength of Material by U.C. Jindal, Galgotia publications.
3. Strength of materials by R. Subramanian, Oxford university press, New Delhi.
4. Mechanics of Materials- by R. C. Hibbler

Web References:

1. http://freevideolectures.com/Course/2361/Streneth-of Materials
2. http://nptel.iitm.ac.in/video.php?subjectId=112107147
3. http://nptel.iitm.ac.in/cources/Webcourse- contents/IITDelhi/Mechanics%20of20Solids/index.htm

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II Year B. Tech. Civil Engineering – II Sem.

Hydraulics and Hydraulic Machinery

Course Learning Objectives:

Objectives of the course are

a. ***To provide the student with an understanding of Hydraulics as it applies to the environment and to civil engineering works.***
B. ***To enable the students to understand the working principles of various type of hydraulic machines – pumps and turbines with emphasis on developing ability to solve real – life problems in Hydraulics Engineering***

Unit –I

Open Channel Flow: Types of flows - Type of channels – Velocity distribution – Energy and momentum correction factors – Chezy's, Manning's; and Bazin formulae for uniform flow – Most Economical sections. Critical flow : Specific energy-critical depth – computation of critical depth – critical sub-critical and super critical flows. Non uniform flow-Dynamic equation for G.V.F., Mild, Critical, Steep, horizontal and adverse slopes-surface profiles-direct step method- Rapidly varied flow, hydraulic jump, energy dissipation.

Unit –II

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

Unit –III

Basics of Turbo Machinery: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency-Angular momentum principle, Applications to radial flow turbines. Layout of a typical Hydropower installation – Heads and efficiencies - classification of turbines.

Unit –IV

Hydraulic Turbines – I: Pelton wheel - Francis turbine – Kaplan turbine - working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and function efficiency.

Hydraulic Turbines – II: Governing of turbines-surge tanks-unit and specific turbines-unit speed-unit quantity-unit power-specific speed performance characteristics-geometric similarity-cavitation.

Unit –V

Centrifugal-Pumps: Pump installation details-classification-work done- Manometric head-minimum starting speed-losses and efficiencies specific speed, multistage pumps-pumps in parallel- performance of pumps characteristic curves- NPSH- Cavitation.

Reciprocating Pumps: Introduction, classification of reciprocating pumps, main components of reciprocating pumps, working of a reciprocating pumps, discharge through pumps, indicator diagram, work done by reciprocating pumps, slip of reciprocating pumps.

Unit –VI

Hydropower Engineering: Classification of Hydropower plants-Definition of Terms – Load factor, Utilisation factor, Estimation of hydropower potential.

Course outcomes

Upon successful completion of this course the student will be able to:

1. Solve uniform open channel flow problems

2. Apply dimensional analysis and similitude in order to account for the implications of scale in model experiment.
3. Calculate depth profiles in channels with steady gradually – varied flow.
4. Understand the working principles of various hydraulic machineries.
5. Select the appropriate turbines and pumps to meet the field requirements.

Text books:

1. Open Channel flow by K. Subramanya, Tata McGraw Hill Publishers
2. "Hydraulics, Fluid Mechanics and Hydraulic Machinery", Modi and Seth, Standard book house.

References:

1. Fluid mechanics and fluid machines by Rajput, S. Chand & Co.
2. Hydraulic Machines by Banga & Sharma Khanna Publishers.
3. Fluid Mechanics & Fluid Power Engineering by D.S. Kumar Kataria & Sons.
4. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) Ltd., New Delhi.

Web references:

1. http://www.learnerstv.com/Free-Engineering-Video-lectures-1tv078-Page1.htm
2. http://www.learnerstv.com/vidio/Free-video-Lecture-2631-Engineering.htm

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II Year B. Tech. Civil Engineering – II Sem.

Concrete Technology

Course Learning Objectives:

The primary objectives of the course are

a. ***To impart the knowledge of cement production, basic constituents/ingredients of cements and various types of cements.***
b. ***To provide the knowledge of basic ingredients of concretes and its behavior in various environments.***
c. ***To impart the know of how of the test procedures for the determination of properties of concrete, both fresh and hardened.***
d. ***To provide an understanding of design of concrete material, durability of concrete in various environments, various types of concretes/special concretes***

Unit –I

Ingredients of Concrete Cements & Admixtures: Portland cement – Chemical composition – Hydration, Setting of cement, Fineness of cement, Structure of hydrate cement – Test for physical properties – Different grades of cements – Admixtures – Mineral and chemical admixtures – accelerators, retarders, air entrainers, plasticizers, super plasticizers, fly ash and silica fume.

Aggregates: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregates – 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 and well graded aggregate as per relevant IS code – Maximum aggregate size.

Quality of mixing water

Unit –II

Fresh Concrete: Steps in Manufacture of Concrete–proportion, mixing, placing, compaction, finishing, curing – including various types in each stage. Properties of fresh concrete-Workability – Factors affecting workability – Measurement of workability by different tests, Setting times of concrete, Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete, Ready mixed concrete, Shotcrete.

Unit –III

Hardened Concrete: Water / Cement ratio – Abram's Law – Gelspaoe ratio – Nature of strength of concrete –Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength – Curing, Testing of Hardened Concrete: Compression tests – Tension tests – Factors affecting strength – Flexure tests –Splitting tests – Non-destructive testing methods – codal provisions for NDT.

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.

Unit –V

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

Unit – VI

Special Concretes: Ready mixed concrete, Shotcrete -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, Polymer concrete – Types of Polymer concrete – Properties of polymer concrete, High performance concrete – Self consolidating concrete, SIFCON, self healing concrete.

Course Outcomes:

Upon successful completion of this course, student will be able to

1. Understand the basic concepts of concrete.
2. Realise the importance of quality of concrete.
3. Familiarise the basic ingredients of concrete and their role in the production of concrete and its behaviour in the field.
4. Test the fresh concrete properties and the hardened concrete properties.
5. Evaluate the ingredients of concrete through lab test results.
6. Design the concrete mix by BIS method.
7. Familiarise the basic concepts of special concrete and their production and applications.
8. Understand the behaviour of concrete in various environments.

Text Books:

1. Concrete Technology by M.S.Shetty. – S.Chand & Co.; 2004.
2. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi.

References:

1. Properties of Concrete by A.M.Neville – PEARSON – 4th edition.
2. Concrete Technology by A.R. Santha Kumar, Oxford University Press, New Delhi.

Web references:

1. http://www.learnerstv.com/Free-Engineering-Video-lectures-1tv053-Page1.htm
2. http://videolectures.net/mit801f99_lewin_lec27/
3. http://nptel.iitm.ac.in/video.php?subjectId=105102088

II Year B. Tech. (CE) – II Sem.

Structural analysis –I

Course Learning Objectives :

The objectives of the course are to inculcate/enable the student to learn/understand

a. ***The rudiments of structural analysis, determinate and indeterminate structures, Degree of static indeterminacy, significance of compatibility conditions.***
b. ***Analysis of indeterminate structures viz., Propped cantilevers, fixed beams and continuous beams using different methods including energy methods and sketching of SFD and BMD.***
c. ***To impart concepts of Bending Moment and Shear force for beams with different boundary and loading conditions and to draw the diagrams of variation across the length.***
d. ***The analysis of determinate structures (Beams and Trusses) subjected to moving loads using influence line.***

Unit –I

Propped Cantilevers & Fixed Beams: Degree of static indeterminacy- compatibility condition-Analysis of propped cantilevers with elastic and rigid prop-shear force and Bending moment diagrams-Deflection of propped cantilevers

Introduction to statically indeterminate beams with U.D. 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-point of inflexion/contraflexer.

Unit –II

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

Unit –III

Moment Distribution Method : Stiffness and carry over factors – Distribution factors – Analysis of continuous beams with and without sinking of supports – Portal frames – including Sway-Substitute frame analysis by two cycle.

Unit –IV

Slope-Deflection Method : Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

Unit –V

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

UNIT –VI

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

Influence Lines : Definition of influence line for SF, Influence line for SF, Influence line for BM – load position for maximum SF at a section – Load position for maximum BM at a sections, ingle point load, U.D. load longer than the span, U.D. load shorter than the span – Influence lines for forces in members, of Pratt and Warren trusses.

Course Outcomes:

Upon successful completion of this course the student will be able to,

1. Differentiate determinate and indeterminate structures.
2. Identify the behavior of structures due to the expected loads, including the moving loads, acting on the structure
3. Estimate the bending moment and shear forces in beams for different boundary conditions.
4. Analyze the continuous beams using various methods-, three moment method, slope deflection method, energy theorems.
5. Draw the influence line diagrams for various types of moving loads on beams/bridges.
6. Analyze the loads in Pratt and Warren trusses when loads of different types and spans are passing over the truss.

Text Books :

1. Structural Analysis by S.S. Bhavikatti
2. Theory of Structures by B.C. Punmia

References :

1. Theory of Structures by Gupta, Pandit & Gupta; Tata McGraw Hill, New Delhi.
2. V.N. Vazirani and M.M. Ratwani, "Analysis of Structures – Vol. I and II", Khanna Publishers, New Delhi.
3. Theory of Structures by R.S. Khurmi, S. Chand Publishers.
4. Theory of Structures by S. Ramamrutham, Dhanpat Rai Publishing House, New Delhi.
5. Structural Analysis by R.C. Hibbeler, Pearson, New Delhi.

Web References :

1. http:// nptel.iitm.ac.in/courses/1051050/1
2. http://www.youtube.com/watch?v=s4CN6aVkhPo
3. http:// www.youtube.com/watch?v=qhEton-EEOw&list=TLfinufAGBXOtv7NQrcAhnyQPUnsnQX3jjj

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II Year B. Tech. (CE) – II Sem.

Environmental Engineering – I

Course Learning Objectives

The objective of this course is:

a. ***Outline planning and the design of water supply systems for a community/town/city***
b. ***Provide knowledge of water quality requirement for domestic usage***
c. ***Impart understanding of importance of protection of water source quality and enlightens the efforts involved in converting raw water into clean potable water.***
d. ***Selection of valves and fixture in water distribution systems.***
e. ***Impart knowledge on design of water distribution network.***

Introduction: Waterborne Diseases : Protected water supply – Population forecasts, design period – water demand – factors affecting – fluctuations – fire demand – storage capacity – water quality and testing – drinking water standards.

Sources of Water : Comparison from quality and quantity and other considerations – intakes – infiltration galleries distribution systems. – requirements – methods and layouts.

Unit –II

Quality & Purification of Water: Layout and general outline of water treatment units – sedimentation – principles – design factors – coagulation-flocculation clarifier design – coagulants – feeding arrangements.

Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation comparison of filters – disinfection – theory of chlorination, chlorine demand, other disinfection practices- Miscellaneous treatment methods.

Unit-III

Distribution Systems: 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.

Unit –IV

Waste Water Characteristics: 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. Design of sewers – shapes and materials – sewer appurtenances manholes –inverted siphon – catch basins – flushing tanks – ejectors, pumps and pumphouses – house drainge – components requirements – sanitary fittings-traps – one pipe and two pipe systems of plumbing – ultimate disposal of sewage – sewage farming – dilution.

Unit –V

Layouts & Preliminary Treatment: Layout and general outline 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.

Unit-VI

Treatment & Disposal of Sludge: Construction and design of oxidation ponds - Sludge digestion – factors effecting – design of Digestion tank – Sludge disposal by drying – septic tanks working principles and design – soak pits.

Course Outcomes:

After completion of the course, a successful student is able to

1. Plan and design the water and distribution networks and sewerage systems.
2. Identify the water source and select proper intake structure.
3. Characterization of water.
4. Select the appropriate appurtenances in the water supply.
5. Selection of suitable treatment flow for raw water treatments.

Text Books:

1. Water supply and sanitary Engineering by G.S. Birdi, Dhanpat Rai & Sons Publishers.
2. Elements of environmental engineering by K.N. Duggal, S. Chand Publishers

Referencs :

1. Water and Waste Water Technology by Mark J Hammar and Mark J. Hammar Jr.
2. Water and Waste Water Technology by Steel
3. Water and Waste Water Engineering by Fair Geyer and Okun
4. Waste water treatment- concepts and design approach by G.L. Karia and R.A. Christian, Prentice Hall of India
5. Waste water Engineering by Metcalf and Eddy.
6. Unit operations in Environmental Engineering by R. Elangovan and M.K. Saseetharan, New age International
7. Water Supply Engineering, Vol. 1, waste water Engineering, Vol. II, B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi

Web-Resources: www.nptel.com

II Year B. Tech. (CE) – II Sem.

Fluid Mechanics and Hydraulic Machinery Lab

Course Learning Objectives:

The objective of this course is:

a. To verify the principles of open channel flow in the laboratory by conducting experiments.

b. The enable the students to understand the working principles of various types of hydraulic machines by conducting laboratory experiments and draw performance curves for various hydraulic machines.

List of Experiments

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice by a constant head method.
3. Determination of Coefficient of discharge for an external mouth piece by variable head method.
4. Calibration of contracted Rectangular Notch and /or Triangular Notch
5. Determination of Coefficient of loss of head in a sudden contraction and friction factor.
6. Verification of Bernoulli's equation.

7. Impact of jet on vanes
8. Study of Hydraulic jump.
9. Performance test on Pelton wheel turbine
10. Performance test on Francis turbine.
11. Efficiency test on centrifugal pump.
12. Efficiency test on reciprocating pump.

Course Outcomes

Upon successful completion of this course the students will be able to :

1. Calibrate various discharge measurement meters in a open channel flow.
2. Measure the discharge through an open channel.
3. Draw performance curves by conducting experiments on various hydraulic machineries.
4. Conduct efficiency and performance tests on turbines and pumps.

References:

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II Year B. Tech. (CE) – II Sem.

Concrete Technology Lab

Course Learning Objectives :

The objectives of the course is to enable student conduct necessary test for determination of engineering properties of concrete making materials, fresh concrete, and hardened concrete.

List of Experiments:

At least 10 experiments must be conducted (at least one for each property)

1. Determination of normal Consistency and fineness of cement.
2. Determination of initial setting time and final setting time of cement.
3. Determination of specific gravity and soundness of cement.
4. Determination of compressive strength of cement.
5. Determination of grading and fineness modulus of Coarse aggregate by sieve analysis.
6. Determination of specific gravity of coarse aggregate.
7. Determination of grading and fineness modulus of fine aggregate (sand) by sieve analysis.
8. Determination of bulking of sand.
9. Determination of workability of concrete by compaction factor method.
10. Determination of workability concrete by slump test
11. Determination of workability concrete by Vee - bee test.
12. Determination of compressive strength of cement concrete and its young's modulus.
13. Determination of split tensile strength of concrete & modules of rupture.
14. Non- Destructive testing on concrete (for demonstration)

List of Equipment:

1. Standard set of sieves for coarse aggregate and fine aggregate
2. Vicat's apparatus
3. Specific gravity bottle.
4. Lechatlier's apparatus
5. Slump Test Apparatus.
6. Compaction Factor Test Apparatus
7. Vee - Bee test apparatus
8. Longitudinal compresso meter
9. Universal testing Machine (UTM)/compression Testing Machine (CTM).
10. Rebound hammer, Ultrasonic pulse velocity machine, micro cover meter etc.

Note : At least a minimum of 10 experiments shall be conducted.

Course Outcomes:

Upon successful completion of this course, student will be able to

1. Determine the consistency and fineness of cement.
2. Determine the setting times of cement.
3. Determine the specific gravity and soundness of cement.
4. Determine the compressive strength of cement.
5. Determine the workability of cement concrete by compaction factor, slump and Vee – Bee tests
6. Determine the specific gravity of coarse aggregate and fine aggregate by Sieve analysis.
7. Determine the flakiness and elongation index of aggregates.
8. Determine the bulking of sand.
9. Understand the non-destructive testing procedures on concrete.

References :

GIET Lab Manuals

Web-Resources: www.nptel.com

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III Year B.Tech. (CE). – I Semester

Design of Reinforced Concrete Structures

Course Objectives:

The objective of this course is:

a. ***Familiarize Students with different types of design philosophies***
b. ***Equip student with concepts of design of flexural members***
c. ***Understand Concepts of shear, bond and torsion***
d. ***Familiarize students with different types of compressions members and Design***
e. ***Understand different types of footings and their design***

Unit – I

Introduction: Working stress method Design codes and handbooks, loading standards – Dead, live, wind and earthquake loads, elastic theory, design constants, modular ratio, neutral axis depth and moment of resistance, balanced, under-reinforced and over-reinforced sections, working stress method of design of singly and doubly reinforced beams.

Limit State Design: Concepts of limit state design – Basic statistical principles – Characteristic loads – Characteristic strength – Partial load and safety factors – representative stress-strain curves for cold worked deformed bars and mild steel bars. Assumptions in limit state design – stress – block parameters – limiting moment of Resistance.

Unit – II

Design for Flexure: Limit state analysis and design of singly reinforced sections- effective depth- Moment of Resistance- Doubly reinforced and flanged (T and L) beam sections- Minimum depth for a given capacity- Limiting Percentage of Steel- Minimum Tension Reinforcement-Maximum Flexural Steel- Design of Flanged Sections (T&L)- Effective width of flange –Behavior- Analysis and Design.

Unit – III

Design for 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:

Deflection, cracking and code provision, Design of formwork for beams and slabs.

Unit – IV

Design of Compression members: Effective length of a column, Design of short and long columns – under axial loads, uniaxial bending and biaxial bending – Braced and un-braced columns – I S Code provisions.

Unit – V

Footings: Different types of footings – Design of isolated and combined footings - rectangular and circular footings subjected to axial loads, uni-axial and bi-axial bending moments.

Unit – VI

Slabs: Classification of slabs, design of one - way slabs, two - way slabs, and continuous slabs using IS Coefficients (conventional), design of waist-slab staircase.

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

Following plates should be prepared by the students.
1. Reinforcement detailing of T-beams, L-beams and continuous beams.
2. Reinforcement detailing of columns and isolated footings.
3. Detailing of one-way, two-way and continuous slabs and waist-slab staircase.

Course Outcomes

After completion of the course, a successful student is able to
1. Carryout analysis and design of flexural members and detailing
2. Design structures subjected to shear, bond and torsion
3. Work on different types of design philosophies
4. Design different type of compression members and footings

Text Books:

1. 'Limit State Design' by A. K. Jain, Nem Chand & Brothers.
2. 'Design of Reinforced concrete Structures' by N. Subrahmanyian, Oxford Publications.
3. 'Reinforced Concrete Structures' by S. Unnikrishna Pillai & Devdas Menon, Tata McGraw Hill, New Delhi.

References:

1. 'Design of concrete structures'by Arthus H.Nilson, David Darwin, and Chorles W. Dolar, Tata McGrawHill, 3rd Edition, 2005.
2. 'Reinforced Concrete Structures' by Park and Pauley, John Wiley and Sons.

IS Codes:

1) IS -456-2000 (Permitted to use in examination hall)
2) IS – 875
3) SP-16

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III Year B.Tech. (CE). – I Semester

Managerial Economics and Financial Analysis

Unit-I

Objective: To understand the concept; and nature of Managerial Economics and its relationship with other disciplines, concepts of Demand and Demand forecasting for Proper Production Planning.

Introduction to Managerial Economics and demand Analysis: Definition of Managerial Economics and Scope – Managerial Economics and its relation with other subjects – Concepts of Demand – Types – Determinants, Law of Demand its Exception – Elasticity of Demand – Types and Measurement - Demand forecasting and its methods.

Unit-II

Objective: To understand the concept of Production function, Input Output relationship, different Cost Concepts and Concept of Cost – Volume – Profit Analysis.

Production and Cost Analysis: Production function Isoquants and Isocosts – Law of Variable proportions – Cobb-Douglas Production function- Economies of Scale- Cost Concepts-Opportunity Cost-Fixed Vs Variable Costs – Explicit Cost Vs Implicit Costs – Out of Pocket Costs Vs Imputed Costs – Cost Volume Profit Analysis- Determination of Break-Even Point (Simple Problems)

Unit-III

Objective: To understand the nature of Competition, Characteristics of Pricing in the different market structure and significance of various pricing methods.

Introduction to Markets, Theories of the Firm and Pricing Policies: Market Structures: Perfect Competition, Monopoly and Monopolistic and Oligopoly – Features – Price, Output Determination – Managerial Theories of firm: Maris and Williamson's models – Methods of Pricing: Limit Pricing, Market Skimming Pricing, And Internet Pricing: Flat Rate Pricing, Usage sensitive, Transaction based pricing, Priority Pricing.

Unit-IV

Objective: To know the different forms of Business Organization and their Merits and Demerits both Public and Private Enterprises and the concepts of Business Cycles.

Types of Business Organizations and Business Cycles: Features and Evaluation of Sole trader – Partnership – Joint Stock Company – State / Public Enterprises and their forms – Business Cycles – Meaning and Features – Phases of Business Cycle.

Unit-V

Objective: To understand the different Accounting Systems preparation of Financial Statements and uses of Different tools for performance evaluation.

Introduction to Financial Accounts: Introduction to Double Entry Systems, Preparation of Journal – Subsidiary Books- Ledger-Cash Book-Trial Balance- Preparation of Financial Statements, Analysis of Financial Statements through Ratio Analysis (Simple Problems).

Unit -VI

Objective: To understand the concept of Capital, Capital Budgeting and to know the techniques used to evaluate Capital Budgeting proposals by using different methods.

Capital, Capital Budgeting: Capital, Significance of Capital, Sources of Finance (Capital) - Meaning of Capital Budgeting Need for Capital Budgeting - Techniques of Capital Budgeting - Traditional and Modern Methods.

Text Books:

1. Prof. J.V. Prabhakara Rao, Prof.P. Venkata Rao. "Managerial Economics and Financial Analysis", Ravindra Publication.
2. Dr. A.R.Aryasri- Managerial Economics and Financial Analysis – TMH Publications.

Reference Books:

1. Dr. B. Kuberudu and Dr.T.V. Ramana: Managerial Economics & Financial Analysis, Himalaya Publishing House.

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III Year B.Tech. (CE). – I Semester

Structural Analysis – II

Course Objectives:

The objective of this course is:

a. ***Familiarize Students with Different types of Structures***
b. ***Equip student with concepts of Arches***
c. ***Understand Concepts of lateral Load analysis***
d. ***Familiarize Cables and Suspension Bridges***
e. ***Understand Analysis methods, Kanis Method and Matrix methods.***

Unit – I

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

Two Hinged Arches: 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

Lateral Load Analysis Using Approximate Methods: application to building frames. (i) Portal method (ii) Cantilever method.

Unit – III

Cable Structures and Suspension Bridges: Introduction, characteristics of cable, analysis of cables subjected to concentrated and uniformly distributed loads, anchor cable, temperature stresses, analysis of simple suspension bridge, three hinged and two hinged stiffening girder suspension bridges.

Unit – IV

Kani's Method: Analysis of continuous beams – including settlement of supports and single bay portal frames with and without side sway.

Unit – V

Introduction to Matrix Method: Flexibility methods: Introduction, application to continuous beams (maximum of two unknowns) including support settlements.

Unit – VI

Stiffness method: Introduction, application to continuous beams (maximum of two unknowns) including support settlements.

Course Outcomes

After completion of the course, a successful student is able to

1. Differentiate Determinate and Indeterminate Structures
2. Carryout lateral Load analysis of structures
3. Analyze Cable and Suspension Bridge structures
4. Analyze structures, Kani's Method and Matrix methods.

Text Books:

1. 'Structural Analysis' by T.S.Thandavamoorthy, Oxford university press, India.
2. 'Theory of Structures – II' by B.C.Punmia, Jain & Jain, Laxmi Publications, India.

3. 'Structural Analysis' by S.S. Bhavikatti, Vikas Publications.

References:

1. 'Theory of structures' by Ramamuratam, Dhanpatrai Publications.
2. 'Analysis of structures' by Vazrani & Ratwani – Khanna Publications.
3. 'Structural Analysis' by R.C. Hibbeler, Pearson Education, India.

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III Year B.Tech. (CE). – I Semester

Soil Mechanics

Course Objectives:

The objective of this course is:

a. ***To enable the student to determine the index properties of the soil and classify it.***
b. ***To impart the concept of seepage of water through soils and determine the discharge of water through soils.***
c. ***To impart the principles of compaction and consolidation of soils and determine the magnitude and the rate of consolidation settlement.***
d. ***To enable the student to understand the concept of shear strength of soils, determine the shear parameters of sands and clays and the areas of their application.***

Unit – I

Introduction: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass- volume relationship –Relative density - consistency limits and indices – Various Types of soil Classifications – Unified soil classification and I.S. Soil classification.

Unit – II

Index Properties of Soils: Grain size analysis – Sieve and Hydrometer methods – Mechanism of compaction – factors affecting – effects of compaction on soil properties - compaction control.

Unit – III

Permeability: Soil water – capillary rise – One dimensioned flow of water through soils – Darcy's law-permeability – Factors affecting –laboratory determination of coefficient of permeability –Permeability of layered systems. Total, neutral and effective stresses –quick sand condition – 2-D flow and Laplace's equation - Seepage through soils –Flow nets: Characteristics and Uses.

Unit – IV

Stress Distribution In Soils: Stresses induced by applied loads - Boussinesq's and Westergaard's theories for point loads and areas of different shapes– Newmark's influence chart – 2:1 stress distribution method.

Unit – V

Consolidation: Compressibility of soils – e-p and e-log p curves – Stress history – Concept of consolidation - Spring Analogy - Terzaghi's theory of one-dimensional Consolidation – Time rate of consolidation and degree of consolidation – Determination of coefficient of consolidation (c_v) – Over consolidated and normally consolidated clays.

Unit – VI

Shear Strength of Soils: Basic mechanism of shear strength - Mohr – Coulomb Failure theories – Stress-Strain behavior of Sands - Critical Void Ratio – Stress-Strain behavior of clays – Shear Strength determination various drainage conditions.

Course Outcomes

After completion of the course, a successful student is able to

1. The student must know the definition of the various quantities related to soil mechanics and establish their inter-relationships.
2. The student should be able to know the methods of determination of the various index properties of the soils and classify the soils.
3. The student should be able to know the importance of the different engineering properties of the soil such as compaction, permeability, consolidation and shear strength and determine them in the laboratory.
4. The student should be able to apply the above concepts in day-to-day civil engineering practice.

Text Books:

1. 'Soil Mechanics' by B.C. Punmia & Ashok Kumar Jain, Arun Kumar Jain, Laxmi Publications (P) LTD.
2. 'Soil Mechanics' by Dr. K.R. Arora, Standard Publishers Distributors.
3. 'Soil Mechanics and Foundation Engineering' by V.N.S.Murthy, CBS publishers.

References:

1. 'Fundamentals of Soil Mechanics' by D.W.Taylor., Wiley.
2. 'An introduction to Geotechnical Engineering' by Holtz and Kovacs; Prentice Hall.

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III Year B.Tech. (CE). – I Semester

Transportation Engineering – I

Course Objectives:

The objective of this course is:

a. ***To impart different concepts in the field of Highway Engineering.***
b. ***To acquire design principles of Highway Geometrics and Pavements***
c. ***To learn various highway construction and maintenance procedures.***

Unit – I

Highway Planning and Alignment: Highway development in India; Classification of Roads; Road Network Patterns; Necessity for Highway Planning; Different Road Development Plans – First, second, third road development plans, road development vision 2021, Rural Road Development Plan – Vision 2025; Planning Surveys; Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports.

Unit – II

Highway Geometic Design: Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements- Sight Distance Elements-Stopping sight Distance, Overtaking Sight Distance and Intermediate Sight Distance- Design of Horizontal Alignment-Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical alignment-Gradients- Vertical curves.

Unit – III

Traffic Engineering: Basic Parameters of Traffic-Volume, Speed and Density- Traffic Volume Studies; Speed studies –spot speed and speed & delay studies; Parking Studies; Road Accidents-Causes and Preventive measures - Condition Diagram and Collision Diagrams; PCU Factors, Capacity of Highways – Factors Affecting; LOS Concepts; Road Traffic Signs; Road markings; Types of Intersections; At-Grade Intersections – Design of Plain, Flared, Rotary and Channelized Intersections; Design of Traffic Signals – Webster Method –IRC Method.

Unit – IV

Highway Materials: Subgrade soil: classification –Group Index – Subgrade soil strength – California Bearing Ratio – Modulus of Subgrade Reaction. Stone aggregates: Desirable properties – Tests for Road Aggregates – Bituminous Materials: Types – Desirable properties – Tests on Bitumen – Bituminous paving mixes: Requirements – Marshall Method of Mix Design.

Unit – V

Design Of Pavements: Types of pavements; Functions and requirements of different components of pavements; Design Factors

Flexible Pavements*:* Design factors – Flexible Pavement Design Methods – CBR method – IRC method – Burmister method – Mechanistic method – IRC Method for Low volume Flexible pavements.

Rigid Pavements: Design Considerations – wheel load stresses – Temperature stresses – Frictional stresses – Combination of stresses – Design of slabs – Design of Joints – IRC method – Rigid pavements for low volume roads – Continuously Reinforced Cement Concrete Pavements – Roller Compacted Concrete Pavements.

Unit – VI

Highway Construction and Maintenance: Types of Highway Construction – Earthwork; Construction of Earth Roads, Gravel Roads, Water Bound Macadam Roads, Bituminous Pavements and Construction of Cement Concrete Pavements.

Pavement Failures, Maintenance of Highways, pavement evaluation, strengthening of existing pavements.

Course Outcomes

After completion of the course, a successful student is able to

1. Plan highway network for a given area.
2. Determine Highway alignment and design highway geometrics.
3. Design Intersections and prepare traffic management plans.
4. Judge suitability of pavement materials and design flexible and rigid pavements.
5. Construct and maintain highways

Text Books:

1. 'Highway Engineering' by Khanna S.K., Justo C.E.G and Veeraragavan A, Nem Chand Bros, Roorkee.
2. 'Traffic Engineering and Transportation' Planning by Kadiyali L.R, Khanna Publishers, New Delhi.

References:

1. 'Principles of Highway Engineering' by Kadiyali LR, Khanna Publishers, New Delhi.
2 'Principles of Transportation Engineering' by Partha Chakroborthy and Animesh Das, PHI Learning Private Limited, Delhi

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III Year B.Tech. (CE). – I Semester

Engineering Geology

Course Objectives:

The objective of this course is:

a. ***To introduce the Engineering Geology as a subject in Civil Engineering.***
b. ***To enable the student to use subject in civil engineering applications.***

Unit – I

Introduction: Branches of Geology, Importance of Geology in Civil Engineering with case studies.
Weathering: Weathering of rocks, Geological agents, weathering process of Rock, River process and their development.

Unit – II

The study of Minerals: Definitions of mineral and rock, Different methods of study of mineral and rock.

Unit – III

Structural Geology: Strike, Dip and Outcrop study of common geological structures associating with the rocks such as Folds, Faults, Joints and Unconformities- parts, types, mechanism and their importance in Civil Engineering.

Unit – IV

Ground Water: Water table, Cone of depression, Geological controls of Ground Water Movement, Ground Water Exploration Techniques.
Earthquakes And Land Slides: Terminology, Classification, causes and effects, Shield areas and Seismic bells, Richter scale intensity, Precautions of building constructions in seismic areas. Classification of Landslides, Causes and Effects, measures to be taken prevent their occurrence at Land slides.

Unit – V

Geophysics: Importance of Geophysical methods, Classification, Principles of Geophysical study by Gravity method, Magnetic method, Electrical methods, Seismic methods, Radiometric method and Electrical resistivity, Seismic refraction methods and Engineering properties of rocks.

Unit – VI

Geology Of Dams, Reservoirs And Tunnels: Types and purpose of Dams, Geological considerations in the selection of a Dam site. Life of Reservoirs Purpose of Tunnelling, effects, Lining of Tunnels. Influence of Geology for successful Tunnelling.

Course Outcomes

Upon the successful completion of this course, the students will be able to:

1. Identify and classify the geological minerals.
2. Measure the rock strengths of various rocks.
3. Classify and measure the earthquake prone areas to practice the hazard zonation.
4. Classify, monitor and measure the Landslides and subsidence.

5. Prepares, analyses and interpret the Engineering Geologic maps
6. Analyses the ground conditions through geophysical surveys.
7. Test the geological material and ground to check the suitability of civil engineering project construction.
8. Investigate the project site for mega/mini civil engineering projects.Site selection for mega engineering projects like Dams, Tunnels, disposal sites etc…

Text Books:

1. 'Engineering Geology' by D. Venkat Reddy, Vikas Publishing House pvt. Ltd, 2013.
2. 'Engineering Geology' by N. Chenn Kesavulu, Trinity Press (Laxmi Publications), 2nd Edition, 2014.

References:

1. 'Engineering Geology for Civil Engineers' by P.C. Varghese,PHI learning pvt. Ltd.
2. 'Environmental Geology' by K.S. Valdiya, McGraw Hill Publications, 2nd ed.

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III Year B.Tech. (CE). – I Semester

Geotechnical Engineering Lab

Course Objectives:

The objective of this course is:

a. ***To impart knowledge of determination of index properties required for classification of soils.***
b. ***To teach how to determine compaction characteristics and consolidation behavior from relevant lab tests; to determine permeability of soils.***
c. ***To teach how to determine shear parameters of soil through different laboratory tests.***

LIST OF EXPERIMENTS

1. Specific gravity, G
2. Atterberg's Limits.
3. Field density-Core cutter and Sand replacement methods
4. Grain size analysis by sieving
5. Hydrometer Analysis Test
6. Permeability of soil - Constant and Variable head tests
7. Compaction test
8. Consolidation test (to be demonstrated)
9. Direct Shear test
10. Triaxial Compression test (UU Test)
11. Unconfined Compression test
12. Vane Shear test
13. Differential free swell (DFS)
14. CBR Test

At least Tenexperiments shall be conducted.

Course Outcomes

After completion of the course, a successful student is able to

1. Determine index properties of soil and classify them.
2. Determine permeability of soils.
3. Determine Compaction, Consolidation and shear strength characteristics.

Text Books:

1. 'Basic and Applied Soil Mechanics' by Gopal Ranjan and A.S.R.Rao, New Age International Publishers.
2. 'Soil Mechanics' by B.C. Punmia & Ashok Kumar Jain, Arun Kumar Jain, Laxmi Publications (P) LTD.
3. 'Soil Mechanics' by Dr. K.R. Arora, Standard Publishers Distributors.

References:

1. 'Determination of Soil Properties' by J. E. Bowles.
2. IS Code 2720 – relevant parts.

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III Year B.Tech. (CE). – I Semester

Transportation Engineering Lab

Course Objectives:

The objective of this course is:

a. ***To test crushing value, impact resistance, specific gravity and water absorption, percentage attrition, percentage abrasion, flakiness index and elongation index for the given road aggregates.***
b. ***To know penetration value, ductility value, softening point, flash and fire point, viscosity and stripping for the given bitumen grade.***
c. ***To test the stability for the given bitumen mix.***
d. ***To carry out surveys for traffic volume, speed and parking.***

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.
5. Stripping Test
6. Viscosity Test.

III. BITUMINOUS MIX:

1. Marshall Stability test.

IV. TRAFFIC SURVEYS:

1. Traffic volume study at mid blocks.
2. Traffic Volume Studies (Turning Movements) at intersection.
3. Spot speed studies.
4. Parking study.

V. DESIGN & DRAWING:

1. Earthwork calculations for road works.
2. Drawing of road cross sections.
3. Rotors intersection design.

Course Outcomes

After completion of the course, a successful student is able to

1. Ability to test aggregates and judge the suitability of materials for the road construction
2. Ability to test the given bitumen samples and judge their suitability for the road construction

3. Ability to obtain the optimum bitumen content for the mix design
4. Ability to determine the traffic volume, speed and parking characteristics.

Text Books:

1. 'Highway Material Testing Manual' by S.K. Khanna, C.E.G Justo and A.Veeraraghavan, Neam Chan Brothers New Chand Publications, New Delhi.

References:

1. IRC Codes of Practice
2. Asphalt Institute of America Manuals
3. Code of Practice of B.I.S. Web-Resources: www.nptel.com

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III Year B.Tech. (CE). – I Semester

MINI PROJECT / STUDY PROJECT

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III Year B.Tech. (CE). – II Semester

Design of Steel Structures

Course Objectives:

The objective of this course is to:

a. ***Familiarize Students with different types of Connections and relevant IS codes***
b. ***Equip student with concepts of design of flexural members***
c. ***Understand Design Concepts of tension and compression members in trusses***
d. ***Familiarize students with different types of Columns and column bases and their Design***
e. ***Familiarize students with Plate girder and Gantry Girder and their Design***

Unit – I

Connections: Bolted connections – definition, Bolt strength and capacity, Welded connections: Introduction, Advantages and disadvantages of welding- Strength of welds-Butt and fillet welds: Permissible stresses – IS Code requirements. Design of fillet weld subjected to moment acting in the plane and at right angles to the plane of the joints. Introduction to limit state design of steel structures.

Unit – II

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

Unit – III

Tension Members and compression members: General Design of members subjected to direct tension and bending –effective length of columns. Slenderness ratio – permissible stresses. Design of compression members, struts etc.

Roof Trusses: Different types of trusses – Design loads – Load combinations as per IS Code recommendations, structural details –Design of simple roof trusses involving the design of purlins, members and joints – tubular trusses.

Unit – IV

Design of Eccentric connections: framed connections – unstiffened and stiffened seat connection.

Unit – V

Design of Columns: Built up compression members – Design of lacings and battens. Design Principles of Eccentrically loaded columns, Splicing of columns.

Design of Column Foundations: Design of slab base and gusseted base. Column bases subjected moment.

Unit – VI

Design of Plate Girder: Design consideration – I S Code recommendations Design of plate girder-Welded – Curtailment of flange plates, stiffeners – splicing and connections.

NOTE: Welding connections should be used in Units II – VI.

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

Course Outcomes

After completion of the course, a successful student is able to

1. Work with relevant IS codes.
2. Carryout analysis and design of flexural members and detailing.
3. Design compression members of different types with connection detailing.
4. Design Plate Girder and Gantry Girder with connection detailing
5. Produce the drawings pertaining to different components of steel structures.

Text Books:

1. 'Design and Drawing of Steel Structures' by S.S. Bhavikatti, I.K. International Publishers.
2. 'Design of steel structures' by S.K. Duggal, Tata Mcgraw Hill, and New Delhi.

References:

1. 'Structural Design in Steel' by Sarwar Alam Raz, New Age International Publishers, New Delhi
2. 'Design of Steel Structures' by P. Dayaratnam; S. Chand Publishers
3. 'Steel Structure Design and practice' by N. Subramanian, Oxford University Press.

IS Codes:

1) IS -800 – 2007
2) IS – 875
3) Steel Tables.

These codes and steel tables are permitted to use in the examinations.

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III Year B.Tech. (CE). – II Semester

Foundation Engineering

Course Objectives:

The objective of this course is:

a. ***To impart to the student knowledge of types of shallow foundations and theories required for the determination of their bearing capacity.***
b. ***To enable the student to compute immediate and consolidation settlements of shallow foundations.***
c. ***To impart the principles of important field tests such as SPT and Plate bearing test.***
d. ***To enable the student to imbibe the concepts of pile foundations and determine their load carrying capacity.***

Unit – I

Soil Exploration: Need – Methods of soil exploration – Boring and Sampling methods – Field tests – Penetration Tests – Pressure meter – planning of Programme and preparation of soil investigation report.

Unit – II

Earth And Earth-Retaining Structures: Infinite and finite earth slopes in sand and clay – types of failures – factor of safety of infinite slopes – stability analysis by Swedish arc method, standard method of slices – Taylor's Stability Number-Stability of slopes of dams and embankments – different conditions.
Rankine's & Coulomb's theory of earth pressure – Culmann's graphical method - earth pressures in layered soils.

Unit – III

Shallow Foundations – Bearing Capacity Criteria: Types of foundations and factors to be considered in their location - Bearing capacity – criteria for determination of bearing capacity – factors influencing bearing capacity – analytical methods to determine bearing capacity – Terzaghi's theory – IS Methods.

Unit – IV

Shallow Foundations – Settlement Criteria: Safe bearing pressure based on N- value – allowable bearing pressure; safe bearing capacity and settlement from plate load test – Types of foundation settlements and their determination - allowable settlements of structures.

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.

Unit – VI

Well Foundations: Types – Different shapes of well – Components of well – functions – forces acting on well foundations - Design Criteria – Determination of steining thickness and plug - construction and Sinking of wells – Tilt and shift.

Course Outcomes

After completion of the course, a successful student is able to

1. The student must be able to understand the various types of shallow foundations and decide on their location based on soil characteristics.
2. The student must be able to compute the magnitude of foundation settlement and decide on the size of the foundation accordingly.

3. The student must be able to use the field test data and arrive at the bearing capacity.
4. The student must be able to apply the principles of bearing capacity of piles and design them accordingly.

Text Books:

1. 'Soil Mechanics' by B.C. Punmia & Ashok Kumar Jain, Arun Kumar Jain, Laxmi Publications (P) LTD.
2. 'Soil Mechanics' by Dr. K.R. Arora, Standard Publishers Distributors..

References:

1. Foundation Analysis and Design'by Bowles, J.E., (1988) – 4th Edition, McGraw-Hill Publishing Company, Newyork.
2. 'Theory and Practice of Foundation Design' by N.N.SOM & S.C.DAS PHI Learning Private limited.

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III Year B.Tech. (CE). – II Semester

Transportation Engineering – II

Course Objectives:

The objective of this course is:

a. ***To know various components and their functions in a railway track***
b. ***To acquire design principles of geometrics in a railway track.***
c. ***To know various techniques for the effective movement of trains.***
d. ***To acquire design principles of airport geometrics and pavements.***
e. ***To know the planning, construction and maintenance of Docks and Harbours.***

A. RAILWAY ENGINEERING

Unit – I

Components of Railway Engineering: Permanent way components – Railway Track Gauge - Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast –Rail Fastenings – Creep of Rails- Theories related to creep – Adzing of Sleepers- Sleeper density – Rail joints. Advances in railway engineering.

Unit – II

Geometric Design of Railway Track: Alignment – Engineering Surveys - Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve –safe speed on curves – Transition curve – Compound curves – Reverse curves – Extra clearance on curves – widening of gauge on curves – vertical curves – cheek rails on curves.

Unit – III

Turnouts & Controllers: Track layouts – Switches – Design of Tongue Rails – Crossings – Turnouts – Layout of Turnout – Double Turnout – Diamond crossing – Scissors crossing.

Signal Objectives – Classification – Fixed signals – Stop signals – Signalling systems – Mechanical signalling system – Electrical signalling system – System for Controlling Train Movement – Interlocking – Modern signaling Installations.

B.AIRPORT ENGINEERING

Unit – IV

Airport Planning & Design: Airport Master plan – Airport site selection – Air craft characteristics – Zoning laws – Airport classification – Runway orientation – Wind rose diagram – Runway length – Taxiway design – Terminal area and Airport layout – Visual aids and Air traffic control.

Unit – V

Runway Design: Various Design factors – Design methods for Flexible pavements – Design methods for Rigid pavements – LCN system of Pavement Design – Airfield Pavement Failures – Maintenance and Rehabilitation of Airfield pavements – Evaluation & Strengthening of Airfield pavements – Airport Drainage – Design of surface and subsurface
drainage.

C.DOCKS & HARBOURS

Unit – VI

Planning, Layout, Construction & Maintenance Of Docks & Harbours: Classification of ports – Requirement of a good port – classification of Harbours – Docks - Dry & wet docks – Transition sheds and workhouses – Layouts; Quays – construction of Quay walls – Wharves – Jetties – Tides - Tidal data and Analysis – Break waters – Dredging – Maintenance of Ports and Harbours – Navigational aids.

Course Outcomes

At the end of course, Student can

1. Design geometrics in a railway track.
2. Provide good transportation network
3. Design airport geometrics and airfield pavements.
4. Plan, construct and maintain Docks and Harbours.

Text Books :

1. Railway Engineering by Satish Chandra and Agarwal M.M., Oxford University Press, New Delhi
2. Airport Engineering by Khanna & Arora - Nemchand Bros, New Delhi.
3. Docks and Harbour Engineeringby Bindra S.P. - Dhanpathi Rai & Sons, New Delhi.

References:

1. 'Railway Engineering' by Saxena & Arora - Dhanpat Rai, New Delhi.
2. 'Transportation Engineering' by Srinivasa Kumar R, University Press, Hyderabad
3. 'Highway, Railway, Airport and Harbour Engineering' by Subramanian KP, Scitech Publications (India) Pvt. Limited, Chennai.

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III Year B.Tech. (CE). – II Semester

Environmental Engineering – II

Course Objectives:

The objective of this course is:

a. ***Outline planning and the design of wastewater collection, conveyance and treatment systems for a community/town/city.***
b. ***Provide knowledge of characterisation of wastewater generated in a community.***
c. ***Impart understanding of treatment of sewage and the need for its treatment.***
d. ***Summarize the appurtenance in sewerage systems and their necessity.***
e. ***Teach planning, and design of septic tank and imhoff tank and the disposal of the effluent from these low cost treatment systems.***
f. ***Effluent disposal method and realise the importance of regulations in the disposal of effluents in rivers.***

Unit – I

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 – appurtenances in sewerage – cleaning and
ventilation of sewers.

Unit – II

Pumping of wastewater: Pumping stations – location – components– types of pumps and their suitability with regard to wastewaters.

House Plumbing: systems of plumbing-sanitary fittings and other accessories–one pipe and two pipe systems – Design of building drainage.

Unit – III

Sewage characteristics – Sampling and analysis of wastewater - Physical, Chemical and Biological Examination-Measurement of BOD and COD - BOD equations.
Treatment of sewage: Primary treatment-Screens-grit chambers-grease traps–floatation– sedimentation – design of preliminary and primary treatment units.

Unit – IV

Secondary treatment: Aerobic and anaerobic treatment process-comparison.
Suspended growth process: Activated Sludge Process, principles, designs, and operational problems, modifications of Activated Sludge Processes, Oxidation ponds, Aerated Lagoons.
Attached Growth Process: Trickling Filters–mechanism of impurities removal- classification–design-operation and maintenance problems. RBCs, Fluidized bed reactors.

Unit – V

Miscellaneous Treatment Methods: Nitrification and Denitrification – Removal of Phosphates –UASB– Membrane reactors-Integrated fixed film reactors. Anaerobic Processes: Septic Tanks and Imhoff tanks-working Principles and Design–disposal of septic tank effluent.

Unit – VI

Bio-solids (Sludge) management: Characteristics- handling and treatment of sludge thickening – anaerobic digestion of sludge.

Disposal of sewage: methods of disposal – disposal into water bodies- Oxygen Sag Curve-disposal on land-sewage sickness.

Advances in sewage disposal methods.

Course Outcomes

After completion of the course, a successful student is able to

1. Plan and design the sewerage systems
2. Characterization of Sewage
3. Select the appropriate appurtenances in the sewerage systems
4. Selection of suitable treatment flow for sewage treatment
5. Identify the critical point of pollution in a river for a specific amount of pollutant disposal into the river

Text Books:

1. Wastewater Engineering Treatment and Reuse by Metcalf & Eddy, Tata McGraw-Hill edition.
2. Elements of Environmental Engineering by K.N. Duggal, S. Chand & Company Ltd. New Delhi, 2012.

References:

1. Environmental Engineering –II: Sewage disposal and Air Pollution Engineering, by Garg, S.K.; Khanna Publishers.
2. Sewage treatment and disposal by Dr. P.N. Modi& Sethi.

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III Year B.Tech. (CE). – II Semester

Water Resources Engineering–I

Course Objectives:

The course is designed to

a. ***Introduce hydrologic cycle and its relevance to Civil engineering.***
b. ***Make the students understand physical processes in hydrology and, components of the hydrologic cycle.***
c. ***Appreciate concepts and theory of physical processes and interactions.***
d. ***Learn measurement and estimation of the components hydrologic cycle.***
e. ***Provide an overview and understanding of Unit Hydrograph theory and its analysis.***
f. ***Understand flood frequency analysis, design flood, flood routing.***
g. ***Appreciate the concepts of groundwater movement and well hydraulics.***

Unit – I

Introduction: Engineering hydrology and its applications, Hydrologic cycle, hydrological data-sources of data.

Precipitation:Types and forms, measurement, raingauge network, presentation of rainfall data, average rainfall, continuity and consistency of rainfall data, frequency of rainfall, Intensity-Duration-Frequency (IDF) curves, Depth-Area-Duration (DAD) curves, Probable Maximum Precipitation (PMP), design storm.

Unit – II

Abstractions from Precipitation: Initial abstractions.
Evaporation: factors affecting, measurement, reduction
Evapotranspiration: factors affecting, measurement, control
Infiltration: factors affecting, Infiltration capacity curve, measurement, infiltration indices.

Unit – III

Runoff : Catchment characteristics**,** Factors affecting runoff, components, computation- empirical formulae, tables and curves, stream gauging, rating curve, flow mass curve and flow duration curve.

Hydrograph analysis: Components of hydrograph, separation of base flow, effective rainfall hyetograph and direct runoff hydrograph, unit hydrograph, assumptions, derivation of unit hydrograph, unit hydrographs of different durations, principle of superposition and S-hydrograph methods, limitations and applications of unit hydrograph, synthetic unit hydrograph.

Unit – IV

Floods: Causes and effects, frequency analysis- Gumbel's and Log-Pearson type III distribution methods, Standard Project Flood (SPF) and Probable Maximum Flood (PMF), flood control methods and management.

Flood Routing: Hydrologic routing, channel and reservoir routing- Muskingum and Puls methods of routing.

Unit – V

Groundwater: Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, types of wells, Darcy's law, Dupuit's equation- steady radial flow to wells in confined and unconfined aquifers, yield of a open well-recuperation test.

Unit – VI

Advanced Topics in Hydrology: Rainfall-runoff Modelling, instantaneous unit hydrograph (IUH) - conceptual models - Clark and Nash models, general hydrological models- Chow - Kulandaiswamy model.

Course Outcomes

After completion of the course, a successful student is able to

1. Have a thorough understanding of the theories and principles governing the hydrologic processes.
2. Be able to quantify major hydrologic components and apply key concepts to several practical areas of engineering hydrology and related design aspects.
3. Develop Intensity-Duration-Frequency and Depth-Area Duration curves to design hydraulic structures.
4. Be able to develop design storms and carry out frequency analysis.
5. Be able to determine storage capacity and life of reservoirs.
6. Develop unit hydrograph and synthetic hydrograph.
7. Be able to estimate flood magnitude and carry out flood routing.
8. Be able to determine aquifer parameters and yield of wells.
9. Be able to model hydrologic processes.

Text Books:

1. 'Engineering Hydrology' by Jayarami Reddy, P, Laxmi Publications Pvt. Ltd., (2013), New Delhi
2. 'Applied hydrology' by Chow V.T., D.R Maidment and L.W. Mays, Tata McGraw Hill Education Pvt. Ltd., (2011), New Delhi.

References:

1. 'Water Resources Engineering', Mays L.W, Wiley India Pvt. Ltd, (2013).
2. 'Engineering Hydrology –Principles and Practice'by Ponce V.M., Prentice Hall International, (1994).

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III Year B.Tech. (CE). – II Semester

Environmental Pollution and Control

(Open Elective)

Course Objectives:

The objective of this course is:

a. ***Impart knowledge on fundamental aspects of air pollution & control, noise pollution, and solid waste management.***
b. ***Provide basic knowledge on sustainable development.***
c. ***Introduces some basics of sanitation methods essential for protection of community health.***
d. ***Differentiate the solid and hazardous waste based on characterization.***

Unit – I

Air Pollution: Air pollution Control Methods–Particulate control devices – Methods of Controlling Gaseous Emissions – Air quality standards.

Noise Pollution: Noise standards, Measurement and control methods – Reducing residential and industrial noise – ISO14000.

Unit – II

Industrial wastewater Management: – Strategies for pollution control - Volume and Strength reduction – Neutralization – Equalization – Proportioning – Common Effluent Treatment Plants - Recirculation of industrial wastes – Effluent standards.

Unit – III

Solid Waste Management: solid waste characteristics – basics of on-site handling and collection – separation and processing - Incineration- Composting-Solid waste disposal methods – fundamentals of Land filling.

Unit – IV

Environmental Sanitation: Environmental Sanitation Methods for Hostels and Hotels, Hospitals, Swimming pools and public bathing places, social gatherings (melas and fares), Schools and Institutions, Rural Sanitation-low cost waste disposal methods.

Unit – V

Hazardous Waste: Characterization - Nuclear waste – Biomedical wastes – Electronic wastes - Chemical wastes – Treatment and management of hazardous waste-Disposal and Control methods.

Unit – VI

Sustainable Development: Definition- elements of sustainable developments-Indicators of sustainable development- Sustainability Strategies- Barriers to Sustainability–Industrialization and sustainable development – Cleaner production in achieving sustainability- sustainable development.

Course Outcomes

After completion of the course, a successful student is able to

1. Identify the air pollutant control devices
2. Have knowledge on the NAAQ standards and air emission standards

3. Differentiate the treatment techniques used for sewage and industrial wastewater treatment methods.
4. Understand the fundamentals of solid waste management, practices adopted in his town/village and its importance in keeping the health of the city.
5. Appreciate the methods of environmental sanitation and the management of community facilities without spread of epidemics.
6. Appreciate the importance of sustainable development while planning a project or executing an activity.

Text Books:

1. Environmental Engineering, by Ruth F. Weiner and Robin Matthews – 4th Edition Elesevier, 2003.
2. Environmental Science and Engineering by J.G. Henry and G.W. Heinke – Pearson Education.
3. Environmental Engineering by Mackenzie L Davis & David A Cornwell. McGraw Hill Publishing.

References:

1. Air Pollution and Control by M.N. Rao & H.N. Rao
2. Solid Waste Management by K. Sasi Kumar, S.A. Gopi Krishna. PHI New Delhi.
3. Environmental Engineering by Gerard Kiley, Tata McGraw Hill.

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III Year B.Tech. (CE). – II Semester

Disaster Management

(Open Elective)

Course Objectives:

The objective of this course is:

a. ***Develop an understanding of why and how the modern disaster manager is involved with pre-disaster and post-disaster activities.***
b. ***Develop an awareness of the chronological phases of natural disaster response and refugee relief operations. Understand how the phases of each are parallel and how they differ.***
c. ***Understand the 'relief system' and the 'disaster victim.'***
d. ***Describe the three planning strategies useful in mitigation.***
e. ***Identify the regulatory controls used in hazard management.***
f. ***Describe public awareness and economic incentive possibilities.***
g. ***Understand the tools of post-disaster management.***

Unit – I

Natural Hazards And Disaster Management: Introduction of DM – Inter disciplinary -nature of the subject– Disaster Management cycle – Five priorities for action. Case study methods of the following: floods, draughts – Earthquakes – global warming, cyclones & Tsunamis – Post Tsunami hazards along the Indian coast – landslides.

Unit – II

Man Made Disastar and Their Management Along With Case Study Methods Of The Following: Fire hazards – transport hazard dynamics – solid waste management – post disaster – bio terrotirism -threat in mega cities, rail and air craft's accidents, and Emerging infectious diseases & Aids and their management.

Unit – III

Risk and Vulnerability: Building codes and land use planning – social vulnerability – environmental vulnerability – Macroeconomic management and sustainable development, climate change risk rendition – financial management of disaster – related losses.

Unit – IV

Role of Technology In Disaster Managements: Disaster management for infra structures, taxonomy of infra structure – treatment plants and process facilities-electrical substations- roads and bridges- mitigation programme for earth quakes –flowchart, geospatial information in agriculture drought assessment-multimedia technology in disaster risk management and training transformable indigenous knowledge in disaster reduction.

Unit – V

Education and Community Preparedness: Education in disaster risk reduction-Essentials of school disaster education-Community capacity and disaster resilience-Community based disaster recovery - Community based disaster management and social capital-Designing resilience- building community capacity for action.

Unit – VI

Multi-sectional Issues: Impact of disaster on poverty and deprivation- Climate change adaptation and human health -Exposure, health hazards and environmental risk-Forest management and disaster risk

reduction.- Institutional capacity in disaster management -The Red cross and red crescent movement.- Corporate sector and disaster risk reduction-A community focused approach.

Course Outcomes

After completion of the course, a successful student is able to

1. Affirm the usefulness of integrating management principles in disaster mitigation work
2. Distinguish between the different approaches needed to manage preduring and post- disaster periods
3. Explain the process of risk management
4. Relate to risk transfer

Text Books:

1. 'Disaster Management – Global Challenges and Local Solutions' by Rajib shah & R R Krishnamurthy (2009),Universities press.
2. 'Disaster Science & Management' by Tushar Bhattacharya, Tata McGraw Hill Education Pvt. Ltd., New Delhi.
3. 'Disaster Management – Future Challenges and Opportunities' by Jagbir Singh (2007), I K International Publishing House Pvt. Ltd.

References:

1. 'Disaster Management' edited by H K Gupta (2003),Universities press.

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III Year B.Tech. (CE). – II Semester

Architecture and Town Planning

(Open Elective)

Course Objectives:

The objective of this course is:

a. ***Initiating the students to different architectures of the world. The distinctions between the eastern and western architecture styles are focused.***
b. ***The salient features of Egyptian, Greek, Roman, Indian Vedic, Indus valley civilization, Buddhist, Hindu and Indo-Sarsanic Architecture are introduced.***
c. ***Architectural design concepts, principles of planning and composition are imparted.***
d. ***To enable the student to understand town planning from ancient times to modern times.***
e. ***To impart the concepts of town planning standards, land scaping and expansion of towns.***

Unit – I

History of Architecture: Western Architecture: Egyptian, Greek, Roman Architectures- Orders. Indian Architecture: Vedic age, Indus valley civilization– Buddhist period: Stambas, Stupa, Toranas, Chaityas, Viharas – Hindu temples: Dravidian and Indo Aryan Styles-Temple of Aihole, Madurai, Bhuvaneshwar, Mount Abu. Indo Sarsanic (Islamic) Architecture: Mosque - Palace - Fort - Tomb.

Unit – II

Architectural Design: Principles of designing – Composition of Plan – relationship between plan and elevation- building elements, form, surface texture, mass, line, color, tone- Principles of Composition: Unity, contrast, proportion, scale, balance, circulation, rhythm, character, expression.

Unit – III

Principles of Planning: Principles of planninga residence- site selection, site orientation- aspect, prospect, grouping, circulation, privacy, furniture requirements, services and other factors.

Post-classic Architecture: Introduction of post-classic architecture contribution of eminent architects to modern period-Edward Lutyens, Le Corbusier, Frank Lloyd Wrigt, Walter Groping.

Unit – IV

Histroical Back Ground of Town Planning: Town planning in India – Town plans of mythological Manasa-Town plans of ancient towns: Harappa, Mohenjodaro, Pataliputra, Delhi, Acropolis (Greece), Jerusalem, Mecca, Rome, London.

Unit – V

Modern Town Planning: Zoning- Roads and road traffic- Housing- Slums, Parks, Play grounds- Public Utility Services- Surveys and maps for planning- Neighborhood Planning.

Standards of Town planning: Planning new towns, planning standards and specifications, national and regional planning, town planning and legislation planning regulations and limitations.

Unit – VI

Land Scaping and Expansion of Towns: Land scaping for the towns, horizontal and vertical expansion of towns- garden cities, satellite towns floating towns- sky scrapers-pyramidal cities.

Course Outcomes

After completion of the course, a successful student is able to

1. The student should be able to distinguish architectural styles of eastern and western world.
2. The student should understand the importance of Orders of architecture.
3. Should be able to compose spaces of buildings using design concepts, planning principles.
4. Should understand the town planning standards, landscaping features and regulations controlling expansion of the towns and the cities.

Text Books:

1. 'The great ages of World Architecture' by G.K. Hiraskar.
2. 'Planning and Design of Buildings by Section of Architecture' by Y. S. Sane.
3. 'Professional Practice' by G.K.Krishnamurthy, S.V.Ravindra, PHI Learning, New Delhi.

References:

1. 'Indian Architecture – Vol. I & II' by Percy Brown, Taraporevala Publications, Bombay.
2. 'Fundamentals of Town Planning' by G.K. Haraskar.

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III Year B.Tech. (CE). – II Semester

Green Technologies

(Open Elective)

Course Objectives:

The objective of this course is:

a. ***To present different concepts of green technologies.***
b. ***To acquire principles of Energy efficient technologies.***
c. ***To impart knowledge on the methods of reducing CO2 levels in atmosphere.***
d. ***To gain knowledge of the importance of life cycle assessment***
e. ***To learn the importance of green fuels and its impact on environment.***

Unit – I

Introduction to Green Technology – definition- Importance – Historical evolution – advantages and disadvantages of green technologies-factors affecting green technologies- Role of Industry, Government and Institutions – Industrial Ecology – role of industrial ecology in green technology.

Unit – II

Cleaner Production (CP): Definition – Importance – Historical evolution - Principles of Cleaner Production–Benefits–Promotion – Barriers – Role of Industry, Government and Institutions – clean development mechanism, reuse, recovery, recycle, raw material substitution-Wealth from waste, case studies.

Unit – III

Cleaner Production Project Development and Implementation: Overview of CP Assessment Steps and Skills, Process Flow Diagram, Material Balance, CP Option Generation – Technical and Environmental Feasibility analysis – Economic valuation of alternatives - Total Cost Analysis – CP Financing – Preparing a Program Plan – Measuring Progress- ISO 14000.

Unit – IV

Pollution Prevention: Pollution Prevention and Cleaner Production Awareness Plan – Waste audit – Environmental Statement, carbon credit, carbon sequestration, carbon trading, Life Cycle Assessment - Elements of LCA – Life Cycle Costing – Eco Labelling.

Unit – V

Availability and need of conventional energy resources: Major environmental problems related to the conventional energy resources, future possibilities of energy need and availability. Non-conventional energy sources: Solar Energy-solar energy conversion technologies and devices, their principles, working and application.

Unit – VI

Green Fuels: Definition-benefits and challenges – comparison of green fuels with conventional fossil fuels with reference to environmental, economical and social impacts- public policies and market-driven initiatives.

Biomass energy: Concept of biomass energy utilization, types of biomass energy, conversion processes, Wind Energy, energy conversion technologies, their principles, equipment and suitability in Indian context; tidal and geothermal energy.

Course Outcomes

After completion of the course, a successful student is able to

1. Enlist different concepts of green technologies in a project
2. Understand the principles of Energy efficient technologies
3. Estimate the carbon credits of various activities
4. Identify the importance of life cycle assessment
5. Recognize the benefits of green fuels with respect to sustainable development.

Text Books:

1. 'Pollution Prevention: Fundamentals and Practice' by Paul L Bishop (2000), McGraw Hill International.
2. 'Pollution Prevention and Abatement Handbook – Towards Cleaner Production' by World Bank Group (1998), World Bank and UNEP, Washington D.C.
3. 'Cleaner Production Audit' by Prasad Modak, C.Visvanathan and Mandar Parasnis (1995), Environmental System Reviews, No.38, Asian Institute of Technology, Bangkok.
4. 'Green Technologies for better future' by M.C. Graw Hill International Publications.

References:

1. 'Handbook of Organic Waste Conversion' by Bewik M.W.M.
2. 'Energy, The Solar Hydrogen Alternative' by Bokris J.O.
3. 'Non-conventional Energy Sources' by Rai G.D.

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III Year B.Tech. (CE). – II Semester

Environmental Engineering Lab

Course Objectives:

The course will address the following:

a. ***Estimation some important characteristics of water and wastewater in the laboratory.***
b. ***It also gives the significance of the characteristics of the water and wastewater.***

List of Experiments

1. Determination of pH and Electrical Conductivity (Salinity) of Water and Soil.
2. Determination and estimation of Total Hardness–Calcium & Magnesium.
3. Determination of Alkalinity/Acidity
4. Determination of Chlorides in water and soil.
5. Determination and Estimation of total solids, organic solids and inorganic solids and settleable solids by Imhoff Cone.
6. Determination of Iron.
7. Determination of Dissolved Oxygen with D.O. Meter & Wrinklers Method and B.O.D.
8. Determination of N, P, K values in solid waste
9. Physical parameters – Temperature, Colour, Odour, Turbidity, Taste.
10. Determination of C.O.D.
11. Determination of Optimum coagulant dose.
12. Determination of Chlorine demand.
13. Presumptive Coliform test.

NOTE: At least 10 of the above experiments are to be conducted.

Course Outcomes

After completion of the course, a successful student is able to

1. Estimation some important characteristics of water and wastewater in the laboratory.
2. Draw some conclusion and decide whether the water is potable or not.
3. Decide whether the water body is polluted or not with reference to the state parameters in the list of experiments.
4. Estimation of the strength of the sewage in terms of BOD and COD.

Text Books:

1. Standard Methods for Analysis of Water and Waste Water – APHA.
2. Chemical Analysis of Water and Soil by KVSG Murali Krishna, Reem Publications, New Delhi.

References:

1. Relevant IS Codes.
2. Chemistry for Environmental Engineering by Sawyer and Mc. Carty.

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III Year B.Tech. (CE). – II Semester

Engineering Geology Lab

Course Objectives:

The objective of this course is:

a. ***To identify the mega-scopic types of Ore minerals & Rock forming minerals.***
b. ***To identify the mega-scopic types of Igneous, Sedimentary, Metamorphic rocks.***
c. ***To identify the topography of the site & material selection***

LIST OF EXPERIMENTS

1. Physical properties of minerals: Mega-scopic identification of
   a. Rock forming minerals – Quartz group, Feldspar group, Garnet group, Mica group & Talc, Chlorite, Olivine, Kyanite, Asbestos, Tourmelene, Calcite, Gypsum, etc…
   b. Ore forming minerals – Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite, etc…
2. Megascopic description and identification of rocks.
   a) Igneous rocks – Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite, Granite Poryphery, Basalt, etc…
   b) Sedimentary rocks – Sand stone, Ferrugineous sand stone, Lime stone, Shale, Laterite, Conglamorate, etc…
   c) Metamorphic rocks – Biotite – Granite Gneiss, Slate, Muscovite & Biotiteschist, Marble, Khondalite, etc…
3. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc.
4. Simple Structural Geology problems.
5. Bore hole data.
6. Strength of the rock using laboratory tests.
7. Field work – To identify Minerals, Rocks, Geomorphology& Structural Geology.

LAB EXAMINATION PATTERN:

1. Description and identification of FOUR minerals
2. Description and identification of FOUR (including igneous, sedimentary and metamorphic rocks)
3. ONE Question on Interpretation of a Geological map along with a geological section.
4. TWO Questions on Simple strike and Dip problems.
5. Bore hole problems.
6. Project report on geology.

Course Outcomes

After completion of the course, a successful student is able to

1. Identify Mega-scopic minerals & their properties.
2. Identify Mega-scopic rocks & their properties.
3. Identify the site parameters such as contour, slope & aspect for topography.
4. Know the occurrence of materials using the strike & dip problems.

Text Books:

1. 'Engineering Geology' by Subinoy Gangopadhay, Oxford University press.
2. 'Engineering Geology' by D. Venkat Reddy, Vikas Publishing House pvt. Ltd, 2013.

3. 'Engineering Geology' by N. Chenn Kesavulu, Trinity Press (Laxmi Publications), 2nd Edition, 2014.

References:

- 'Applied Engineering Geology Practicals' by M T Mauthesha Reddy, New Age International Publishers, 2nd Edition.
- 'Foundations of Engineering Geology' by Tony Waltham, Spon Press, 3rd edition, 2009.

Web-Resources: www.nptel.com

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III Year B.Tech. (CE). – II Semester

Soft skills - II

(Title: Professional Communication and Employability skills)

Course Objectives: To help the students

- ***Participate in group discussions with confidence and to make effective presentations.***
- ***With- resume packaging, preparing and facing interviews.***
- ***Build an impressive personality through effective time management and goal setting, self-confidence and assertiveness.***
- ***Understand, what constitutes proper grooming and etiquette in a professional environment.***

Unit-I

Communicative Competence – The Art of Communication, basic grammar, personal SWOT Analysis, Analyzing audience, role of emotions and body language in communication-Effective listening skills, using English in different situations

Unit-II

Group Discussion – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence-Elements of effective presentation – Structure of presentation – Presentation tools

Unit-III

Interview Skills – Resume' writing – structure and presentation, planning, defining the career objective, projecting ones strengths and skill-pre-interview planning, opening strategies, answering strategies, mock interviews

Unit-IV

Personality Development – Effective Time Management, setting realistic goals, self confidence and assertiveness, stress management, moral values.

Unit- V

Technical Communication: Report writing: Importance, structure, drafting of reports, Business Writing: Sales letters, claim and adjustment letters, Job Application letter, preparing a personal resume, notices, agenda and minutes of the meeting

Unit-VI

Development of Occupational Competency

Leadership skills - Problem solving skills - Organising and Co-ordination skills - Critical thinking Decision Making

Course Outcomes:

After completion of the course, a successful student is able to

1. Be effective communicators and participate in group discussions with confidence. Also be able to make presentations in a professional context.
2. Write resumes, prepare and face interviews confidently.

3. Be assertive and set short term and long term goals. Also learn to manage time effectively and deal with stress.
4. Make the transition smoothly from campus to corporate.

Suggested Reading:

1 Personality Development and Soft Skills-Barun.K.Mithra, Oxford Publications
2 Technical Communication –Principles and Practice-Meenakshi Raman,Sangeeta Sharma, Oxford Publications
3. Effective Technical Communication-Mc Grawhill-Ashraf Rizvi

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*IV Year B.Tech. (CE). – I Sem*ester

Water Resources Engineering–II

Course Objectives:

The course is designed to

a. ***Introduce the types of irrigation systems***
b. ***Introduce the concepts of planning and design of irrigation systems***
c. ***Discuss the relationships between soil, water and plant and their significance in planning an irrigation system.***
d. ***Understand design methods of erodible and non-erodible canals***
e. ***Know the principles of design of hydraulic structures on permeable foundations.***
f. ***Know the concepts for analysis and design principles of storage and diversion head works.***
g. ***Learn design principles of canal structures***

Unit – I

Irrigation: Necessity and importance, principal crops and crop seasons, types, methods of application, soil-water-plant relationship, soil moisture constants, consumptive use, estimation of consumptive use, crop water requirement, duty and delta, factors affecting duty, depth and frequency of irrigation, irrigation efficiencies, water logging and drainage, standards of quality for irrigation water, crop rotation.

Unit – II

Canals: Classification, design of non-erodible canals - methods of economic section and maximum permissible velocity, economics of canal lining, design of erodible canals -Kennedy's silt theory and Lacey's regime theory, balancing depth of cutting.

Unit – III

Canal Structures:

Falls: Types and location, design principles of Sarda type fall and straight glacis fall.

Regulators: Head and cross regulators, design principles

Cross Drainage Works: Types, selection, design principles of aqueduct, siphon aqueduct and super passage.

Outlets: types, proportionality, sensitivity and flexibility

River Training: Objectives and approaches

Unit – IV

Diversion Head Works: Types of diversion head works, weirs and barrages, layout of diversion head works, components. causes and failures of weirs on permeable foundations, Bligh's creep theory, Khosla's theory, design of impervious floors for subsurface flow, exit gradient.

Unit – V

Reservoir Planning: Investigations, site selection, zones of storage, yield and storage capacity of reservoir, reservoir sedimentation.

Dams: Types of dams, selection of type of dam, selection of site for a dam.

Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a dam, stability analysis, drainage galleries, grouting.

Unit – VI

Earth Dams: Types, causes of failure, criteria for safe design, seepage, measures for control of seepage-filters, stability analysis-stability of downstream slope during steady seepage and upstream slope during sudden drawdown conditions.
Spillways: Types, design principles of Ogee spillways, types of spillways crest gates. Energy dissipation below spillways-stilling basin and its appurtenances.

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

1. Estimate irrigation water requirements
2. Design irrigation canals and canal network
3. Plan an irrigation system
4. Design irrigation canal structures
5. Plan and design diversion head works
6. Analyse stability of gravity and earth dams
7. Design ogee spillways and energy dissipation works

Text Books:

1. 'Irrigation and Water Power Engineering' by B.C. Punmia, P.B.B Lal, Laxmi Publications Pvt. Ltd., New Delhi.
2. 'Irrigation Engg. & Hydraulic structures' by S.K. Garg, Khanna Publishers, New Delhi.

References:

1. 'Water Resources Engineering' by Mays L.W (2013), Wiley India Pvt. Ltd, New Delhi.
2. 'Irrigation Engineering' by Sharma R.K. and Sharma, T.K (2012), S.Chand & Co Publishers.
3. 'Water Resources Engineering' by Satyanarayana Murthy Challa (2008), New Age International Publishers.

Web-Resources: www.nptel.com

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*IV Year B.Tech. (CE). – I Sem*ester

Construction Technology and Management

Course Objectives:

The objective of this course is:

a. ***To introduce to the student the concept of project management including network drawing and monitoring.***
b. ***To introduce the various equipment related to construction like earth moving equipment, trucks and handling equipment, aggregate production and construction equipment and machinery.***
c. ***To introduce the importance of safety in construction projects.***
d. ***To learn safety operation of construction machinery***
e. ***To learn techniques to distinguish civil structures safety***
f. ***To understand fire safety principles***

Unit – I

Construction project management: Construction project management and its relevance – qualities of a project manager – project planning – coordination –scheduling - monitoring – bar charts – milestone charts – critical path method.

Unit – II

Project evaluation: Project evaluation and review technique – cost analysis - updating – crashing for optimum cost – crashing for optimum resources – allocation of resources.

Unit – III

Construction equipment: Construction equipment – economical considerations – earthwork equipment – Trucks and handling equipment – capacities of trucks.– calculation of truck production – compaction equipment – types of compaction rollers.

Concreting equipment: Concreting equipment – Types of crushers – selection of crushing equipment - screening of aggregate – concrete mixers – mixing and placing of concrete – consolidating and finishing.

Unit – IV

Hoisting and earthwork equipment: Hoisting and earthwork equipment – hoists – cranes – tractors - bulldozers – graders – scrapers– draglines - clamshell buckets. Safety in earth moving equipment.

Unit – V

Construction methods: Construction methods – earthwork – piling – placing of concrete – form work – fabrication and erection – quality control and safety engineering.

Unit – VI

Accidents Causes: Problems impeding safety in construction industry- causes of fatal accidents, related to various construction activities, human factors associated with these accidents.

Hazards Of Construction And Prevention: Excavations, basement and wide excavation, trenches, shafts – scaffolding , types, causes of accidents, scaffold inspection checklist

Safety in Demolition Work: Safety in demolition work, manual, mechanical, using explosive - keys to safe demolition, pre survey inspection, method statement, site supervision, safe clearance zone, health hazards from demolition

Course Outcomes

Upon the successful completion of this course, the students will be able to:

1. Appreciate the importance of construction planning.
2. Understand the functioning of various earth moving equipment.
3. Know the methods of production of aggregate products and concreting.
4. Apply the gained knowledge to project management and construction techniques.
5. Ensure safety while operating construction machinery
6. Outline safety plans for demolition of buildings
7. Prepare fire safety plans for a given building

Text Books :

1. 'Construction Planning, Equipment and Methods' by Peurifoy and Schexnayder , Shapira, Tata Mcgrawhill.
2. 'Construction Project Management Theory and Practice'by Kumar Neeraj Jha (2011), Pearson.
3. 'Reliability Maintenance and Safety Engineering, by Gupta A K, Laxmi Publications, New Delhi.

References:

1. 'Construction Project Management - An Integrated Approach' by Peter Fewings , Taylor and Francis
2. 'Construction Safety Hand Book'by V.J.Davies and K.Thomasin, Thomas Telford Ltd., London, 1990.

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*IV Year B.Tech. (CE). – I Sem*ester

Prestressed Concrete

Course Objectives:

The objective of this course is:

a. ***Familiarize Students with concepts of prestressing.***
b. ***Equip student with different systems and devices used in prestressing.***
c. ***Understand the different losses of prestress including short and long term losses.***
d. ***Familiarize students with the analysis and design of prestressed concrete members under flexure, shear and torsion.***

Unit – I

Basic concepts of Prestressing: Basic concepts of Prestressing- Advantages and Applications of Prestressed Concretes, High Strength Concrete- Permissible Stresses, Shrinkage, Creep, Deformation Characteristics, High strength Steel- Types, Strength- Permissible Stresses- Relaxation of Stress, Stress Corrosion- Durability, Fire Resistance, Cover Requirements.

Unit – II

Prestressing Systems: Prestressing Systems- Introduction, Tensioning devices, Pre-tensioning Systems, Post tensioning Systems, Basic Assumptions in Analysis of prestress and design, Analysis of prestress, Resultant Stresses at a section- pressure line- Concepts of load balancing- Stresses in Tendons, Cracking moment.

Unit – III

Losses of Pre-stressing: Losses of Pre-stressing- Loss of Pre-stress in pre-tensioned and post tensioned members due to various causes -Elastic shortening of concrete, shrinkage of concrete, creep of concrete, Relaxation of steel, slip in anchorage, differential shrinkage- bending of members and frictional losses- Total losses allowed for design.

Unit – IV

Design for Flexural Resistance: Design for Flexural resistance - Types of flexural failure – Code procedures- Design of sections for flexure- Control of deflections- Factors influencing- Prediction of short term and long term deflections.

Unit – V

Design for Shear and Torsion: Design for Shear and Torsion- Shear and Principal Stresses- Design of Shear reinforcements- Codal Provisions- Design for Torsion, Design for Combined bending, shear and torsion.

Unit – VI

Transfer of Stresses: Transfer of Prestress in pre tensioned members- Transmission length- Bond stresses- end zone reinforcement- Codal provisions- Anchorage zone Stresses in Post tensioned members- Stress distribution in end block- Anchorage Zone reinforcement.

Course Outcomes

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

1. Understand the different methods of prestressing.

2. Estimate the effective prestress including the short and long term losses.
3. Analyze and design prestressed concrete beams under flexure and shear.
4. Understand the relevant IS Codal provisions for prestressed concrete

Text Books :

1. 'Prestressed Concrete' by N. Krishna Raju, Tata McGraw hill
2. 'Prestressed Concrete' by S. Ramamrutham

References:

1. 'Prestressed Concrete' by P. Dayaratnam
2. 'Prestressed Concrete' by T. Y. Lin & Burns, Wiley Publications

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*IV Year B.Tech. (CE). – I Sem*ester

Remote Sensing and GIS Applications

Course Objectives:

The course is designed to

a. ***Introduce the basic principles of Remote Sensing and GIS techniques.***
b. ***Learn various types of sensors and platforms***
c. ***learn concepts of visual and digital image analyses***
d. ***Understand the principles of spatial analysis***
e. ***Appreciate application of RS and GIS to Civil engineering***

Unit – I

Introduction to remote sensing: Basic concepts of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere, energy interaction with the earth surfaces characteristics of remote sensing systems.

Sensors and platforms: Introduction, types of sensors, airborne remote sensing, spaceborne remote sensing, image data characteristics, digital image data formats-band interleaved by pixel, band interleaved by line, band sequential, IRS, LANDSAT, SPOT. Advanced sensors and its applications.

Unit – II

Image analysis: Introduction, elements of visual interpretations, digital image processing- image preprocessing, image enhancement, image classification, supervised classification, unsupervised classification.

Unit – III

Geographic Information System: Introduction, key components, application areas of GIS, map projections.

Data entry and preparation: spatial data input, raster data models, vector data models.

Unit – IV

Spatial data analysis: Introduction, overlay function-vector overlay operations, raster overlay operations, arithmetic operators, comparison and logical operators, conditional expressions, overlay using a decision table, network analysis-optimal path finding, network allocation, network tracing.

Unit – V

RS and GIS applications General: Land cover and land use, agriculture, forestry, geology, geomorphology, urban applications.

Unit – VI

Application to Hydrology and Water Resources: Flood zoning and mapping, groundwater prospects and potential recharge zones, watershed management.

Course Outcomes

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

1. Be familiar with ground, air and satellite based sensor platforms.
2. Interpret the aerial photographs and satellite imageries
3. Create and input spatial data for GIS application
4. Apply RS and GIS concepts in water resources engineering

Text Books :

1. Bhatta B (2008), 'Remote sensing and GIS', Oxford University Press
2. Lillesand, T.M, R.W. Kiefer and J.W. Chipman (2013) 'Remote Sensing and Image Interpretation', Wiley India Pvt. Ltd., New Delhi
3. 'Fundamentals of Remote Sensing' by George Joseph, Universities Press, 2013.
4. 'Fundamentals of Geographic Information Systems' by Demers, M.N, Wiley India Pvt. Ltd, 2013.

References:

1. 'Remote Sensing and its Applications' by Narayan LRA, Universities Press, 2012.
2. 'Concepts and Techniques of Geographical Information System' by Chor Pang Lo and A K W Yeung, Prentice Hall (India), 2006
3. 'Introduction to Geographic Information Systems' by Kand Tsung Chang, McGraw Hill Higher Education, 2009.

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*IV Year B.Tech. (CE). – I Sem*ester

Ground Improvement Techniques

(Elective-I)

Course Objectives:

The objective of this course is:

a. ***To make the student appreciate the need for different ground improvement methods adopted for improving the properties of remoulded and in-situ soils by adopting different techniques such as in situ densification and dewatering methods.***
b. ***To make the student understand how the reinforced earth technology and soil nailing can obviate the problems posed by the conventional retaining walls.***
c. ***To enable the students to know how geotextiles and geosynthetics can be used to improve the engineering performance of soils.***
d. ***To make the student learn the concepts, purpose and effects of grouting.***

Unit – I

Densification Methods: In situ densification methods- in situ densification of granular soils- vibration at ground surface and at depth, impact at ground and at depth – in situ densification of cohesive soils – pre loading – vertical drains – sand drains and geo drains – stone columns.

Unit – II

Dewatering: Dewatering – sumps and interceptor ditches – single and multi stage well points – vacuum well points – horizontal wells – criteria for choice of filler material around drains – electro osmosis

Unit – III

Stabilization of soils: Stabilization of soils – methods of soil stabilization – mechanical – cement – lime – bitumen and polymer stabilization – use of industrial wastes like fly ash and granulated blast furnace slag.

Unit – IV

Reinforced earth: Reinforced earth – principles – components of reinforced earth – design principles of reinforced earth walls – stability checks – soil nailing.

Unit – V

Geosynthetics: Geosynthetics – geotextiles – types – functions , properties and applications – geogrids , geomembranes and gabions - properties and applications.

Unit – VI

Grouting: Grouting – objectives of grouting – grouts and their applications – methods of grouting – stage of grouting – hydraulic fracturing in soils and rocks – post grout tests

Course Outcomes

By the end of the course, the student should be able to

1. possess the knowledge of various methods of ground improvement and their suitability to different field situations.
2. The student should be in a position to design a reinforced earth embankment and check its stability.
3. The student should know the various functions of Geosynthetics and their applications in Civil Engineering practice.

4. The student should be able to understand the concepts and applications of grouting.

Text Books :

1. 'Ground Improvement Techniques'by Purushotham Raj, Laxmi Publications, New Delhi.
2. 'Ground Improvement Techniques' by Nihar Ranjan Patro, Vikas Publishing House (P) Limited, New Delhi.
3. 'An introduction to Soil Reinforcement and Geosynthetics' by G.L.Siva Kumar Babu, Universities Press.

References:

1. 'Ground Improvement' by MP Moseley, Blackie Academic and Professional, USA.
2. 'Designing with Geosynethetics' by RM Koerner, Prentice Hall.

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*IV Year B.Tech. (CE). – I Sem*ester

Bridge Engineering

(Elective-I)

Course Objectives:

The objective of this course is:

a. ***Familiarize Students with different types of Bridges and IRC standards.***
b. ***Equip student with concepts and design of Slab Bridges, T Beam Bridges, Box Culverts.***
c. ***Understand concepts of design of Plate Girder Bridges***
d. ***Familiarize with different methods of inspection of bridges and maintenance.***

Unit – I

Introduction: Introduction- Bridges- Types- Slab bridges, T Beam, Arch bridges, Cable Stayed bridges, prestressed concrete bridges, Truss Bridges, Culverts, - Nomenclature- Selection of Bridge Site- Economical span- Abutments pier and end connections- types of foundations- Open, Pile, Well Foundations, Bearings – Types- Introduction to Loading standards- Railway and IRC Loading.

Unit – II

Slab bridges: Slab bridges -Wheel load on slab- effective width method- slabs supported on two edges- cantilever slabs- dispersion length- Design of interior panel of slab- Guyon's – Massonet Method –Hendry-Jaegar Methods- Courbon's theory- Pigeaud's method.

Unit – III

T-Beam bridges: T-Beam bridges- Analysis and design of various elements of bridge –Design of deck slab, Longitudinal girders, Secondary beams- Reinforcement detailing.

Unit – IV

Plate Girder Bridges: Elements of plate girder and their design-web- flangeintermediate stiffener- vertical stiffeners- bearing stiffener- Splices, Design problem with detailing.

Unit – V

Box Culverts: Loading –Analysis and Design- Reinforcement detailing.

Unit – VI

Inspection and Maintenance of Bridges: Procedures and methods for inspection – Testing of bridges- Maintenance of Sub Structures and Superstructures- Maintenance of bearings- Maintenance Schedules.

Course Outcomes

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

1. Explain different types of Bridges with diagrams and Loading standards
2. Carryout analysis and design of Slab bridges, T Beam bridges, Box culvers and suggest structural detailing
3. Carryout analysis and design of Plate girder bridges
4. Organize for attending inspections and maintenance of bridges and prepare reports.

Text Books :

1. 'Essentials of Bridge Engineering' by Jhonson Victor D
2. 'Design of Bridge Structures' by T. R. Jagadeesh, M.A. Jayaram, PHI

3. 'Design of RC Structures' by B. C. Punmai, Jain & Jain, Lakshmi Publications.

References:

1. 'Design of Concrete Bridges' by Aswini, Vazirani, Ratwani.
2. 'Design of Steel Structures' by B. C. Punmai, Jain & Jain, Lakshmi Publications.
3. 'Design of Bridges' by Krishna Raju.

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*IV Year B.Tech. (CE). – I Sem*ester

Urban Hydrology

(Elective-I)

Course Objectives:

The course is designed to:

a. ***appreciate the impact of urbanization on catchment hydrology***
b. ***understand the importance of short duration rainfall runoff data for urban hydrology studies.***
c. ***learn the techniques for peak flow estimation for storm water drainage system design.***
d. ***understand the concepts in design of various components of urban drainage systems.***
e. ***learn some of the best management practices in urban drainage.***
f. ***understand the concepts of preparation master urban drainage system.***

Unit – I

Introduction: Urbanisation and its effect on water cycle – urban hydrologic cycle – trends in urbanisation – Effect of urbanisation on hydrology.

Unit – II

Precipitation Analysis: Importance of short duration of rainfall and runoff data, methods of estimation of time of concentration for design of urban drainage systems, Intensity-Duration -Frequency (IDF) curves, design storms for urban drainage systems.

Unit – III

Approaches to urban drainage: Time of concentration, peak flow estimation approaches, rational method, NRCS curve number approach, runoff quantity and quality, wastewater and storm water reuse , major and minor systems.

Unit – IV

Elements of drainage systems: Open channel, underground drains, appurtenances, pumping, source control.

Unit – V

Analysis and Management: Storm water drainage structures, design of storm water network- Best Management Practices–detention and retention facilities, swales, constructed wetlands, models available for storm water management.

Unit – VI

Master drainage plans: Issues to be concentrated upon – typical urban drainage master plan, interrelation between water resources investigation and urban planning processes, planning objectives, comprehensive planning , use of models in planning.

Course Outcomes

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

1. Develop intensity duration frequency curves for urban drainage systems.
2. Develop design storms to size the various components of drainage systems.

3. Apply best management practices to manage urban flooding.
4. Prepare master drainage plan for an urbanized area.

Text Books:

1. 'Manual on Drainage in Urbanised area'by Geiger W. F., J Marsalek, W. J. Rawls and F. C. Zuidema, (1987 - 2 volumes), UNESCO,
2. 'Urban Hydrology' by Hall M J (1984), Elsevier Applied Science Publisher.
3. 'Hydrology – Quantity and Quality Analysis' by Wanielista M P and Eaglin (1997), Wiley and Sons.

References:

1. 'Storm water Detention for Drainage' by Stahre P and Urbonas B (1990), Water Quality and CSO Management, Prentice Hall.
2. 'Urban water cycle processes and interactions' by Marsalek et al (2006), Publication No. 78, UNESCO, Paris (http://www.bvsde.paho.org/bvsacd/cd63/149460E.pdf)
3. 'Frontiers in Urban Water Management – Deadlock or Hope' by Maksimovic C and J A Tejada-Guibert (2001), IWA Publishing.

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***IV Year B.Tech. (CE). – I Sem*ester**

Advanced Surveying

(Elective-I)

Course Objectives:

The objective of this course is to enable the students to,

a. ***Understand the basics of Geodetic Surveying and triangulation systems.***
b. ***Understand the hygrographic surveying and prediction of tides.***
c. ***Understand the Photogrammetric Surveying and Astronomical Surveying.***
d. ***Understand the importance and applications of total stations and GPS.***

Unit – I

Geodetic Surveying: Definition, importance, triangulation system, order of triangulation, size and shape of triangulation, strength of figure criterion, triangulation fieldwork, base line measurement- tape corrections, problems in baseline measurement, measurement of angles.

Unit – II

Hydrographic Surveying: Tides-lunar tides, solar tides, spring and neap tides, measurement of tides- shore lines, soundings, sounding equipments, locating soundings by cross rope method and range and time intervals-mean sea level-prediction of tides**.**

Unit – III

Photogrammetric Surveying: Basic principles,-photo theodolite, horizontal and vertical angles from terrestrial photographs, elevation of a point by photographic measurement, determination of focal length of the lens, Aerial camera- scale of vertical photograph, scale of tilted photograph, combined effects of tilt and relief, stereoscopic vision, mosaics.

Unit – IV

Astronomical Surveying: Spherical Trigonometry, latitude and longitude, solar system, astronomical teams, coordinate systems-altitude, azimuth system, declination, hour angle system, time and astronomical work-sidereal time, apparent solar time, mean solar time, standard time, standard time, application of astronomy in surveying, corrections to astronomical observations.

Unit – V

Total stations: Importance, measurement of horizontal angles, vertical angles, horizontal distance, slope distance, height of object-remote elevation measurement (REM), remote distance measurement (RDM)-radial and continuous distances for measuring the lengths and sides of the closed circuits, areas and perimeters calculations.

Unit – VI

Global Positioning System: Principles of GPS, components of GPS, types of GPS and accuracy, applications of GPS, sources of error GPS and limitations.

Course Outcomes

Upon the successful completion of this course, the students will be able to:

1. The student should be able to conduct different types of surveys for obtaining better results.

2. The student should be able to utilize the total stations for getting the required information.
3. The student should be capable of using the GPS instrument to obtain appropriate information of the objectsand their positions.

Text Books:

1. 'Surveying and Levelling' by R. Subramanian, Oxford University Press, New Delhi.
2. A text book of Surveying' by C. Venkatramaiah, University Press, New Delhi.
3. 'Surveying Vol. II and Vol. III (Higher Surveying)' by Dr. B. C. Punmia, Ashok K. Jain and Arun K. Jain, Laxmi Publications Pvt. Ltd., New Delhi.
4. 'Advanced Surveying' by Satheesh Gopi, R. Sathikumar and N. Madhu, Pearson, New Delhi.

References:

1. 'Remote Sensing and its Applications' by L A R Narayan, Universities Press, New Delhi.
2. 'Geographical Information Science' by Narayan Panigrahi, Universities Press, New Delhi.
3. 'Basics of Remote Sensing and GIS' by Dr. S. Kumar, University Science Press, New Delhi.

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IV Year B.Tech. (CE). – I Semester

Design and Detailing Lab

Course Objectives:

The objective of this course is to enable the students to:

a. Understand the quantity calculations of different components of the buildings.
b. Understand the rate analysis of different quantities of the buildings components.
c. Learn various specifications and components of the buildings.

Design and detailing of –

1. Residential Building
2. Commercial Complex
3. Hospital Building
4. School Building
5. Water Tank
6. Retaining Wall

Course Outcomes

Upon the successful completion of this course:

1. The student should be able to determine the quantities of different components of buildings.
2. The student should be in a position to find the cost of various building components.
3. The student should be capable of finalizing the value of structures.

Text Books:

1. 'Structural Design and Drawing' by Krishna Raju, Orient Blackswan Pvt Ltd.-New Delhi
2. 'Limit State Design of Reinforced Concrete' by Dr. B.C. Punmia, Ashok Kumar Jain & Arun Kumar Jain, Laxmi Publications (P) Ltd.
3. 'Estimating and Costing' by B.N. Dutta, UBS publishers, 2000.

References:

GIET Lab Manuals

Web-Resources: www.nptel.com

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IV Year B.Tech. (CE). – I Semester

GIS & CAD Lab

Course Objectives:
The course is designed to

a. ***Introduce image processing and GIS software***
b. ***Familiarize structural analysis software***
c. ***Understand the process of digitization, creation of thematic map from toposheets and maps.***
d. ***Learn to apply GIS software to simple problems in water resources and transportation engineering.***
e. ***Learn to analyse 2 D and 3D frame steel tubular truss using structural analysis software.***
f. ***Learn to analyse and design retaining wall and simple towers.***

GIS:
SOFTWARES:
1. Arc GIS 9.0
2. ERDAS 8.7
3. Mapinfo 6.5

Any one or Equivalent.

EXCERCISES IN GIS:
1. Digitization of Map/Toposheet
2. Creation of thematic maps.
3. Estimation of features and interpretation
4. Developing Digital Elevation model
5. Simple applications of GIS in water Resources Engineering & Transportation Engineering.

COMPUTER AIDED DESIGN AND DRAWING:
SOFTWARE:
1. STAAD PRO / Equivalent/
2. STRAAP
3. STUDDS

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

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

1. Work comfortably on GIS software
2. Digitize and create thematic map and extract important features
3. Develop digital elevation model

4. Use structural analysis software to analyse and design 2D and 3D frames.
5. Design and analyse retaining wall and simple towers using CADD software.

Text Books :

1. 'Concept and Techniques of GIS' by C.P.L.O. Albert, K.W. Yong, Printice Hall Publishers.

References:
GIET Lab Manuals.

Web-Resources: www.nptel.com

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IV Year B.Tech. (CE). – I Semester

SUMMER INTERNSHIP/TRAINING

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IV Year B.Tech. (CE). – II Semester

Estimating, Specifications & Contracts

Course Objectives:

The objective of this course is to enable the students to:

a. ***Understand the quantity calculations of different components of the buildings.***
b. ***Understand the rate analysis of different quantities of the buildings components.***
c. ***Learn various specifications and components of the buildings.***

Unit – I

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

Unit – II

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

Unit – III

Earthwork: Earthwork for roads and canals, Reinforcement bar bending and bar requirement schedules.

Unit – IV

Contracts: Contracts – Types of contracts – Contract Documents – Conditions of contract, Valuation of buildings- Standard specifications for different items of building construction.

Unit – V

Detailed Estimation: Detailed Estimation of Buildings using individual wall method.

Unit – VI

Detailed Estimation: Detailed Estimation of Buildings using centre line method.

Course Outcomes

Upon the successful completion of this course:

1. The student should be able to determine the quantities of different components of buildings.
2. The student should be in a position to find the cost of various building components.
3. The student should be capable of finalizing the value of structures.

Text Books:

1. 'Estimating and Costing' by B.N. Dutta, UBS publishers, 2000.
2. 'Civil Engineering Contracts and Estimates' by B. S. Patil, Universities Press (India) Pvt. Ltd., Hyd.

References:

1. 'Standard Schedule of rates and standard data book' by public works department.
2. IS 1200 (Parts I to XXV-1974/ Method of Measurement of Building & Civil Engg Works – B.I.S.)

Web-Resources: www.nptel.com

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IV Year B.Tech. (CE). – II Semester

Environmental Impact Assessment and Management

(Elective-II)

Course Objectives:

The objective of this course is:

a. ***To impart knowledge on different concepts of Environmental Impact Assessment.***
b. ***To know procedures of risk assessment***
c. ***To learn the EIA methodologies and the criterion for selection of EIA methods.***
d. ***To pre-requisites for ISO 14001 certification***
e. ***To know the procedures for environmental clearances and audit***
f. ***To appreciate the importance of stakeholder participation in EIA***

Unit – I

Basic concept of EIA: Elements of EIA-factors affecting EIA-Initial environmental Examination-life cycle analysis preparation of Environmental Base map-Classification of environmental parameters – role of stakeholders in the EIA preparation –stages in EIA.

Unit – II

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, cost/benefit Analysis - EIS and EMP.

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- application of remote sensing and GIS for EIA.

Unit – IV

Procurement of relevant soil quality: Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures - E I A with reference to surface water, Air and Biological environment:

Methodology for the assessment of Impacts on surface water environment, Generalized approach for assessment of Air pollution Impact.

Unit – V

Assessment of Impact: Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation.

Environmental Risk Assessment and Risk management in EIA: Risk assessment and treatment of uncertainty-key stages in performing an Environmental Risk Assessment-advantages of Environmental Risk Assessment.

Unit – VI

EIA notification by Ministry of Environment and Forest (Govt. of India): Provisions in the EIA notification, procedure for environmental clearance, procedure for conducting environmental impact assessment report- evaluation of EIA report. Environmental legislation objectives, evaluation of Audit data and preparation of Audit report. Post Audit activities, Concept of ISO and ISO 14000.

Case studies and preparation of Environmental Impact assessment statement for various Industries.

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. Prepare EMP, EIS, and EIA report
2. Identify the risks and impacts of a project
3. Selection of an appropriate EIA methodology
4. Evaluation the EIA report
5. Estimate the cost benefit ratio of a project
6. Know the role of stakeholder and public hearing in the preparation of EIA

Text Books:

1. Environmental Impact Assessment, Canter Larry W.,McGraw-Hill education Edi (1996)
2. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, Hyderabad.

References:

1. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers.
2. Environmental Science and Engineering, by Suresh K. Dhaneja – S.K. Katania & Sons Publication, New Delhi.
3. Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd., Delhi.

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IV Year B.Tech. (CE). – II Semester

Advanced Structural Engineering

(Elective-II)

Course Objectives:

The objective of this course is:

a. ***Familiarize Students with Raft Foundations and Retaining walls.***
b. ***Equip student with concepts of design of different types of RCC water tanks.***
c. ***Understand Concepts of flat slabs***
d. ***Familiarize different types of Bunkers, Silos and Chimneys.***
e. ***Understand different types of transmission towers.***

Unit – I

Analysis and Design of Raft Foundations: Analysis and Design of Raft Foundations – Design of RCC Retaining walls: Cantilever and Counter fort

Unit – II

Analysis and Design of Water Tanks: Analysis and Design of RCC Water Tanks, Circular and Rectangular types- Intze tank including staging.

Unit – III

Analysis and Design of Flat Slabs: Analysis and Design of Flat Slabs- Direct Design and Equivalent Frame Methods- Check for Punching shear.

Unit – IV

Analysis and Design of Bunkers: Analysis and Design of Bunkers and Silos- Concepts of Loading.

Unit – V

Analysis and Design of Chimney: Analysis and Design of Chimney, Concepts of loading

Unit – VI

Introduction to Transmission Towers: Introduction to Transmission Towers- Principles and procedures

Course Outcomes

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

1. Design raft foundations and different types of RCC retaining walls
2. Carryout analysis and design of different types of RCC water tanks
3. Solve the problems design of RCC Bunkers, Silos and Chimneys
4. Understand various types of transmission towers and loading on them.

Text Books :

1. 'Reinforced Concrete Structures' Vol-2 by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
2. 'Reinforced Concrete Structures' by N. Subrahmanian, Oxford Publishers
3. 'Design Drawing of Concrete and Steel Structures' by N. Krishna Raju University Press 2005.

References:

1. 'Essentials of Bridge Engineering' by D. Johnson Victor, Oxford and IBM publication Co., Pvt. Ltd.
2. 'Reinforced concrete design' by S. U, Pillai and D. Menon, Tata Mc.Grawhill Publishing Company

Codes: Relevant IS: codes.

Web-Resources: www.nptel.com

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IV Year B.Tech. (CE). – II Semester

Design and Drawing of Irrigation Structures

(Elective-II)

Course Objectives:

The objective of this course is:

a. ***Expose and acquaint students with different types of hydraulic structures, in minor and major irrigation systems and their functions.***
b. ***familiarize students with concepts of design of irrigation structures.***
c. ***Understand the different design parameters and types of structures.***
d. ***Familiarize students with established field practices in collection of data and operational requirements.***
e. ***Familiarize students in understanding the critical points in design of a major canal system.***

Design and drawing of :

1. Surplus weir.
2. Tank sluice with a tower head
3. Canal drop – Notch type.
4. Canal regulator
5. Under tunnel
6. Syphon aqueduct type III

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

Course Outcomes

Upon successful completion of this course, student will be able to

1. Work on different design formats and codes
2. Carry out design of minor or major irrigation structures, with specific study of location/situations.
3. Carryout the analysis or designs of masonry/concrete structures for tension, compression and stability.
4. Produce detailed drawings of designed structures as ready for construction.

Text Books :

1. Water resources engineering –principles and practice by C. Satyanarayana Murthy, New Age International publishers.
2. Irrigation, water power and water resources Engineering by Dr. K.R. Arora, Standard Publishing house, Delhi.

References:

1. Irrigation engineering and Hydraulic structures by S.K. Garg, Standard Book House.
2. Irrigation and water power engineering by B.C.Punmia & Lal, Laxmi publications pvt.Ltd., New Delhi.

Web-Resources: www.nptel.com

IV Year B.Tech. (CE). – II Semester

Traffic Engineering

(Elective-II)

Course Objectives:

The objective of this course is:

a. ***To know various components and characteristics of traffic.***
b. ***To know various traffic control devices and principles of highway safety.***
c. ***To understand the detrimental effects of traffic on environment***
d. ***To know highway capacity and level of service concepts.***
e. ***To learn about intelligent vehicle highway systems.***

Unit – I

Components Of The Traffic System: Human-Vehicle–Environment System; characteristics of Road users, Vehicles, Highways and their classification; Traffic Studies:Inventories; Volume studies; Speed, Travel time and Delay studies; Intersection studies; Pedestrian studies; Parking studies; Accident studies.

Unit – II

Traffic Characteristics: Microscopic and macroscopic flow characteristics: Time headways; Temporal, spatial and model flow patterns; Interrupted and Un interrupted traffic. Microscopic and macroscopic speed characteristics: Vehicular speed Trajectories; Speed characteristics – Mathematical distribution; Speed and travel time variations; Travel time and delay studies.

Microscopic and Macroscopic density characteristics: Distance headway characteristics; Car-following theories; Density measurement techniques; Density contour maps.

Unit – III

Traffic Control Devices & Highway Safety: Traffic signs & Markings; Signal Warrants; Signal phasing and Development of phase plans; Fixed and Vehicle activated signals; Webster method; ARRB method; Drew's Method; IRC method; Signal coordination; Area Traffic control. Accident characteristics – Road – Driver – Vehicle; Accident recording and Analysis; Highway Safety Improvement Program; Safety Audit.

Unit – IV

Environmental Considerations: Air pollution: Kinds of pollutants; Air pollution standards; Measures of air quality; modelling and control. Noise pollution: Measurement of sound levels; Acceptable limits, Prediction of noise levels, Traffic noise control.

Unit – V

Highway Capacity And Level Of Service: Capacity and level of service; Factors affecting Capacity and LOS; Capacity of Rural Highways, Capacity of Urban Roads; HCM and IRC standards.

Unit – VI

Intelligent Vehicle – Highway Systems: Traffic surveillance and monitoring; IVHS programs, Role of IVHS, IVHS categories, Benefits and Costs of IVHS.

Course Outcomes

At the end of course, Student can

1. Determine traffic speed, volume, travel time and density.
2. Design traffic signals

3. Determine highway capacity

Text Books :

1. 'Traffic Engineering: Theory and Practice' by Pignataro LJ., Prentice hall, Inc.
2. 'Traffic and Transport planning' by Kadiyali L.R., Khanna Publishers.

References:

1. 'Traffic Engineering Hand Book' by Institute of Transportation Engineers, 4 Ed., Prentice Hall
2. 'Traffic Engineering' by Mc Shane, WR and RP Roess, Prentice Hall.

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IV Year B.Tech. (CE). – II Semester

Advanced Foundation Engineering

(Elective-III)

Course Objectives:

The objective of this course is:

a. ***To enable the student to appreciate how Meyerhof's general bearing capacity equations are important over Terzaghi's bearing capacity equation.***
b. ***To teach the student special methods of computation of settlements and the corrections to be applied to settlements.***
c. ***To enable the student to understand the advanced concepts of design of pile foundations.***
d. ***To teach the student the problems posed by expansive soils and the foundation practices appropriate to expansive soils.***
e. ***To enable the student to learn the difference between isolated and combined footings, the determination of bearing capacity of mats and proportioning of footings.***

Unit – I

Bearing capacity: Bearing capacity of Foundations using general bearing capacity equation – Meyerhof's, Brinch Hansen's and Vesic's methods.

Unit – II

Settlement analysis: Settlement analysis - Immediate settlement of footings resting on granular soils – Schmertmann & Hartman method – De Beer and Martens method - Immediate settlement in clays – Janbu's method – correction for consolidation settlement using Skempton and Bjerrum's method – Correction for construction period.

Unit – III

Mat foundations: Mat foundations – Purpose and types of isolated and combined footings – Mats/ Rafts – Proportioning of footings – Ultimate bearing capacity of mat foundations – allowable bearing capacity of mats founded in clays and granular soils – compensated rafts.

Unit – IV

Earth-retaining structures: Earth-retaining structures – cantilever sheet piles – anchored bulkheads – fixed and free earth support methods – design of anchors – braced excavations – function of different components – forces in ties – stability against bottom heave.

Unit – V

Pile Foundations: Pile foundations – single pile versus group of piles – load-carrying capacity of pile groups – negative skin friction (NSF) -settlement of pile groups in sands and clays – laterally loaded piles in granular soils – Reese and Matlock method – laterally loaded piles in cohesive soils – Davisson and Gill method – Broms' analysis.

Unit – VI

Expansive Soils: Foundations in expansive soils – definitions of swell potential and swelling pressure – determination of free swell index – factors affecting swell potential and swelling pressure – foundation practices – sand cushion method – CNS layer - drilled piers and belled piers – under-reamed piles – moisture control methods.

Course Outcomes

Upon successful completion of this course, student will be able to

1. Compute the safe bearing capacity of footings subjected to vertical and inclined loads.
2. Understand the advanced methods of settlement computations and proportion foundation footings.
3. Appreciate the methods of computing the pull-out capacity and negative skin friction of piles and compute the settlements of pile groups in clays.
4. Appreciate the problems posed by expansive soils and the different foundation practices devised.
5. Appreciate the difference between isolated footings and combined footings and mat foundations.

Text Books :

1. 'Basic and applied soil mechanics' by Gopal Ranjan and ASR Rao, New Age Publishers.
2. 'Soil Mechanics and Foundation Engineering' by VNS Murthy, CBS Publishers.
3. 'Principles of Foundation Engineering' by BM Das, Thomson Brooks/Cole.

References:

1. 'Foundation Analysis and Design' by JE Bowles, John Wiley.
2. 'Foundation Design' by WC Teng, Prentice Hall Publishers.

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*IV Year B.Tech. (CE). – II Sem*ester

Earthquake Resistant Design

(Elective-III)

Course Objectives:

The objective of this course is:

a. ***Familiarize Students with Engineering Seismology***
b. ***Equip student with concepts of Structural Dynamics***
c. ***Understand Concepts of Seismic Design***
d. ***Familiarize with Design philosophies for Seismic loading***
e. ***Familiarize students with various IS codal provisions for ductile design and detailing***

Unit – I

Engineering seismology: Engineering seismology - rebound theory – plate tectonics – seismic waves - Earthquake size and various scales – local site effects – Indian seismicity – seismic zones of India – theory of vibrations – near ground and far ground rotation and their effects.

Unit – II

Introduction to Structural Dynamics: Fundamental objective of Dynamic analysis – Types of prescribed loadings – Formulation of the Equations of Motion– Elements of a Vibratory system – Degrees of Freedom – Oscillatory motion – Simple Harmonic Motion – Free Vibrations of Single Degree of Freedom (SDOF) systems – Undamped and Damped – Critical damping – Logarithmic decrement – Forced vibrations of SDOF systems – Harmonic
excitation – Dynamic magnification factor.

Unit – III

Seismic Design Concepts: Seismic design concepts – EQ load on simple building – load path – floor and roof diaphragms – seismic resistant building architecture – plan configuration – vertical configuration – pounding effects – mass and stiffness irregularities – torsion in structural system- Provision of seismic code (IS 1893 & 13920) – Building system – frames – shear wall – braced frames – layout design of Moment Resisting Frames (MRF) – ductility of MRF – Infill wall – Nonstructural elements.

Unit – IV

Lateral Forces: Calculation of equivalent lateral force- Design Base Shear- Storey Shear, Estimation of Natural period of Structure, Computation of Response acceleration Coefficient- Zone factor- Seismic weight- Response reduction factors- Seismic Coefficient Method.

Unit – V

Ductility: Design and ductile detailing of Beams and columns of frames -Concept of strong column weak beams, Ductility criteria for earthquake resistant design, Ductile detailing of flexural members as per IS 13920- Longitudinal reinforcement, Shear reinforcement, Anchorage of reinforcement- Development length, Lap Splices.

Unit – VI

Seismic Analysis: Seismic Analysis and design of simple 2-storied RC Building frame – Equivalent static lateral force method and response spectrum method.

Course Outcomes

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

1. Explain fundamentals of Engineering Seismology
2. Acquaint with the principles Structural dynamics
3. Solve SDOF Systems and suggest ductile design
4. Compute equivalent lateral seismic loads and carryout a seismic design as per IS codal provisions

Text Books:

1. 'Earthquake Resistant Design of Structures' -Pankaj Agarwal and Manish ShriKhande, Prentice – Hall of India, 2007, New Delhi.
2. 'Earthquake Resistant Design of Building Structures' by Vinod Hosur, Wiley India Ltd.
3. 'Reinforced Concrete Design' by A. K. Jain.

References:

1. 'Introduction to the Theory of Seismology' by Bullen K.E., Great Britain at the University Printing houses, Cambridge University Press 1996.
2. Relevant code of practices.

Web-Resources: www.nptel.com

*IV Year B.Tech. (CE). – II Sem*ester

Solid Waste Management

(Elective-III)

Course Objectives:

The objective of this course is:

a. ***To impart the knowledge the methods of collection and optimization of collection routing of municipal solid waste.***
b. ***To acquire the principles of treatment of municipal solid waste***
c. ***To know the impact of solid waste on the health of the living beings***
d. ***To learn the criterion for selection of landfill and its design***
e. ***To plan the methods of processing such as composting the municipal organic waste.***

Unit – I

Introduction to Solid Waste Management: Goals and objectives of solid waste management, Classification of Solid Waste - Factors Influencing generation of solid waste - sampling and characterization –Future changes in waste composition, major legislation, monitoring responsibilities.

Unit – II

Basic Elements In Solid Waste Management: Elements and their inter relationship – principles of solid waste management- onsite handling, storage and processing of solid waste

Collection of Solid Waste: Type and methods of waste collection systems, analysis of collection system - optimization of collection routes– alternative techniques for collection system.

Unit – III

Transfer and Transport: Need for transfer operation, compaction of solid waste - transport means and methods, transfer station types and design requirements.

Unit – IV

Separation and Transformation of Solid Waste: unit operations used for separation and transformation: shredding - materials separation and recovery, source reduction and waste minimization.

Unit – V

Processing and Treatment: Processing of solid waste – Waste transformation through combustion and composting, anaerobic methods for materials recovery and treatment – Energy recovery – biogas generation and cleaning– Incinerators.

Unit – VI

Disposal of Solid Waste: Methods of Disposal, Landfills: Site selection, design and operation, drainage and leachate collection systems –designated waste landfill remediation.

Course Outcomes

Upon successful completion of this course, the students will be able to:

1. Design the collection systems of solid waste of a town
2. Design treatment of municipal solid waste and landfill
3. To know the criteria for selection of landfill
4. To characterise the solid waste and design a composting facility

Text Books:

1. George Techobanoglous "Integrated Solid Waste Management", McGraw Hill Publication, 1993.

References:

1. Vesilind, P.A., Worrell, W., Reinhart, D. "Solid Waste Engineering", Cenage learning, New Delhi, 2004
2. Charles A. Wentz; "Hazardous Waste Management", McGraw Hill Publication, 1995.

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IV Year B.Tech. (CE). – II Semester

Pavement Analysis & Design and Evaluation

(Elective-III)

Course Objectives:

The objective of this course is:

a. ***To know various factors affecting pavement design***
b. ***To know various concepts for the stresses in pavements.***
c. ***To understand material characterisation and mix design concepts.***
d. ***To acquire design principles of flexible and rigid pavements.***
e. ***To acquire design principles of shoulders, overlays and drainage.***

Unit – I

Factors Affecting Pavement Design: Variables Considered in Pavement Design, Types of Pavements, Functions of Individual Layers, Classification of Axle Types of Rigid Chassis and Articulated Commercial Vehicles, Legal Axle and Gross Weights on Single and Multiple Units, Tire Pressure, Contact Pressure, EAL and ESWL Concepts, Traffic Analysis: ADT, AADT, Truck Factor, Growth Factor, Lane, Directional Distributions & Vehicle Damage Factors, Effect of Transient & Moving Loads.

Unit – II

Stresses In Pavements: ***Vehicle-Pavement Interaction:***Transient, Random & Damping Vibrations, Steady State of Vibration, Experiments on Vibration, Stress Inducing Factors in Flexible and Rigid pavements; ***Stress in Flexible Pavements:*** Visco-Elastic Theory and Assumptions, Layered Systems Concepts, Stress Solutions for One, Two and Three Layered Systems, Fundamental Design Concepts; ***Stresses in Rigid Pavements:***Westergaard's Theory and Assumptions, Stresses due to Curling, Stresses and Deflections due to Loading, Frictional Stresses, Stresses in Dowel Bars & Tie Bars, Introduction to DAMA, KENLAYER & KENSLABS Programs.

Unit – III

Material Characterisation & Mix Design Concepts: CBR and Modulus of Subgrade Reaction of Soil, Mineral aggregates – Blending of aggregates, binders, polymer and rubber modified bitumen, Resilient, Diametral Resilient and Complex (Dynamic) Moduli of Bituminous Mixes, Permanent Deformation Parameters and other Properties, Effects and Methods of Stabilisation and Use of Geo Synthetics; Marshall's and Hveem's Methods of

Bituminous Concrete Mix Design, Field Implications of Stability and Flow Values, Introduction to Super Pave Mix Design, IRC Cement Concrete Mix Design.

Unit – IV

Design of Flexible Pavements: Flexible Pavement Design Concepts, Asphalt Institute's Methods with HMA and other Base Combinations, AASHTO, Road Note No 29 & IRC Methods, Design of Runways & Taxiways, Design of Low Volume Rural Roads.

Unit – V

Design Of Rigid Pavements: Calibrated Mechanistic Design Process, PCA, AASHTO & IRC Specifications, Introduction to Prestressed and Continuously Reinforced Cement Concrete Pavement Design, Rigid Pavement Design for Low Volume Rural Roads.

Unit – VI

Design Of Shoulders, Overlays & Drainage: Shoulder Design Considerations, Traffic Prediction, Parking, Regular & Encroaching Traffic, Thickness Design Specifications for Flexible & Rigid Shoulders; Types & Design of Overlays: AI's Principal Component Analysis & IRC Methods of Overlay Design, Importance of Profile Correction Course; Pavement Drainage Concepts, Drainage Related Failures, Inflow-Outflow Concepts, Condition of Continuity, Surface and Sub Surface Drainage Design Specifications.

Course Outcomes

At the end of course, Student can

1. Design flexible and rigid pavements using various methods
2. Design shoulders, overlays and drainage.

Text Books :

1. 'Pavement Analysis and Design' by Yang H. Huang, Pearson Education, Second Edition.
2. 'Principles of Pavement Design' by Yoder.J. & Witczat Mathew, W. John Wiley & Sons Inc.
3. 'Pavement Design' by Srinivasa Kumar R, Universities Press, Hyderabad.

References:

1. 'Design of Functional Pavements' by Nai C. Yang, McGraw Hill Publications.
2. 'Concrete Pavements' by AF Stock, Elsevier, Applied Science Publishers.
3. 'Pavement and Surfacings for Highway & Airports' by Micheal Sargious, Applied Science Publishers Limited.

Web-Resources: www.nptel.com

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*IV Year B.Tech. (CE). – II Sem*ester

Soil Dynamics and Machine Foundations

(Elective-IV)

Course Objectives:

The objective of this course is:

a. ***The basic course in soil mechanics/geotechnical engineering generally introduces the fundamental concepts, principles and applications of soil as engineering material with properties under static loading.***
b. ***This course on 'Soil Dynamics' discusses***
c. ***About the fundamentals of vibrations***
d. ***about the behaviour and properties/response of soil as a material which is subjected to various types of dynamic or cyclic time dependent loadings.***
e. ***the design and analysis for machine foundations come along with this course to consider the dynamic properties of both soil and foundation as combined mass. Behaviour of various geotechnical structures such as shallow and deep foundations, retaining structures due to various types of time-dependent dynamic loading are discussed here along with the reference to design code provisions.***
f. ***Phenomena like liquefaction and lateral spreading of soil are also discussed.***
g. ***Discusses about the laboratory and filed tests to compute the dynamic soil properties of the soil mass.***

Unit – I

Introduction: Types of motion- SHM- Fundamental definitions- SDOF systems- Free and forced vibration with and without damping – Constant force and rotating mass type excitation –Types of damping-Equivalent stiffness of springs in series and parallel. – Resonance and its effect - magnification-logarithmic decrement – Transmissibility.

Unit – II

Vibration Analysis: Theories of Vibration Analysis- EHS Theory and lumped parameter model- Different modes of vibration- Natural frequency of foundation soil system – Barkan and IS methods – Pressure bulb concept – Reisner Theory – Limitations of Reisner theory – Sung's solutions -- Pauw's Analogy – Heigh's Theory.

Unit – III

Dynamic properties of soils: Dynamic properties of soils, Determination of E, G and Poisons ratio from field and laboratory tests, recommendations of Indian codes- Stress waves in bounded elastic medium- Use of wave theory in the determination of elastic properties, Elastic coefficients of soils and their determination- damping factor from free and forced vibration tests.– Block vibration test – Determination of Damping factor.

Unit – IV

Types of machine foundations: Types of machine foundations – general requirements design – criteria for machine foundations, permissible amplitudes and bearing pressure Design data, design criteria, IS code provisions for the design foundations of reciprocating machines.

Unit – V

Impact loading: Design data, design criteria, IS code provisions for the design foundations of Impact type of machines.

Unit – VI

Vibration Isolation: Transmissibility, Principles of isolation- Methods of isolation- Vibration isolators- Types and their characterizes Special Topics: Liquefaction of soils, CSR, CRR, Factor of safety against liquefaction - Dynamic bearing capacity, Earth retaining structures under dynamic loads.

Course Outcomes

On successful completion of these course, the student able to

1. Use theory of vibrations to find the behavior of soil under dynamic loading.
2. Design machine foundations under different loads and soil conditions.
3. Understand the liquefaction phenomina.
4. Conduct various laboratory and filed tests to determine the dynamic soil prosperities and its interpretation.
5. Design vibration isolators under any vibratory machines.

Text Books :

1. 'Vibrations of Soils and Foundations' by Richart Hall and Woods

References:

1. 'Vibration Analysis and Foundation Dynamics' by NSV Kameswara Rao, Wheeler Publishing, New Delhi.
2. 'Foundations of Machines- Analysis and Design' by Prakash and Puri.

Web-Resources: www.nptel.com

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*IV Year B.Tech. (CE). – II Sem*ester

Repair and Rehabilitation of Structures

(Elective-IV)

Course Objectives:

The objective of this course is:

a. ***Familiarize Students with deterioration of concrete in structures***
b. ***Equip student with concepts of NDT and evaluation***
c. ***Understand failures and causes for failures in structures***
d. ***Familiarize different materials and techniques for repairs***
e. ***Understand procedure to carryout Physical evaluation of buildings and prepare report.***

Unit – I

Deterioration of concrete in structures: Physical processes of deterioration like Freezing and Thawing, Wetting and Drying, Abrasion, Erosion, Pitting, Chemical processes like Carbonation, Chloride ingress, Corrosion, Alkali aggregate reaction, Sulphate attack Acid attack, temperature and their causes, Mechanism, Effect, preventive measures. - Cracks:Cracks in concrete, type, pattern, quantification, measurement & preventive measures.

Unit – II

Non Destructive Testing- Non destructive test methods for concrete including Rebound hammer, Ultrasonic pulse velocity, Rebar locator, Corrosion meter, Penetration resistance and Pull out test, Core cutting- Corrosion: Methods for corrosion measurement and assessment including half-cell potential and resistivity, Mapping of data.

Unit – III

Failure of buildings: Definition of building failure-types of failures- Causes of Failures- Faulty Design, Accidental over Loading, Poor quality of material and Poor Construction practices- Fire damage - Methodology for investigation of failures-diagnostic testing methods and equipments-repair of cracks in concrete

Unit – IV

Materials for repair and rehabilitation: Materials for repair and rehabilitation -Admixtures- types of admixtures purposes of using admixtures- chemical composition- Natural admixtures- Fibres- wraps- Glass and Carbon fibre wraps- Steel Plates-Concrete behavior under corrosion, disintegrated mechanisms- moisture effects and thermal effects – Visual investigation- Acoustical emission methods- Corrosion activity measurement- chloride content – Depth of carbonation- Impact echo
methods- Ultrasound pulse velocity methods- Pull out tests.

Unit – V

Repair Techniques: Grouting, Jacketing, Shotcreting, externally bonded plates, Nailing, Underpinning and under water repair; Materials, Equipments, Precautions and Processes.

Unit – VI

Investigation of structures: Distress, observation and preliminary test methods. Case studies: related to rehabilitation of bridge piers, dams, canals, heritage structures, corrosion and erosion damaged structures.

Course Outcomes

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

1. Explain deterioration of concrete in structures
2. Carryout analysis using NDT and evaluate structures
3. Assess failures and causes of failures in structures
4. Carryout Physical evaluation and submit report on condition of the structure.

Text Books:

1. 'Maintenance & Repair of Civil Structures' by B.L. Gupta & Amit Gupta.
2. 'Rehabilitation of Concrete Structures' by B. Vidivelli, Standard Publishers.
3. 'Concrete Bridge Practice Construction, Maintenance & Rehabilitation' by V. K. Raina.

References:

1. 'Concrete Structures- protection Repair and Rehabilitation' by R. Doodge Woodson, BH Publishers

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*IV Year B.Tech. (CE). – II Sem*ester

Water Resources System Planning

(Elective-IV)

Course Objectives:

The course is designed to

a. ***Introduce the concepts of system analysis in the planning, design, and operation of water resources.***
b. ***Appreciate mathematical optimization methods and models.***
c. ***Learn and apply basic economic analysis tools to water resources projects.***
d. ***Understand linear, nonlinear and dynamic programming techniques and apply them to various water resources systems planning and design problems.***

Unit – I

Introduction: Concepts of systems analysis, definition, systems approach to water resources planning and management, role of optimization models, objective function and constraints, types of optimization techniques.

Unit – II

Linear programming: Formulation of linear programming models, graphical method, simplex method, application of linear programming in water resources, revised simplex method, duality in linear programming, sensitivity analysis.

Unit – III

Dynamic programming: Principles of optimality, forward and backward recursive dynamic programming, curse of dimensionality, application for resource allocation.

Unit – IV

Non-linear optimization techniques: Classical optimization techniques, Lagrange methods, Kuhn-Tucker conditions, Search techniques, overview of Genetic Algorithm

Unit – V

Water Resources Economics: Basics of engineering economics, economic analysis, conditions of project optimality, benefit and cost analysis

Unit – VI

Simulation and management: Application of simulation techniques in water resources, planning of reservoir system, optimal operation of single reservoir system, allocation of water resources, optimal cropping pattern, conjunctive use of surface and sub-surface water resources.

Course Outcomes

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

1. Apply optimization methods to solve problems related to water resource systems.
2. Perform basic economic analysis to evaluate the economic feasibility of water resources projects
3. Formulate optimization models for decision making in water resources systems.
4. Use simulation models for planning and design of Water Resources Systems.

Text Books:

1. 'Water Resources System Analysis' by Vedula S and P P Mujumdar, McGraw Hill Company Ltd, 2005.
2. 'Water Resources Economics' by James D and R. Lee, Oxford Publishers, 2005.

References:

1. 'Water Resources Systems Planning and Management – An Introduction to Methods, Models and Applications'by Loucks D P and E V Bee,UNESCO Publications, 2005 (http://ecommons.cornell.edu/bitstream/1813/2804/21/00_intro.pd)
2. 'Optimal design of water distribution networks' by Bhave, P. R, Narosa Publishing house, 2003.

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IV Year B.Tech. (CE). – II Semester

Urban Transportation Planning

(Elective-IV)

Course Objectives:

The objective of this course is:

a. ***To learn various procedures for travel demand estimation .***
b. ***To various data collection techniques for OD data.***
c. ***To know various models and techniques for trip generation, trip distribution, mode choice and traffic assignment.***
d. ***To develop alternative urban transport network plans.***

Unit – I

Urban Transportation Problems & Travel Demand: Urban Issues, Travel Characteristics, Evolution of Planning Process, Supply and Demand – Systems approach; Trends, Overall Planning process, Long term Vs Short term planning, Demand Function, Independent Variables, Travel Attributes, Assumptions in Demand Estimation, Sequential, and Simultaneous Approaches, Aggregate and Disaggregate Techniques.

Unit – II

Data Collection And Inventories: Collection of data – Organisation of surveys and Analysis, Study Area, Zoning, Types and Sources of Data, Road Side Interviews, Home Interview Surveys, Commercial Vehicle Surveys, Sampling Techniques, Expansion Factors, Accuracy Checks, Use of Secondary Sources, Economic data – Income – Population – Employment – Vehicle Owner Ship.

Unit – III

Trip Generation & Distribution: UTPS Approach, Trip Generation Analysis: Zonal Models, Category Analysis, Household Models, Trip Attraction models, Commercial Trip Rates; Trip Distribution: Growth Factor Methods, Gravity Models, Opportunity Models, Time Function Iteration Models.

Unit – IV

Mode Choice Analysis: Mode Choice Behaviour, Competing Modes, Mode Split Curves, Aggregate and Disaggregate Approaches; Discrete Choice Analysis, Choice sets, Maximum Utility, Probabilistic Models: Binary Logit, Multinomial Logit Model – IIA property; Aggregation

Unit – V

Traffic Assignment: Diversion Curves; Basic Elements of Transport Networks, Coding, Route Properties, Path Building Criteria, Skimming Tree, All-or-Nothing Assignment, Capacity Restraint Techniques, Reallocation of Assigned Volumes, Equilibrium Assignment.

Unit – VI

Corridor Identification, Plan Preparation & Evaluation: Master plans, Selection of Corridor, Corridor Identification, Corridor deficiency Analysis; Travel Forecasts to Evaluate Alternative Improvements, Impacts of New Development on Transportation Facilities. Pivot Point Analysis, Environmental and Energy Analysis; Case studies

Course Outcomes

At the end of course, Student can

1. Estimate travel demand for an urban area.
2. Plan the transportation network for a city.

3. Identify the corridor and plan for providing good transportation facilities.
4. Evaluate various alternative transportation proposals.

Text Books:

1. 'Introduction to Urban System Planning' by Hutchinson, B.G., McGraw Hill.
2. 'Transportation Engineering - An Introduction' by Khisty C.J., Prentice Hall.
3. 'Fundamentals of Transportation Planning' by Papacostas, Tata McGraw Hill.

References:

1. 'Urban Transportation Planning: A decision oriented Approach' by Mayer M and Miller E, McGraw Hill.
2. 'Introduction to Transportation Planning' by Bruton M.J., Hutchinson of London.
3. 'Metropolitan Transportation Planning' by Dicky, J.W., Tata McGraw Hill.
4. 'Traffic Engineering and Transportation Planning' by Kadiyali.L.R., Khanna Publishers, New Delhi.

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IV Year B.Tech. (CE). – II Semester

Project Work

Course Objectives:

The main objective of the Project work is

a. ***To enable the student apply engineering knowledge that has been taught all through the programme for solving practical engineering problem.***
b. ***To enable the student capable for problem solving / problem shooting.***
c. ***To in still and inculcate team spirit/ team work in to the minds of the students.***
d. ***To enable/ train the students report making/ documentation.***
e. ***To provide students an opportunity to use any civil engineering software for their project work.***

Course Outcomes of the Project Work

Up on completion of the Project work, the student will be able to

1. Apply all levels of Engineering knowledge in solving the Engineering problems.
2. Work together with team spirit.
3. Use Civil Engineering software at least one.
4. Document the projects

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IV Year B.Tech. (CE). – II Semester

INTELLECTUAL PROPERTY RIGHTS

Unit I

Introduction to Intellectual Property Law –Evolutionary past-Intellectual Property Law Basics-Types of Intellectual Property - Innovations and Inventions — Agencies Responsible for Intellectual Property –National & International

Unit II

Introduction to Copyrights – Principles of Copyrights – Subject Matters of Copyright – Rights Afforded by Copyright Law – Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works – Rights of Distribution – Rights of Performers –– Infringement of Copyright -International Copyright Law

Unit III

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law –Patent Requirements – Ownership and Transfer – Patent Application Process and Granting of Patent – Patent Infringement and Litigation — Double Patenting – Patent Searching Patent Cooperation Treaty – New developments in Patent Law – Invention Developers and Promoters- International Patent Law

Unit IV

Introduction to Trade Mark – Trade Mark Registration Process – Post Registration Procedures – Trade Mark maintenance – Transfer of rights – Inter Parties Proceedings – Infringement – Dilution of Ownership of Trade Mark – Likelihood of confusion – Trade mark claims –Trade Marks Litigation – International Trade Mark Law.

Unit V

Introduction to Trade Secrets – Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreement – Trade Secret Law – Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying state Law.

Unit VI

Introduction to Cyber Law – Information Technology Act 2000 – Cyber Crime and E-commerce – Data Security – Confidentiality – Privacy – International aspects of Computer and Online Crime- Semiconductor Chip Protection Act.

REFERENCE BOOKS:

1. Deborah E.Bouchoux:"Intellectual Property". Cengage learning, New Delhi.
2. Kompal Bansal & Parishit Bansal "Fundementals of IPR for Engineers", BS Pubilcations (Press)
3. Cyber Law. Texts & Cases, South-Western's Special Topics Collections.

4. Prabhuddha Ganguli: "Intellectual Property Rights" Tata Mc-Graw - Hill, New Delhi.
5. Richard Stim: "Intellectual Property", Cengage Learning , New Delhi.
6. Dr.SR Mynani. Law & IP. Asian Law House, Hyderabad.
7. R.Radha Krishnan, S. Balasubramaniam: "Intellectual Property Rights, LANCO Publications, New Delhi.
8. M.Ashok Kumar and Mohd,Iqbal Ali: "Intellectual Property Right" Serials Publications.