Detailed Syllabus

Professional Communication
HU 101
Contacts: 2L
Credits: 2
COURSE OBJECTIVE: COURSE OBJECTIVES:
The subject aims to provide the student with
1) An introduction of Elements of Written Communication
2) The capability to know about the Value-based Text Reading
3) The ability to know about the Fundamentals of Technical Communication
4) An understanding about the Forms of Technical Communication
5) The capability to describe about the Presentation Strategies

LEARNING OUTCOME:.
1) Ability to Describe the Elements of Written Communication
2) Ability to Recognize basic Value-based Text Reading
3) Ability to Express Fundamentals of Technical Communication
4) Ability to Choose appropriate Forms of Technical Communication
5) Ability to Design programs that Presentation Strategies

Professional Communication

Elements of Written Communication: words and phrases, word formation, synonyms and antonyms, homophones, one word substitution, sentence construction, paragraph construction, tense,preposition, creative writing, voice change .8L

Value-based Text Reading :

4

(A) Study of the following essays from the text book with emphasis on writing skills:

1. The Thief by Ruskin Bond

2. The Open Window by Saki

3. Marriage is a private Affair by Chinua Achebe

4. The Moon in the Earthen Pot by Gopini Karunakar

Fundamentals of Technical Communication : process of communication, language as a tool of communication, levels of communication , flow of communication, barriers to communication, communication across cultures; Technical Communication: meaning, significance, characteristics, difference between technical and general communication. 4

Forms of Technical Communication: business letters, job application letter and resume, business letters: sales & credit letters, letters of enquiry, letters of quotation, order, claim and adjustment letters, official letters: D.O. letters, government letters, letters to authorities, etc. , Technical Reports: general format of a report, formal and informal reports, memo report, progress report, status report, survey report, trip report, trouble report, laboratory report, research papers, dissertations and theses.Technical Proposals: purpose, characteristics, types, structure.

8

Presentation Strategies: defining the subject, scope and purpose, analysing audience & locale, collecting materials, preparing outlines, organising the contents, visual aids, nuances of delivery, extemporaneous, manuscripts, impromptu, memorization and non- verbal strategies.

6

References:

1. Board of Editors: Contemporary Communicative English
for Technical Communication
Pearson Longman,2010
2. Dr. D. Sudharani: Manual for English Language Laboratory
Pearson Education (W.B. edition), 2010
3. Technical Communication Principles and Practice by Meenakshi Raman, Sangeeta Sharma(Oxford
Higher Education)
4. Effective Technical Communication by Barun K.Mitra(Oxford Higher Education)
5. V. Sashikumar (ed.): Fantasy- A Collection of Short Stories
Orient Black swan (Reprint 2006)

Basic Electronics Engneering
EC101
Contact: 3L+1T
Credits: 4

COURSE OBJECTIVE: COURSE OBJECTIVES:
The subject aims to provide the student with:
1) An introduction of Semiconductors
2) The capability to know about the Bipolar Junction Transistors
3) The ability to know about the Field Effect Transistors
4) The capability to describe about the Feed Back Amplifier (basic concept), Oscillators and Operational Amplifiers

LEARNING OUTCOME:
1) Ability to Describe the Semiconductors
2) Ability to Recognize Bipolar Junction Transistors
3) Ability to Explain about the Field Effect Transistors
4) Ability to Choose appropriate Feed Back Amplifier (basic concept), Oscillators and Operational Amplifiers
.

Semiconductors: Conductors, Semiconductors and Insulators, electrical properties, band diagrams. Intrinsic and extrinsic, energy band diagram, electrical conduction phenomenon, P-type and N-type semiconductors, drift and diffusion carriers.
Diodes and Diode Circuits Formation of P-N junction, energy band diagram, built-in-potential forward and reverse biased P-N junction, formation of depletion zone, V-I characteristics, Zener breakdown, Avalanche breakdown and its reverse characteristics; Junction capacitance and Varactor diode. Simple diode circuits, load line, linear piecewise model; Rectifier circuits: half wave, full wave, PIV, DC voltage and current, ripple factor, efficiency, idea of regulation. 10

Bipolar Junction Transistors: Formation of PNP / NPN junctions, energy band diagram; transistor mechanism and principle of transistors, CE, CB, CC configuration, transistor characteristics: cut-off active and saturation mode, transistor action and current amplification factors for CB and CE modes. Biasing and Bias stability. 6

Field Effect Transistors: Concept of Field Effect Transistors (channel width modulation), Gate isolation types, JFET Structure and characteristics, MOSFET Structure and characteristics, depletion and enhancement type; CS, CG, CD configurations; CMOS: Basic Principles. 8

Feed Back Amplifier (basic concept), Oscillators and Operational Amplifiers: Concept (Block diagram), properties, positive and negative feedback, loop gain, open loop gain, feedback factors; topologies of feedback amplifier; effect of feedback on gain, output impedance, input impedance, sensitivities (qualitative), bandwidth stability; effect of positive feedback, instability and oscillation, condition of oscillation, Barkhausen criteria.Introduction to integrated circuits: Introduction to binary number; Basic Boolean algebra; Logic gates and function realization.

Reference Books:
• Millman & Halkias: Integrated Electronics.

• Sedra & Smith: Microelectronics Engineering
• Malvino: Electronic Principle.
• Schilling & Belove: Electronics Circuits.
• Millman & Grabal: Microelectronics.
• Salivahanan: Electronics Devices & Circuits.
• Boyelstad & Nashelsky: Electronic Devices & Circuit Theory.

LANGUAGE LABORATORY
Code: HU181
Credits -1

a) Honing ‘Listening Skill’ and its sub skills through Language Lab Audio device; 3
b) Honing ‘Speaking Skill’ and its sub skills;

2

c) Helping them master Linguistic/Paralinguistic features (Pronunciation/Phonetics/Voice modulation/Stress/ Intonation/ Pitch &Accent) of connected speech; 2P
j) Honing ‘Conversation Skill’ using Language Lab Audio –Visual input; Conversational Practice Sessions (Face to Face / via Telephone , Mobile phone & Role Play Mode);

2

k) Introducing ‘Group Discussion’ through audio –Visual input and acquainting them with keystrategies for success;

2

f) G D Practice Sessions for helping them internalize basic Principles (turn- taking, creative intervention, by using correct body language, courtesies & other soft skills) of GD; 4
g) Honing ‘Reading Skills’ and its sub skills using Visual / Graphics/Diagrams /Chart Display/Technical/Non Technical Passages; Learning Global / Contextual / Inferential Comprehension; 2
h) Honing ‘Writing Skill’ and its sub skills by using Language Lab Audio –Visual input; Practice Sessions

2

References:
Dr. D. Sudharani: Manual for English Language Laboratory
Pearson Education (WB edition),2010
Board of Editors: Contemporary Communicative English for Technical Communication,Pearson Longman, 2010

Basic Electronics Engneering
EC191
Contact: 3P
Credits: 2

Familiarisation with passive and active electronic components such as Resistors, Inductors, Capacitors, Diodes, Transistors (BJT, FET) and electronic equipment like DC power supplies, multimeters etc.
Familiarisation with measuring and testing equipment like CRO, Signal generators etc.
Study of I-V characteristics of Junction diodes.
Study of I-V characteristics of Zener diodes.
Study of Half and Full wave rectifiers with Regulation and Ripple factors.
Study of I-V characteristics of BJTs (CE, CB).
Study of I-V characteristics of FETs (CS, CD).

Basic Computation and Principles
of Computer Programming
CS 201
Contacts: 3L + 1T = 4
Credits: 4

COURSE OBJECTIVE: COURSE OBJECTIVES:
The subject aims to provide the student with:
1) An introduction of Fundamentals of Computer:
2) The capability to know about the C Fundamentals:
3) The ability to know about the Operators & Expressions:
4) An understanding about the Flow of Control:
5) The capability to describe about the Fundamentals and Program Structures:
6) An understanding about the Arrays and Pointers:
7) An introduction about the Structures Union and Files:

LEARNING OUTCOME:
1) Ability to Describe the compiler, edit, debug and execute cycle.
2) Ability to Recognize basic data types, variables, constants, operators and expressions.
3) Ability to Explain control flow including selection, iteration and function calls.
4) Ability to Choose appropriate conditional and iteration constructs for a given programming
5) Ability to Design programs that use compound data types: array, structs, strings.
6) Ability to Understand dynamic memory allocation and static memory allocation.
7) Ability to Describe various simple problem solving techniques.

Fundamentals of Computer:
History of Computer, Generation of Computer, Classification of Computers 2
Basic Anatomy of Computer System, Primary & Secondary Memory, Processing Unit, Input & Output devices

3
Binary & Allied number systems representation of signed and unsigned numbers. BCD, ASII. Binary Arithmetic & logic gates

6
Assembly language, high level language, compiler and assembler (basic concepts) 2
Basic concepts of operating systems like MS DOS, MSWINDOW, UNIX, Algorithm & flow chart

2
C Fundamentals:
The C character set identifiers and keywords, data type & sizes, variable names, declaration, statements 3

Operators & Expressions:

Arithmetic operators, relational and logical operators, type, conversion, increment and decrement operators, bit wise operators, assignment operators and expressions, precedence and order of evaluation. Input and Output: Standard input and output, formatted output -- printf, formatted input scanf. 5

Flow of Control:

Statement and blocks, if -else, switch, loops -while, for do while, break and continue, go to and labels

2

Fundamentals and Program Structures:

Basic of functions, function types, functions returning values, functions not returning values, auto, external, static and register variables, scope rules, recursion, function prototypes, C preprocessor, command line arguments. 6

Arrays and Pointers:

One dimensional arrays, pointers and functions, multidimensional arrays. 6

Structures Union and Files:

Basic of structures, structures and functions, arrays of structures, bit fields, formatted and unformatted files. 5

Reference Books:

Introduction To Computing E. Balagurusamy,TMH
The Elements of Programming StyleYourdon, E.
Techniques of Program Structures and DesignSchied F.S.
Theory and Problems of Computers and ProgrammingGottfried
Programming with C SchaumKerninghan B.W. & Ritchie D.M.
The C Programming LanguageRajaraman V.
Fundamental of Computers Balaguruswamy
Programming in C Kanetkar

Basic Electrical Engineering
Code: EE 201
Contacts: 3L + 1T
Credits: 3

COURSE OBJECTIVE: COURSE OBJECTIVES:

The subject aims to provide the student with:

1) An introduction of Fundamentals of Electrostatics
2) The capability to know about the DC Network Theorem
3) The ability to know about the Electromagnetism
4) An understanding about the DC Machines
5) The capability to describe about the AC Fundamentals
6) An understanding about the Single Phase Transformer
7) An introduction about the phase Induction Motor
8) An introduction about the Three Phase System
9) An understanding about the General Structure of an Electrical Power System

LEARNING OUTCOME:

1) Ability to Describe about the Electrostatics
2) Ability to Recognize basic DC Network Theorem
3) Ability to Explain about the Electromagnetism
4) Ability to Choose appropriate DC Machines
5) Ability to Describe about the AC Fundamentals
6) Ability to Understand about the Single Phase Transformer
7) Ability to Describe about the phase Induction Motor
8) Ability to Describe about the Three Phase System
9) Ability to Explain about the General Structure of an Electrical Power System

Electrostatics: Coulomb's law, Electric Field Intensity, Electric field due to a group of charges, continuous charge distribution, Electric flux, Flux density, Electric potential, potential difference, Gauss's law, proof of gauss's law, its applications to electric field and potential calculation, Capacitor, capacitance of parallel plate capacitor, spherical capacitor, isolated spheres, concentric conductors, parallel conductors. Energy stored in a capacitor. 5L

DC Network Theorem: Definition of electric circuit, network, linear circuit, non-linear circuit, bilateral circuit, unilateral circuit, Dependent source, Kirchhoff's law, Principle of superposition. Source equivalence and conversion, Thevenin's Theorem, Norton Theorem, nodal analysis, mesh analysis, star-delta conversion. Maximum power transfer theorem with proof. 7L

Electromagnetism: Biot-savart law, Ampere's circuital law, field calculation using Biot-savart & ampere's circuital law. Magnetic circuits, Analogous quantities in magnetic and electric

circuits, Faraday's law, Self and mutual inductance. Energy stored in a magnetic field, B-H curve, Hysteretic and Eddy current losses, Lifting power of Electromagnet. 5L

DC Machines: Construction, Basic concepts of winding (Lap and wave). DC generator: Principle of operation, EMF equation, characteristics (open circuit, load) DC motors: Principle of operation, Speed-torque Characteristics (shunt and series machine), starting (by 3 point starter), speed control (armature-voltage and field control). 6L

AC Fundamentals: Production of alternating voltage, waveforms, average and RMS values, peak factor, form factor, phase and phase difference, phasor representation of alternating quantities, phasor diagram, behaviour of AC series, parallel and series parallel circuits, Power factor, Power in AC circuit, Effect of frequency variation in RLC series and parallel circuits, Resonance in RLC series and parallel circuit, Q factor, band width of resonant circuit. 6

Single Phase Transformer: Core and shell type construction, EMF equation, no load and on load operation, phasor diagram and equivalent circuit, losses of a transformer, open and short circuit tests, regulation and efficiency calculation. 4

phase Induction Motor: Types, Construction, production of rotating field, principle of operation, equivalent circuit and phasor diagram, rating, torque-speed characteristics (qualitative only). Starter for squirrel cage and wound rotor induction motor. Brief introduction of speed control of 3 phase induction motor (voltage control, frequency control, resistance control) 5

Three Phase System: Voltages of three balanced phase system, delta and star connection, relationship between line and phase quantities, phasor diagrams. Power measurement by two watt meters method. 3

General Structure of an Electrical Power System: Power generation to distribution through overhead lines and under-ground cables with single line diagram. 1

Text books:

1. Basic Electrical engineering, D.P Kothari & I.J Nagrath, TMH, Second Edition
2. Fundamental of electrical Engineering, Rajendra Prasad, PHI, Edition 2005.
3. Basic Electrical Engineering, V.N Mittle & Arvind Mittal, TMH, Second Edition
4. Basic Electrical Engineering, J.P. Tewari, New age international publication

Reference books:

1. Basic Electrical Engineering (TMH WBUT Series), Abhijit Chakrabarti & Sudipta Nath, TMH
2. Electrical Engineering Fundamental, Vincent.D.Toro, Pearson Education, Second Edition.

2. Hughes Electrical & Electronics Technology, 8/e, Hughes, Pearson Education.
3. Basic Electrical Engineering, T.K. Nagsarkar & M.S. Sukhija, Oxford
4. Introduction to Electrical Engineering, M.S. Naidu & S, Kamakshaiah, TMH
5. Basic Electrical Engineering, J.J. Cathey & S.A Nasar, TMH, Second Edition.

Basic Electrical Engineering Lab
Code: EE 291
Contacts: 3
Credits: 2

List of Experiments:

1. Characteristics of Fluorescent lamps
2. Characteristics of Tungsten and Carbon filament lamps
3. (a) Verification of Thevenin's theorem.
   (b) Verification of Norton's theorems.
4. Verification of Maximum power theorem.
5. Verification of Superposition theorem
6. Study of R-L-C Series circuit
7. Study of R-L-C parallel circuit
8. Calibration of ammeter and voltmeter.
9. Open circuit and Short circuit test of a single phase Transformer.
10. No load characteristics of D.C shunt Generators
11. Starting and reversing of speed of a D.C. shunt
12. Speed control of DC shunt motor.
13. Measurement of power in a three phase circuit by two wattmeter method

Basic Computation & Principles of Computer Programming Lab
Code: CS 291
Contacts: Credits: 2

Exercises should include but not limited to:

1.DOS System commands and Editors (Preliminaries)
2.UNIX system commands and vi (Preliminaries)
3.Simple Programs: simple and compound interest. To check whether a given number is a palindrome or not, evaluate summation series, factorial of a number , generate Pascal's triangle, find roots of a quadratic equation
4.Programs to demonstrate control structure : text processing, use of break and continue, etc.
5.Programs involving functions and recursion
6.Programs involving the use of arrays with subscripts and pointers
7.Programs using structures and files.

Values & Ethics In Profession
MC(HU)-301
Contracts: 2L
Credits- 2

COURSE OBJECTIVES:
The subject aims to provide the student with:
1) An introduction of Effects of Technological Growth:
2) The capability to know about the Ethics of Profession:
3) The ability to know about the Profession and Human Values:

LEARNING OUTCOMES:
1) Ability to describe the Effects of Technological Growth:
2) Ability to describe the Ethics of Profession:
3) An ability to demonstrate the Profession and Human Values:

Science, Technology and Engineering as knowledge and as Social and Professional Activities
Effects of Technological Growth:
Rapid Technological growth and depletion of resources, Reports of the Club of Rome. Limits of growth: sustainable development
Energy Crisis: Renewable Energy Resources
Environmental degradation and pollution. Eco-friendly Technologies. Environmental Regulations, Environmental Ethics Appropriate Technology Movement of Schumacher; later developments Technology and developing notions. Problems of Technology transfer, Technology assessment impact analysis.
Human Operator in Engineering projects and industries. Problems of man, machine, interaction, Impact of assembly line and automation. Human centered Technology.
Ethics of Profession:
Engineering profession: Ethical issues in Engineering practice, Conflicts between business demands and professional ideals. Social and ethical responsibilities of Technologists. Codes of professional ethics. Whistle blowing and beyond, Case studies.
Profession and Human Values:
Values Crisis in contemporary society
Nature of values: Value Spectrum of a good life
Psychological values: Integrated personality; mental health
Societal values: The modern search for a good society, justice, democracy, secularism, rule of law, values in Indian Constitution.
Aesthetic values: Perception and enjoyment of beauty, simplicity, clarity
Moral and ethical values: Nature of moral judgements; canons of ethics; ethics of virtue; ethics of duty; ethics of responsibility.

References :
1. Stephen H Unger, Controlling Technology: Ethics and the Responsible Engineers, John Wiley & Sons,
New York 1994 (2nd Ed)

2. Deborah Johnson, Ethical Issues in Engineering, Prentice Hall, Englewood Cliffs, New Jersey 1991.
3. A N Tripathi, Human values in the Engineering Profession, Monograph published by IIM, Calcutta 1996.

Numerical Methods and Applications
Code: M(CE) 301
Contacts: 2L + 2T
Credits: 3

COURSE OBJECTIVE:

The subject aims to provide the student with:
1) An introduction of Fundamentals of Approximation
2) The capability to know about the Errors and how to minimize them
3) The ability to know about the solution procedure for finding the roots of the equations
4) An understanding about the Area calculation
5) The capability to interpolate and to judge the best fitting curve
6) An understanding about the solution of ODE

LEARNING OUTCOME:

1) Ability to approximate the numerical data
2) Ability to find the error
3) Ability to evaluate the root
4) Ability to make integration
5) Ability to identify the functional value at any point in a finite range
6) Ability to solve the ODE

Approximation in numerical computation: Truncation and rounding errors, Fixed and floating-point arithmetic. Propagation of errors. 2

Numerical integration: Trapezoidal rule, Simpson's 1/3 rule, Weddle's rule, Expression for corresponding error terms. 3

Numerical solution of Algebraic equation:
Bisection method, Regula-Falsi method, Newton-Raphson method. 3

Calculus of Finite Difference: Finite differences, forward differences, backward differences, Shift Operators, Evaluation of missing terms, central differences, divided differences. 3

Interpolation: Newton forward/backward interpolation, Lagrange's and Newton's divided difference Interpolation. 4

Numerical solution of a system of linear equations:
Gauss elimination method, Matrix inversion, LU Factorization method, Gauss Jacobi iterative method, Gauss-Seidel iterative method. 6L

Numerical solution of ordinary differential equation: Picard,s Method of Successive Approximation, Taylor's Series Method, Euler's method, Modified Euler's method, Runge-Kutta methods. 5

Curve fitting: Linear function, Polynomial function, Power function, Exponential function. 4

Text books:

1. C.Xavier: C Language and Numerical Methods.
2. Dutta & Jana: Introductory Numerical Analysis.
3. J.B.Scarborough: Numerical Mathematical Analysis.
4. Jain, Iyengar , & Jain: Numerical Methods (Problems and Solution).

Reference books:

1. Balagurusamy: Numerical Methods, Scitech.
2. Baburam: Numerical Methods, Pearson Education.
3. N. Dutta: Computer Programming & Numerical Analysis, Universities Press.
4. Soumen Guha & Rajesh Srivastava: Numerical Methods, OUP.
5. Srimanta Pal: Numerical Methods, OUP.

Surveying-I
Code: CE- 301
Contact: 2L + 2T
Credits: 3

COURSE OBJECTIVES:

The subject aims to provide the student with:

1) An introduction of surveying
2) The capability to know about the chain surveying and also the various types of chain
3) The ability to know about the compass surveying and also the types of compasses.
4) An understanding about the plane table surveying
5) The capability to describe about the leveling
6) An understanding about the contouring and characteristics of contour.
7) An introduction about the uses of minor Instruments such as Clinometers, Planimeter.

LEARNING OUTCOMES:

1) Ability to describe the definition and procedure of chain surveying.
2) Ability to describe the procedure of compass surveying.
3) An ability to demonstrate the procedure of plane table surveying.
4) An ability to do the levelling.
5) An ability to demonstrate about the characteristics of contour.
6) Ability to describe the uses of minor instruments.

Introduction: Definition, classification of surveying, objectives, history of surveying, modern trends inm surveying, principles of surveying.

1

Chain surveying: Chain and its types, optical square, cross staff. Reconnaissance and site location, locating ground features by offsets – field book. Chaining for obtaining the outline of structures, methods for overcoming obstacles, conventional symbols, plotting chain survey and computation of areas, errors inb chain surveying and their elimination – problems. Triangulation and Traversing.

8

Compass surveying: Types of compasses, use and adjustments, bearings, local attraction and its adjustments. Chain and compass surveying of an area, booking and plotting. Adjustments of traverse, errors in compass surveying and precautions - problems.

8

Plane table surveying: Equipment, leveling, orientation, different methods of survey, two and three point problems, errors and precautions.

4

Leveling: Introduction,basic definitions, leveling instruments and their features, temporary adjustment of levels, sensitiveness of bubble tube. Methods of leveling ‐ differential, profile & fly leveling, cross sectional and reciprocal leveling. Effect of curvature and refraction, reducing errors and eliminating mistakes in leveling. Permanent adjustments of dumpy level. Modern levels ‐Tilting level, Automatic levels, precise levels. Plotting longitudinal sections and cross sections. Measurement of area and volume. Trignometrical Levelling

8

Contouring: Topographic map, characteristics of contour, contour interval. Methods of locating contours, Interpolation of contours. Measurement of area and volume from contour maps.

4

Minor Instruments: Clinometers, Planimeter (mechanical and digital)

3

Books recommended

1. Surveying ‐ Vol I & II B.C. Punmia
2. Surveying levelling ‐ Vol I & II ‐ T.P. Kanetkar & Kulkarni

SOLID MECHANICS
Code: CE302
Contact: 2L+2T
Credits: 3

COURSE OBJECTIVES:

The subject aims to provide the student with:

1) An understanding of basic strength of material part on which analysis of shear force and bending moment of beam.

2) The capability to use abstractions to analyze simply supported beam .

3) The ability to formulate and solve stress strain behaviour of elements.

4) An understanding of deflection of beam

5) The capability to analyze the truss member

6) an understanding of column analysis

LEARNING OUTCOMES:

1) Ability to calculate stress strain behaviour of material.

2) Ability to calculate shear force and bending moment of beams and column.

3) An ability to analyze the stress strain behaviour of truss member

Review of Basic Concepts of Stress and Strain: Normal stress, Shear stress, Bearing stress,Normal strain, Shearing strain; Hooke's law; Poisson's ratio; Stress-strain diagram of ductile andbrittle materials; Elastic limit; Ultimate stress;
Yielding; Modulus of elasticity; Factor of safety.

Beam Statics: Support reactions, concepts of redundancy, axial force, shear force and bending moment diagrams for concentrated, uniformly distributed, linearly varying load, concentrated moments in simply supported beams, cantilever and overhanging beams

(9)

Symmetric Beam Bending*:* Basic kinematic assumption, moment of inertia, elastic flexureformulae and its application, Bending and shear stress for regular sections, shear centre.
Deflection of statically determinate beams: Fundamental concepts: Elastic curve, moment,Curvature relationship, governing differential equation, boundary conditions: Direct integration Solution

(13)

Analysis of determinate plane trusses: Concepts of redundancy, Analysis by method of joints,method of sections

Two Dimensional Stress Problems: Principal stresses, maximum shear stresses, Mohr's circle of stresses, construction of Mohr's circle

(10)

Introduction to thin cylindrical & spherical shells: Hoop stress and meridonial - stress and volumetric changes.

(10)

Torsion: Pure torsion, torsion of circular solid shaft and hollow shafts, torsional equation, torsional rigidity, closed coil helical springs.

Columns: Fundamentals, criteria for stability in equilibrium, column buckling theory, Euler's load for columns with different end conditions, limitations of Euler's theory – problems, eccentric load and secant formulae.

References

Name Author Publishers

1 Elements of Strength of Material
S. P. Timoshenko & D. H. Young EWP Pvt. Ltd

2 Engineering Mechanics of Solids
E. P. Popov
Pearson Education

3 Strength of Materials
R. Subramanian OXFORD University Press

4 Strength of Material Bansal

5 Strength of Materials
S S Bhavikatti Vikas Publishing House Pvt. Ltd

Building Material and Construction
Code: CE- 303
Contact: 2L+2T
Credits: 3

COURSE OBJECTIVES:

The subject aims to provide the student with:

1) An understanding of basic property of building materials
2) The capability to know about the cement .
3) The ability to describe the property of concrete .
4) An understanding of timber and its product
5) The capability to describe the construction procedure of foundation (shallow and deep foundation)
6) an understanding about the various part of a building.
7) an introduction about the plaster floor etc.

LEARNING OUTCOMES:

1) Ability to describe the property of building material.
2) Ability to explain about the wood product.
3) An ability to demonstrate the the construction procedure of foundation (shallow and deep foundation)
4) An ability to demonstrate the various part of building as well as the rules of plastering and floor finish.

Materials of Construction

Bricks :classification ‑characteristics ‑Testing of bricks as per BIS.
3

Aggregates: Types, Classification and Characteristics
3

Lime: Types, composition, Manufacturing, Properties ‑ Hydration
2

Mortars: Classification and characteristics ‑Types and uses
2

Cement: OPC ‑ Composition, Blended cement, Hydration, Setting Time.
3

Mortar and Concrete: Types ‑ Ingredients ‑ uses .

3

Wood and wood products: ‑ Structure, characteristics of good timber, defects, seasoning, decay & its prevention. Suitability of timber for specific uses. Wood products: Veneers plywood, Fibre boards, chipboards, black boards, batten boards and laminated boards ‑ characteristics and uses.

3

Paints,Enamels & Varnishes.- 2

Building Construction

Foundations*:* Types of foundations [definitions and uses]: Spread foundations, Piles and Well foundation
(4)

Brick Masonry*:* Rules for bonding; stretcher bond, header bond; English and Flemish bonds for one, one and a half brick thick walls.Cavity wall 3

Walls, Doors and Windows: Load bearing and partition walls reinforced brick walls; common types of doors and windows of timber and metal. (3)

Stairs: Types; R.C. Stair cases with sketches; Elevation and Cross section of different types of stair case. (4)

Roofs: Types of pitched roofs and their sketches; Lean ‐ to, coupled and collared roofs; king-post truss, queen-post truss and simple steel trusses; Roof covering materials: -Tiles, AC sheets, and G.I. sheets (3)

Plastering and Painting: Plastering with cement and lime mortar; White-washing, colour washing and distempering; Painting: New and existing wood and metal work.
3

Flooring: Cement concrete, terrazzo, Mosaic, marble and tiled flooring
4

Recommended Books

1. Building materials ‐ S.K.Duggal
2. Building materials ‐ P. C. Varghese [Prentice Hall of India]
3. Engineering Materials ‐ S.C. Rangwala
4. Concrete Technology ‐ M.S. Shetty
5. Concrete Technology ‐ A. M. Nevile & J. J. Brooks [Pearson Education]
6. Building Construction by B.C.Punmia
7. Building Construction and Foundation Engineering by Jha and Sinha

References:
National Building Code

Engineering Geology
Code: CE- 304
Contact: 2L+1T
Credits: 2

COURSE OBJECTIVES:

The subject aims to provide the student with:

1) An understanding of definition and property of minerals crystal
2) The capability to know the classification of rocks
3) The ability to know the weathering procedure of rocks .
4) An understanding of geological work of rivers
5) The capability to describe the introduction of structural elements of rocks.
6) an understanding about the earthquakes and seismic hazards.
7) an introduction about the uses of rocks as building materials and also about the geophysical exploration

LEARNING OUTCOMES:

1) Ability to describe the definition and property of minerals crystal.
2) Ability to describe the classification of rocks.
3) An ability to demonstrate about the geological work of rivers
4) An ability to demonstrate the structural elements of rocks
5) An ability to demonstrate about the earthquakes and seismic hazards
6) Ability to describe the uses of rocks as building materials
7) Ability to describe about the geophysical exploration

Geology and its importance in Civil Engineering.

2

Mineralogy: Definition, internal and external structure of minerals, study of crystals, Classification andphysical properties of minerals.

3

Classification of rocks .

4

a) Igneous rocks: Origin, mode of occurrence, forms & texture, classification and engineering importance.
b) Sedimentary rocks: Process of sedimentation, classification and engineering importance.
c) Metamorphic rocks: Agents and types of metamorphism, classification and engineering importance.

Weathering of rocks: Agents and kinds of weathering, soil formation & classification based on origin. .

2

Geological work of rivers: Origin and stages in the system, erosion, transportation and deposition.

1

Structural geology: Introduction to structural elements of rocks, dip & strike, definition, description,classification of folds, faults and joints, importance of geological structures in Civil Engineering.

4

Earthquakes and seismic hazards: Causes and effects, seismic waves and seismographs, Mercelli’ s intensityscale and Richter’ s scale of magnitude.

3

Engineering properties of rocks: Porosity, permeability, compressive strength, tensile strength and abrasive resistance.

3

Rocks as construction materials: Qualities required for building and ornamental stones, foundations, concrete aggregate, railway ballast, road metal, pavement, flooring and roofing.

3

Geophysical exploration: Methods of Geophysical Exploration, electrical resistivity method field procedure -sounding and profiling, electrode configuration, interpretation of resistivity data. Geophysical surveys in ground water and other Civil Engg. Projects.

4

Applied Geology: Surface and subsurface geological and geophysical investigations in major Civil Engg. Projects. Geological studies of Dams and reservoir sites, Geological studies for selection of tunnels andbn underground excavations.

4

Landslides: Types of landslides, causes, effects and prevention of landslides.

3

Reference Books:

1. Engineering and General Geology by Parbin Singh, Fourth edition. Katson publishing house Delhi
1987.

Geology & construction Materials lab
Code: CE- 394
Credits -1
Study of crystals with the help of crystal models

Identification of Rocks and Minerals [Hand Specimens]

Microscopic study of Rocks and minerals

Study of Geological maps, interpretation of geological structures Thickness problems, Bricks and building materials/aggregates etc.

Solid Mechanics Lab
Code: CE- 392
Credits -2

Tension test on Structural Materials: Mild Steel and Tor steel (HYSD bars)

Compression Test on Structural Materials: Timber, bricks and concrete cubes

Bending Test on Mild Steel

Torsion Test on Mild Steel Circular Bar

Hardness Tests on Ferrous and Non-Ferrous Metals: Brinnel and Rockwell Tests

Test on closely coiled helical spring

Impact Test: Izod and Charpy

Numerical Methods and Applications Programming Lab
Code: m(CE) 391
Contacts: 2
Credits: 1

List of Methods to be implemented through C program:

1. Trapezoidal Rule
2. Simpson's $1/3^{rd}$ Rule
3. Weddle's Rule
4. Bisection Method
5. Regula-Falsi Method
6. Newton Raphson Method
7. Euler's Method
8. Modified Euler's Method
9. Runge Kutta Method (2^{nd} and 4^{th} Order)
10. Construction of Forward Difference Table
11. Lagrange's Interpolation Formula

STRUCTURAL ANALYSIS
Code: CE401
Contact: 2L + 2 T
Credits: 3

COURSE OBJECTIVES:

The subject aims to provide the student with:

1) An introduction basic concept of mechanics
2) The capability to analyze of determinate structures
3) The ability to know strain energy
4) An understanding about the deflection determinate structures.
5) The capability to analyse influence line diagrams
6) An understanding about analysis of statically indeterminate beams
7) An introduction about the analysis of statically Indeterminate beams

LEARNING OUTCOMES:

1) Ability to describe the basic concept of mechanics
2) Ability to describe the procedure analyze of determinate structures
3) An ability to demonstrate the strain energy
4) An ability to do the deflection determinate structures.
5) An ability to demonstrate about the procedure analyse influence line diagrams
6) Ability to describe the analysis of statically indeterminate beams
7) Ability to describe the procedure analysis of statically indeterminate beams

Review of basic concept of mechanics: Equilibrium, Free body diagram, Determinate and Indeterminate structures, Degree of indeterminacy for different types of structures: Beams, Frames, Trusses

4

Analysis of determinate structures: Portal frames, arches, cables

3

Strain energy: Due to axial load, bending and shear, Torsion; Castigliano's theorems, theorem of minimum potential energy, principle of virtual work, Maxwell's theorem of reciprocal deflection,Betti's law

4

Deflection determinate structures: Moment area and Conjugate beam method, Energy methods,Unit load method for beams, Deflection of trusses and simple portal frames. 8

Influence line diagrams: Statically determinate beams and trusses under series of concentrated and uniformly distributed rolling loads, criteria for maximum and absolute maximum moments and shears.

6

Analysis of statically Indeterminate beams: Theorem of three moments, Energy methods, Force method (method of consistent deformations) [for analysis of propped cantilever, fixed beams and continuous beams (maximum two degree of indeterminacy) for simple loading cases], Analysis of two-hinged arch.

8

Analysis of statically Indeterminate structures:

Moment distribution method - solution of continuous beam, effect of settlement and rotation of support, frames with or without side sway.Slope Deflection Method – Method and application in continuous beams and Frames.Approximate method of analysis of structures: Portal & Cantilever methods

8

References

1 Engineering Mechanics of Solids
By E. P. Popov
Pearson Education
2 Basic structural Analysis
C.S. Reddy
TMH
3 Statically indeterminate structures C. K. Wang McGraw-Hill
4 Elastic analysis of structures
Kennedy and Madugula Harper and Row
5 Structural Analysis (Vol I & Vol II) S S Bhavikatti Vikas Publishing House Pvt. Ltd
6 Structural Analysis Ramammurtham
7 Structures Schodek & M. Bechhold Pearson Education

Soil Mechanics – I
Code-CE 404
Contact -2L+2T
Crdits-3

COURSE OBJECTIVES:

The subject aims to provide the student with:

1) An introduction to Origin & formation of Soil
2) The capability to know Soil as a Three Phase System
3) The ability to know Particle Size Distribution
4) An understanding about the Index Properties of Soil
5) The capability to analyse Soil Classification
6) An understanding about Soil Moisture
7) An introduction about the Effective Stress Principles
8) An introduction about the Two Dimensional Flow Through Soil
9) An capability about the Stress Distribution In Soil

LEARNING OUTCOMES:

1) Ability to describe about the origin & formation of soil
2) Ability to describe the procedure soil as a three phase system
3) An ability to demonstrate the particle size distribution
4) An ability to do the Index Properties of Soil
5) An ability to demonstrate about the soil Classification
6) Ability to describe about the soil moisture
7) Ability to describe about the effective stress principles
8) An ability to do analysis about the two Dimensional flow through soil
9) Ability to describe the stress distribution in soil

Origin & formation of Soil:- Types, Typical Indian Soil, Fundamental of Soil Structure, Clay Mineralogy.

(2)

Soil as a Three Phase System :- Weight- Volume Relationship, Measurement of Physical Properties of Soil: Insitu Density, Moisture Content, Specific Gravity, Relative Density. (5)

Particle Size Distribution :- By Sieving, Sedimentation Analysis. (3)

Index Properties of Soil:- Attarberg's Limits- Determination of Index Properties of Soil by Casagrande's Apparatus, Cone Penetrometer, Soil Indices.

(4)

Soil Classification :- As per Unified Classification System, As per IS Code Recommendation, AASHTO Classification, Field Identification of Soil, Consistency of Soil. (3)

Soil Moisture :- Darcy's Law, Capillarity in Soil, Permeability, Determination of Coefficient of Permeability of Soil in Laboratory, Permeability for Stratified Deposits. (4)
Effective Stress Principles:- Definition of Effective Stress, Estimation of Effective Pressure Due to different conditions

(4)

Two Dimensional Flow Through Soil :- Laplace's Equations, Flow nets, Flow Through Earthen Dam,estimation of Seepage, Uplift due to Seepage, Design of Fillers, Critical Hydraulic Gradient, Quick Sand condition.

(5)

Stress Distribution In Soil :- Bousinesq's & Westergaad's Assumption & Formula for Determination of stress due to Point Loads, Stress Beneath Line, Strip & Uniformly Loaded Circular - Pressure Bulbs, Newmark's charts- Use For Determination of Stress due to Arbitrarily Loaded Areas, Contact Stress distribution for various types of Loading & on Different Types of Soils.

(6)

References :-

1.Principles of Soil Mechanics & Foundation Engineering by – V.N.S. Murthy (UBS Publishers).
2.Soil Mechanics & Foundation Engineering by – B.C.Punmia (Laxmi Publications).
3.Introduction of Soil Mechanics by- B.M.Das (Galgotia Publications).
4.Soil Mechanics by – T.W.Lambe & R.V.Whitman.
5.SP-36 (Part – I & Part - II).
6.Basic & Applied Soil Mechanics by- Gopal(Ranjan & A.S.R.Rao (Willes EasternLtd.)

CONCRETE TECHNOLOGY
CODE-CE 402
CONTACT-2L+2T
CREDITS-3

COURSE OBJECTIVES:

The subject aims to provide the student with:

1) An introduction to basic concept of concrete.
2) The capability to know Types of Cement
3) The ability to know Aggregates
4) An understanding about the Properties of Fresh Concrete
5) The capability to analyse Strength & durability of Concrete
6) An understanding about Permeability of concrete
7) An introduction about the Admixtures
8) An introduction about the Special concrete:

LEARNING OUTCOMES:

1) Ability to describe about basic concept of concrete.
2) Ability to describe about the Types of Cement
3) An ability to demonstrate Aggregates
4) An ability to describe and judge the Properties of Fresh Concrete
5) An ability to demonstrate Strength & durability of Concrete
6) Ability to describe about the Permeability of concrete
7) Ability to describe about the Admixtures
8) An ability to describe about the Special concrete

Introduction:- Concrete as a Structural Material, Good Concrete Manufacture of Portland Cement, Chemical Composition of Cement, Hydration of Cement, Heat of Hydration. (6)

Types of Cement :- ordinary, Rapid hardening, low-heat, sulphate resisting, Portland slag, Portland pozzolana, super sulphated cement, white cement

(3)

Aggregates - Classification, Mechanical and Physical Properties, Deletarious Substances, Alkali-Aggregate Reaction, Sieve Analysis, Grading Curves, Fineness modules, Grading Requirements. Testing of Aggregates - Flakiness, Elongation Tests, Aggregate Crushing Value, Ten Percent Fines Value, Impactm Value, Abrasian Value.Quality of Water - Mixing Water, Curing Water, Harmful Contents.

(6)

Properties of Fresh Concrete - Workability, Factors Affecting Workability, Slump Test Compacting Factor Test, Flow Table Test, Segregation, Bleeding, Setting Time, Mixing and Vibration of Concrete, Mixers and Vibrators, curing, Methods, Maturity.

(4)

Strength & durability of Concrete - Water/Cement ratio, Gel/Space ratio, Strength in Tension, Compression, Effect of Age on Strength, Relation between Compressive and Tensile Strength,

Fatigue Strength, Stress Strain Relation and Modules of Elasticity, Poisson's Ratio, Shrinkage and Creep, Compression Test on Cubes, Cylinders, Non-Destructive Tests.

(8)

Permeability of concrete, Chloride & Sulphate attack on concrete,carbonation of concrete.(3)

Admixtures - different types, effects, uses, Retarders and Super plasticizers.
Mix Design by I.S. Code method.

(3)

Special concrete: Light-weight,Polymer and Fiber-reinforced concrete.
(3)

References:

1. Concrete Technology by M.L. Gambhir (Tata McGraw Hill Publishing Co. Ltd.)
2. Concrete Technology by M.S. Shetty (S.Chand)
3. Text book of Concrete Technology by P.D. Kulkarni (Tata McGraw Hill Publishing Co. Ltd.)
4. Concrete Technology by A.R. Santakumar

Surveying-II
Code: CE- 403
Contact: 2L + 2T
Credits: 3

COURSE OBJECTIVES:

The subject aims to provide the student with:

1) An introduction to theodolite surveying
2) The capability to know tachometric survey
3) The ability to know curve surveying
4) An understanding about the remote sensing
5) The introduction to uses of various instruments

LEARNING OUTCOMES:

1) Ability to describe about the theodolite surveying
2) Ability to describe the procedure tachometer
3) An ability to demonstrate the curve surveying
4) An ability to demonstrate about the remote sensing
5) Ability to describe about the uses of various instruments

Theodolite surveying: Components of a Theodolite, Adjustments, Horizontal and vertical anglemeasurements, Trigonometric leveling, problems on height and distances, traverse table, co-ordinates.

4

Tachometer: Definition, Principles of stadia, tangential systems, Details of stadia system. Analytic tachometer, Horizontal and inclined sight with staff vertical and normal for both fixed and movable hair tachometer, Errors in tachometer methods.

6

Triangulation: Adjustments of station and figure, Leveling adjustment, Method of equal shifts.

4

Curve surveying :

(1) Simple curves Definition, Notations Designations, Elements of simple curve, Setting out by linear methods and Rankine's tangential method. Two Theodolite and tachometric method,

4

(2) Introduction to Compound and reverse curves, vertical curve: types

2

(3) Transition curves: lemniscates, cubic spiral, cubic parabola, setting out

4

Remote Sensing: Introduction to remote sensing and its application in civil engineering,
Uses of Various Instruments: Total Station, GPS etc.

4

Reference Books:

Surveying -Vol 2,3 & 4 by B.C.Punmia.
Plane and Geodetic surveying -Vol 2 by David Clark
Surveying and leveling- Vol 2 by T .P. Kanetkar and Kulkarni
Fundamentals of surveying-by S.K.Roy, New Delhi.

Surveying Practice I
Code:CE491
Contact- 3P
Credits -2
Chain surveying

Preparing index plans, Location sketches, Ranging, Preparation of map, Heights of objects using chain and ranging rods,

Getting outline of the structures by enclosing them in triangles/quadrilaterals, Distance between inaccessible points,Obstacles in chain survey.

Compass surveying
Measurement of bearings, Preparation of map, Distance between two inaccessible points by chain and compass, Chain and

compass traverse

Plane Table survey
Temporary adjustments of plane table and Radiation method, Intersection, Traversing and Resection methods of plane
tabling, Three-point problem

Leveling
Temporary adjustment of Dumpy level, Differential leveling, Profile leveling and plotting the profile, Longitudinal and cross sectioning, Gradient of line and setting out grades, Sensitiveness of Bubble tube
Contouring

Direct contouring, Indirect contouring ‐ Block leveling, Indirect contouring ‐ Radial contouring, Demonstration of minor
Instruments.

Building Planning and Drawing
Code:CE 492
Contact- 3P
Credits: 2;

Foundations
Spread foundation for walls and columns; Footing for a RCC column, raft and pile foundations;
Doors and Windows
Glazed and paneled doors of standard sizes; Glazed and paneled windows of standard sizes; special windows and ventilators
Stairs
Proportioning and design of a dog-legged, open well RCC stair case for an office / Residential building; Details of reinforcements for RCC stair cases; Plan and elevation of straight run, quarter turn, dog-legged and open well stair cases.
Roofs and Trusses
Types of sloping roof, lean-to roofs, RCC roof with details of reinforcements, King post and Queen post trusses.
Functional Design of Buildings
To draw the line diagram, plan, elevation and section of the following:
Residential Buildings (flat & pitched roofs), Office Buildings (flat roof), School.The designs must show positions of various components including lift well and their sizes.
Introduction to drawing by using software package

References:

1 Principles of Building Drawing Shah & Kale
2 Text Book of Building Construction Sharma & Kaul
3 Building Construction B C Punmia

STRUCTURAL DESIGN-I
Code: CE501
Contact: 2L + 2T
Credits: 3

COURSE OBJECTIVES:

The subject aims to provide the student with:

1) An introduction to structural design
2) The capability to know working stress method of design
3) The ability to know limit state method of design
4) An understanding about design procedure of Staircases
5) The introduction to design and detailing of various structural members
6) The ability to know the design procedure of shallow foundations

LEARNING OUTCOMES:

1) Ability to describe about the structural design
2) Ability to describe the working stress method of design
3) An ability to demonstrate the limit state method of design
4) An ability to demonstrate about the staircases
5) Ability to describe about the design and detailing of various structural members
6) An ability to demonstrate shallow foundations

***Introduction*:** Principles of design of reinforced concrete members - Working stress and Limit State method of design

2

***Working stress method of design*:** Basic concepts and IS code provisions (IS: 456 2000)for design against bending moment and shear forces - Balanced, under reinforced and over reinforced beam/ slab sections; design of singly and doubly reinforced sections

6

***Limit state method of design*:** Basic concepts and IS code provisions (IS: 456 2000) for design against bending moment and shear forces; concepts of bond stress and development length; Use of 'design aids for reinforced concrete' (SP: 16).

4

Analysis, design and detailing of singly reinforced rectangular and doubly reinforced beam sections by limit state method.

4

Design and detailing of one-way and two-way slab panels as per IS code provisions

4

Design and detailing of continuous beams and slabs as per IS code provisions 3

***Staircases*:** Types; Design and detailing of reinforced concrete doglegged staircase 3

Design and detailing of reinforced concrete short columns of rectangular and circular cross sections under axial load. Design of short columns subjected to axial load with moments (uniaxial and biaxial bending) – using SP 16. 4

***Shallow foundations*:** Types; Design and detailing of reinforced concrete isolated square and Rectangular footing for columns as per IS code provisions by limit state method. 4

Limit state method should be followed for serial number 4 to 9 as above as per IS 456 - 2000

Text & References:-

1. IS: 456- 2000:"Indian Standard for Plain and reinforced concrete – code of practice", Bureau of Indian Standard

2. SP: 16 Design Aid to IS 456
3. Reinforced Concrete Design by Pillai and Menon, TMH
4. Reinforced concrete Limit state design, Ashok K. Jain

5. Reinforced concrete, S.N.Sinha, TMH

6. Fundamentals of reinforced concrete, N.C.Sinha and S.K. Roy, S.Chand &Co

7. Limit State Design of Reinforced Concrete, P. C. Varghese, PHI

8. Reinforced Concrete, S. K. Mallick and A. P.Gupta, Oxford IBH

Quantity Surveying, Specification and Valuation
Code-CE 502
Contact: 2L + 2T
Credits- 3

COURSE OBJECTIVES:
The subject aims to provide the student with:
1) An introduction to quantity surveying
2) The capability to know analysis and schedule of rates
3) The ability to know specification of materials
4) An understanding about specification of works
5) The introduction to valuation

LEARNING OUTCOMES:
1) Ability to describe about the quantity surveying
2) Ability to describe the analysis and schedule of rates
3) An ability to demonstrate the specification of materials
4) An ability to demonstrate about the specification of works
5) Ability to describe about the valuation

***Quantity Surveying*:** Types of estimates, approximate estimates, items of work, unit of measurement, unit rate of payment. Quantity estimate of a single storied building
Bar bending schedule. Details of measurement and calculation of quantities with cost, bill of quantities, abstract of quantities. Estimate of quantities of road, Underground reservoir, Surface drain, Septic tank.

7

Analysis and schedule of rates: Earthwork, brick flat soling, DPC, PCC and RCC, brick work, plastering, flooring and Finishing,

6

Specification of materials: Brick, cement, fine and coarse aggregates

4

Specification of works: Plain cement concrete, reinforced cement concrete, first class brickwork, cement plastering,Pointing, white washing, colour washing, distempering, lime punning, painting and varnishing

7

Valuation: Values and cost, gross income, outgoing, net income, scrap value, salvage value, market value, Book Value,Sinking fund, capitalized value, Y. P., depreciation, obsolescence,

deferred income, freehold and leasehold property, Mortgage, rent fixation, valuation table.
8

References:

1. Estimating, costing, Specification and Valuation in Civil Engineering by M..Chakroborty

2. Estimating and Costing in Civil Engineering" by B.N.Dutta, USB Publishers & Distributers

3. Civil Estimating, Costing and Valuation by Agarwal / Upadhay

SOIL MECHANICS – II
CODE-CE 503
CONTACT-2L+2T
CREDITS-3

COURSE OBJECTIVES:

The subject aims to provide the student with:

1) An introduction compaction of soil
2) The capability to know about the compressibility & consolidation of soil
3) The ability to know about the shear strength of soil
4) An understanding about the earth pressure theories
5) The introduction to retaining wall & sheet pile structures
6) An understanding about the stability of slopes

LEARNING OUTCOMES:

1) Ability to describe about the compaction of soil
2) Ability to describe the compressibility & consolidation of soil
3) An ability to demonstrate the shear Strength of soil
4) An ability to demonstrate about the earth pressure theories
5) Ability to describe about the retaining wall & sheet pile structures

Compaction of Soil :- Principles of Compaction, IS Light & Heavy Compaction Test, Field Compaction Equipments, Variousmethods of field Compaction Control, CBR Test as per IS recommendation.

5

Compressibility & Consolidation of Soil: - Terzaghi's Theory of One Dimensional Consolidation, Compressibility

Characteristics of Soils, Compression Index, Coefficient of Compressibility & Volume change, Coefficient of Consolidation,Degree & rate of Consolidation, Consolidemeter & Laboratory One Dimensional Consolidation Test as per latest IS Code,Determination of Consolidation Parameters under Consolidated, Normally Consolidated & Over Consolidated Soil, SecondaryConsolidation.

6

Shear Strength of Soil:- Basic Concept of Shear Resistance & Shear Strength of Soil, Mohr-Columb's Theory, Determinationof Shear Parameter of Soil- Stress Controlled & Strain Controlled Test, Laboratory Determination of Soil Shear Parameter-Direct Shear, Tri-axial Test, Unconfined Compression, Vane Shear Test as per Relevant IS Codes, Stress- Strain Relationship ofClays & Sands, Concept of Critical Void Ratio, Stress Path and its Application.

5

Earth Pressure Theories: - Plastic equilibrium of soil, Earth pressure at rest, Active & passive Earth pressure,Rankin's &Coulombs earth pressure theories, wedge method of analysis, estimation of earth pressure by graphical construction (colmann & Rebhann's method).

5

Retaining Wall & sheet pile structures: Proportions of retaining walls, stability checks, cantilever and anchored sheet piles,Free earth and fixed earth method of analysis of anchored bulk heads , coffer dam structures types and suitability.

5

Stability of slopes: Analysis of finite and infinite slopes, Swedish And friction circle method, Taglor's stability number, Bishop's method of stability analysis stability consideration of Earthen Dams.

5

References:

1. Principles of Soil Mechanics & Foundation Egg. By VNS Murthy (UBS Publication)
2. Soil Mechanics and Foundation Engg. By B.C. Punmia (Laxmi Publication)
3. Introduction to Soil Mechanics By B.M. Das (Galgolia publication)
4. Soil Mechanics – By T.W. Lambe & R.V. Whitman(WEL)
5. SP-36 (Part-I & Part-II)
6. Basic & Applied Soil Mechanics By Gopal Ranjan & A.S.R. Rao (Wiley Easter Ltd.)

Fluid Mechanics
Code:CE504
Contact: 3L
Credits: 3

COURSE OBJECTIVES:
The subject aims to provide the student with
1) An introduction to fluid statics
2) The capability to know weirs and notches
3) The ability to know dimensional analysis and model studies
4) An understanding about the introduction to hydraulic turbines
5) The capability to analyse pumps
6) An understanding about turbulent flow in circular pipes
7) An introduction about the steady uniform flow in open channel
8) An introduction about the varied flow through open channel

LEARNING OUTCOMES:
1) Ability to describe about basic concept of Fluid statics
2) Ability to describe about the weirs and notches
3) An ability to demonstrate dimensional analysis and model studies
4) An ability to describe about the hydraulic Turbines
5) An ability to demonstrate pumps
6) Ability to describe about the turbulent flow in circular pipes
7) Ability to describe about the steady uniform flow in open channel
8) An ability to describe about the varied flow through open channel

Fluid statics: Forces on plane and curved surfaces, Center of pressure. Stability of floating bodies, Metacentre

4

.
Weirs and Notches: Rectangular, triangular, Cippoletti, sharp crested and broad crested weirs, submerged weirs

3

Water Hammer: Speed of pressure wave, slow and rapid closure, use of surge tank.
3

Dimensional Analysis and Model studies: Dimensions and dimensional homogeneity, Importance and use of dimensional analysis. Buckingham's Pi theorem with applications. Geometric, Kinematic and Dynamic similarity. Non Dimensional Numbers.
4

Introduction to Hydraulic Turbines: Working Principles of Pelton, Francis and Kaplan turbines

3

Pumps: Centrifugal pumps, performance characteristic graph – design flow rate. Working principles of positive displacement pumps, gear, reciprocating and vane pumps. Hydraulic Ram.

5

Turbulent flow in circular pipes: Fluid friction in pipes, head loss due to friction. Darcy-Weisbach equation, Variation of friction factor with wall roughness – Moody's chart. Minor losses in pipes

5

Steady uniform flow in open channel: Characteristics, Chezy's, Manning's and Bazin's formulae.Hydraulically efficient cross sections. Flow through channels of circular cross sections – depths for maximum velocity and discharge.

5

Varied flow through open channel: Gradually varied and rapidly varied flows. Definition, Specific Energy, Critical, Sub-critical and Super-critical flows. Channel transitions - constricted or raised bed.Establishment of critical flow, Venturi flume and Parshall flume. Definition and diagram for Specific force, Hydraulic Jump

10

References:

1 Fluid Mechanics
Modi & Seth Standard Book House, New Delhi
2 Fluid Mechanics
A.K.Jain Khanna Publishers, New Delhi
3 Fluid Mechanics & Machinery H. M. Raghunath
CBS Publishers, New Delhi
4 Fluid Mechanics and Fluid Machines S. K. Som & G. Biswas Tata McGraw Hill.
5 Fluid Mechanics, Hydraulics
and Fluid Machines
S. Ramamrutham Dhanpat Rai
6 Basic Fluid Mechanics
C. P. Kothandaraman & R.Rudramoorthy New AgeInternational

7 Open Channel Hydraulics Van te Chow
McGraw Hill
8 Fluid Mechanics
John F. Douglas, Gasiorek & Swaffield, Pearson Education
9 Introduction to Fluid Mechanics Fox, Pritchand
10 Fundamental of
Fluid Mechanics Munsen, Young
WIE

Economics for Engineers
HU-501
Contracts: 3L+1T
Credits- 4

COURSE OBJECTIVES:
The subject aims to provide the student with:
1) An introduction **Economic Decisions Making**
2) The capability to know about the **Engineering Costs & Estimation**
3) The ability to know about the **Cash Flow, Interest and Equivalence:**
4) An understanding about the **Cash Flow & Rate Of Return Analysis**
5) The introduction to **Inflation And Price Change**
6) An understanding about the **Present Worth Analysis:**

LEARNING OUTCOMES:
1) Ability to describe about the compaction of soil
2) Ability to describe the compressibility & consolidation of soil
3) An ability to demonstrate the shear Strength of soil
4) An ability to demonstrate about the earth pressure theories
5) Ability to describe about the retaining wall & sheet pile structures

Economic Decisions Making – Overview, Problems, Role, Decision making process.
3

Engineering Costs & Estimation – Fixed, Variable, Marginal & Average Costs, Sunk Costs, Opportunity Costs, Recurring And Nonrecurring Costs, Incremental Costs, Cash Costs vs Book Costs, Life-Cycle Costs; Types Of Estimate, Estimating Models - Per-Unit Model, Segmenting Model, Cost Indexes, Power-Sizing Model, Improvement & Learning Curve, Benefits.

4

Cash Flow, Interest and Equivalence: Cash Flow – Diagrams, Categories & Computation, Time Value of Money, Debt Repayment, Nominal & Effective Interest.
3

Cash Flow & Rate Of Return Analysis – Calculations, Treatment of Salvage Value, Annual Cash Flow Analysis, Analysis Periods; Internal Rate Of Return, Calculating Rate of Return, Incremental Analysis; Best Alternative Choosing An Analysis Method, Future Worth Analysis, Benefit-Cost Ratio Analysis, Sensitivity And Breakeven Analysis. Economic Analysis In The Public Sector - Quantifying And Valuing Benefits & drawbacks.

4

Inflation And Price Change – Definition, Effects, Causes, Price Change with Indexes, Types of Index, Composite vs Commodity Indexes, Use of Price Indexes in Engineering Economic Analysis, Cash Flows that inflate at different Rates.

3

Present Worth Analysis: End-Of-Year Convention, Viewpoint Of Economic Analysis Studies, Borrowed Money Viewpoint, Effect Of Inflation & Deflation, Taxes, Economic Criteria, Applying Present Worth Techniques, Multiple Alternatives.

3

Uncertainty In Future Events - Estimates and Their Use in Economic Analysis, Range Of Estimates, Probability, Joint Probability Distributions, Expected Value, Economic Decision Trees, Risk, Risk vs Return, Simulation, Real Options.

3

Depreciation - Basic Aspects, Deterioration & Obsolescence, Depreciation And Expenses, Types Of Property,Depreciation Calculation Fundamentals, Depreciation And Capital Allowance Methods, Straight-Line Depreciation Declining Balance Depreciation, Common Elements Of Tax Regulations For Depreciation And Capital Allowances.

3

9. Replacement Analysis - Replacement Analysis Decision Map, Minimum Cost Life of a New Asset, Marginal Cost, Minimum Cost Life Problems.

3

10. Accounting – Function, Balance Sheet, Income Statement, Financial Ratios Capital Transactions, Cost Accounting,b Direct and Indirect Costs, Indirect Cost Allocation.

3

Readings:-

1. James L.Riggs,David D. Bedworth, Sabah U. Randhawa : Economics for Engineers 4e , Tata McGraw-Hill

2. Donald Newnan, Ted Eschembach, Jerome Lavelle : Engineering Economics Analysis, OUP

3. John A. White, Kenneth E.Case,David B.Pratt : Principle of Engineering Economic Analysis, John Wiley

4. Sullivan and Wicks: Engineering Economy, Pearson

5. R.Paneer Seelvan: Engineering Economics, PHI

6. Michael R Lindeburg : Engineering Economics Analysis, Professional Pub

Surveying Practice II
Code: CE- 591
Credits: 2

Theodolite surveying: Measurement of horizontal angles, repetition and Reiteration methods, Single plane and double plane
method of trigonometric leveling, Theodolite traverse adjustments.

Tacheometric surveying: Tacheometric constants, Measurement of horizontal and vertical distance. Tacheometric traverse and
Contouring.

Curve surveying: setting out simple curve by chain and tape, offsets from long chord and tangent, from chord produced, Simple
Curve by Rankin's method, Setting out compound and reverse curves, Transition curves, Bernoulli's Lemniscates.

Demonstration: Box-Sextant, Nautical sextant and EDM instruments.

Concrete Technology Lab
Code: CE- 592
Credits: 2

Tests on cement – specific gravity, fineness, soundness, normal consistency, setting time, compressive strength on cement mortar
Cubes.
Tests on fine aggregate – specific gravity, bulking sieve analysis, fineness modulus, moisture content, bulk density, voids and
Deleterious materials.

Tests on coarse aggregate-specific gravity, sieve analysis, fineness modulus, bulk density and voids.

Mix Design-As per IS method,

References:-
BIS on testing of cement, fine and coarse aggregates, Bricks and tiles.
Laboratory manual of concrete testing (Part I) – V.V Sastry and M.L. Gambhir

Soil Mechanics Lab.- I
Code-CE 593
Credits-2

1. Field indentification of different type of soil as per Indian standards [collection of field samples and indentification without
Laboratory testing], determination of natural moisture content.

2. Determination of specific gravity of i) Cohesionless ii) Cohesive soil

3. Determination of Insitu density by core cutter Method

4. Determination Insitu density by sand replacement method

5. Grain size distribution of cohessionless soil by sieving.

6. Grain size distribution of finegrained soil by hydrometer analysis.

7. Determination of Attenberg's limit (liquid limit, plastic limit & shrinkage limit)

8. Determination of co-efficient of permeability by constant head pemeameter (coarse grained soil)

9. Determination of co-efficient of permeability by variable head parameter (fine grained soil).

Reference

1. Soil Testing by T.W. Lamb (John willey)
2. SP-36 (Part-I & Part-II)
3. Measurement of Engineering properties of soil by E. Saibaba Reddy & K. Rama sastri.(New age International publication.

Fluid Mechanics Lab
Code: CE594
Contact- 3P
Credits-2

1. Determination of Orifice co-efficient
2. Calibration of Orifice meter
3. Calibration of V- Notch
4. Measurement of velocity of water in an open channel using a pitot tube
5. Measurement of water surface profile for flow over Broad crested weir
6. Preparation of discharge rating curve for a sluice
7. Measurement of water surface profile for a hydraulic jump
8. Determination of efficiency of a Centrifugal pump

9. Determination of efficiency of a Reciprocating pump
10. Determination of efficiency of a Pelton wheel Turbine
11. Determination of efficiency of a Francis Turbine
12. Determination of efficiency of a Hydraulic Ram

Highway & Transportation Engineering- I
Code: CE- 601
Contact: 2L +2T
Credits: 3

COURSE OBJECTIVES:

The subject aims to provide the student with:

1) An introduction to highway engineering
2) The capability to know about the highway alignment
3) The ability to know about the highway geometric design
4) An understanding about the pavement design
5) The introduction to pavement construction technique
6) An understanding about the special problems on highways

LEARNING OUTCOMES:

1) Ability to describe about the highway engineering
2) Ability to describe the highway alignment
3) An ability to demonstrate the highway geometric design
4) An ability to demonstrate about the pavement design
5) Ability to describe about the pavement construction technique
6) An ability to understand special problems on highways

Introduction to Highway Engineering:

Scope of highway engineering; Jayakar Committee Report; saturation system; highway financing ('pay as you go method andcredit financing method) and highway economics (quantifiable and non quantifiable benefits to highway users, cost of vehicleoperation, annual cost method, and benefit-cost ratio method).

2

Highway Alignment:

Requirements; factors controlling alignment; engineering surveys for highway alignment and location.

2

Highway Geometric Design:

Cross-sectional elements (friction, unevenness, light reflecting characteristics, camber, kerbs, shoulders, footpaths, width of Carriageway, formation, and right of way); PIEV theory, geometric design elements like design speed, passing and non-passing Sight distances; requirements and design principles of horizontal alignment including radius of curvature, super elevation, extra widening, Design of transition curves, curve resistance and grade compensation and vertical alignment.

12

Pavement design: Evaluation of soil subgrade, sub-base, base and wearing courses; design factors for pavement thickness (including design wheel load and ESWL, strength of pavement materials and plate load tests, and effect of climatic variations) Group Index and CBR methods of flexible pavement design; Westergaards analysis of wheel load stresses in rigid pavements; frictional stresses and warping stresses; IRC Recommendations for design of rigid pavements; design of expansion and contraction joints. Benkelmen Beam Test. 6

Pavement construction Technique:
Types of pavement; construction of earth roads, gravel roads, WBM, bitumen and cement concrete roads; joints in cement concrete pavements. Road Materials and Testing : Soil, Stone Aggregate, Bitumen, Marshal Stability Test.

4

Special problems on highways:
Failure in flexible and rigid pavaments; Maintenance of earth roads, WBM and bitumen roads; remedial measures for waves and corrugations and mud-pumping; strengthening of pavements; geometric standards for Hill roads; requirements of highwaydrainage systems; and types of surface and subsoil drainage methods.

6

References:-
1. High Way Engineering By Khanna & Justo

2. Transportation Engineering -Vazirani & S.P Chandala Khanna Puslishers

3. I.S Specifications on Concrete , Aggregate & Bitumen

4. IRC Codes

STRUCTURAL DESIGN-II
Code: CE602
Contact: 2L +2T
Credits: 3

COURSE OBJECTIVES:

The subject aims to provide the student with:
1) An introduction to Materials and specification
2) The capability to know about the structure connections
3) The ability to know about the eccentric connection
4) An understanding about the tension members
5) The introduction to compression members
6) An understanding about the beams:
7) An capability to design plate girders
8) An ability to design a gantry girders

LEARNING OUTCOMES:

1) Ability to describe about the materials and specification
2) Ability to describe the structure connections
3) An ability to demonstrate the structure connections
4) An ability to demonstrate about the eccentric connection
5) Ability to describe about the tension members
6) An ability to understand compression members
7) An ability to demonstrate about the beams
8) Ability to describe about the design procedure plate girders

Materials and Specification:-Rolled steel section, types of structural steel , specifications

2

Structure connections: Riveted, welded and bolted including High strength friction grip bolted joints.– types of riveted & bolted joints, assumptions, failure of joints ,efficiency of joints, design of bolted riveted & welded joints for axial load.

Eccentric connection:- Riveted & bolted joints subjected to torsion & shear, tension & shear, design of riveted, bolted & welded connection.

8

Tension members: Design of tension members, I.S code provisions. Permissible stresses, Design rules, Examples

3

Compression members: Effective lengths about major & minor principal axes, I.S code provisions. Permissible stresses, Design rules, Design of one component, two components and built up compression members under axial load. Examples. Built up columns under eccentric loading: Design of lacing and batten plates, Different types of Column Bases- Slab Base,

Gusseted Base, and Connection details.

8

Beams: Permissible stresses in bending, compression and tension. Design of rolled steel sections, plated beams. Simple Beam end connections, beam -Column connections. I.S code provisions

4

Plate girders: Design of webs & flanges, Concepts of curtailment of flanges – Riveted & welded web stiffeners, web flange splices - Riveted, welded& bolted.

6

Gantry Girder: Design gantry girder considering lateral buckling – I.S code provisions.

5

Text & References:-

1. Design of Steel structures, N. Subramanian, Oxford University Press

2. Design of Steel Structures - S.K.Duggal, Tata Mc-Graw Hill, New Delhi

3. Design of steel structures, A.S.Arya and J.L.Ajmani, Nemchand& Bros.,

4. Design of steel structures, Vol. I & II, Ramachandra

5. Design of steel structures, PasalaDayaratnam – A.H.Wheeler& Co Ltd. 1990

6. Design of steel structures, B.S.Krishnamachar and D.AjithaSinha – Tata McGraw – Hill publishing Co. Delhi.

7. Design of steel structures, Ramamurtham

8. IS 800 – 2007(Latest Revised code) Bureau of Indian Standard

9. S.P.: 6(1) – 1964 Structural Steel Sections, Bureau of Indian Standard

Environmental Engineering
Code: CE- 603
Contact: 2L+2T
Credits: 3

COURSE OBJECTIVES:
The subject aims to provide the student with:
1) An introduction to water demands:
2) The capability to know about the sources of water
3) The ability to know about the quality of water
4) An understanding about the collection and conveyance of water
5) The introduction to treatment of water
6) An understanding about the distribution:
7) An capability to know sewage and drainage
8) An ability to know characteristics of sewage
9) An ability to know solid waste disposal
10) An ability to know disposal by other methods
11) An ability to know treatment of sewage

LEARNING OUTCOMES:
1) Ability to describe about the water demands
2) Ability to describe the sources of water
3) An ability to demonstrate the quality of water
4) An ability to demonstrate about the collection and conveyance of water
5) Ability to describe about the treatment of water
6) An ability to understand about the distribution system
7) An ability to demonstrate about the sewage and drainage
8) Ability to describe about the characteristics of sewage
9) An ability to demonstrate about the solid waste disposal
10) Ability to describe about the disposal by other methods
11) Ability to describe about the treatment of sewage

Water demands: Types of demands domestic, commercial, industrial, fire, public use and losses, per capita demand, variations in demand, factors affecting demand. Design period. Forecasting population-different methods and their suitability. 3

Sources of water: surface sources rivers, streams, lakes and impounded reservoirs, determination of quantity of water in the Above sources. Underground sources Springs, wells and infiltration galleries, measurement of yield of open wells., tube wells, artesian wells and infiltration galleries. Comparison of surface source and subsurface sources in respect of quality and quantity.

2

Quality of water: Pollution and contamination of water. Sources, classification and prevention of pollution. Water borne diseases. Impurities in water. Collection of water samples. Water

analysis Physical chemical and biological tests, standards for potable water.

2

Collection and conveyance of water: Intakes-river, lake, reservoir and canal. Hydraulic design of pressure pipes. Hydrostatic tests on pipes.

2

Treatment of water: Aeration, Plain sedimentation, sedimentation with coagulation- coagulant feeding devices, optimum dosage of coagulant. Filters and their different types, disinfection, water softening. The functional design of treatment unit. Removal of iron, manganese, colour, odour and taste, Fluoridation, desalination.

5

Distribution: Systems of distribution, layout of distribution system, Pressure in distribution system, Storage and distribution reservoirs. Capacity of reservoirs. Type of reservoirs. Detection and presentation of leakages. Design of distribution system Nomograms, Hardy cross method, valves and pipe fittings, Hydrants. Necessity of pumps in water supply, types of pumps, .determination of capacity of pumps required (no derivation)

3

Sewage and drainage: Definition of some common terms used in sanitary engineering. Systems of sanitation, systems of Sewerages. Types of sewage. Sources of sanitary sewage. Estimating the quantity of sanitary sewage and storm sewage.Design of sewers.Nomograms, partial flow diagrams. Testing of sewer lines Sewer appurtenances. Pumping of sewage. House Drainage.

3

Characteristics of sewage: Physical, Chemical and Biological. Test on sewage; Solids, dissolved oxygen, biochemical oxygen demand, stability and relative stability, chlorides, sulphide, nitrogen. pH value, grease, oil and fat. Biological tests, carbon, Nitrogen and sulphur cycles.

3

Solid waste disposal: Quality and quantity of refuse, Collection and conveyance of solid wastes. Disposal of solid waste by composting, and other methods, Salvaging, grinding and discharging into sewers.

3

Disposal by other methods: Oxidation pond, oxidation ditch, aerated lagoon, septic tank, Iimhoff tank, Disposal by dilution, irrigation and farming, stream sanitation.

3

Treatment of sewage: Primary treatment - screen, grit chamber, detritus tank, skimming tank, plain sedimentation sedimentation with coagulation. Secondary treatment - Filtration, normal rate trickling filters, high rate trickling filters activated sludge process, aeration units, types of activated sludge process, sludge digestion. Functional design of primary and secondary treatment units.

3

References:-

Environmental Engineering Vol. I & II S.K. Garg -Khanna Pub .

Water Supply , Waste Disposal &Enviormental Pollution Engineering – A . K . Chatterjee – Khanna Pub .

Water Supply & Waste Water Disposal –G . M . Fair ,J . C . Geyer ,D . A . Okun . –Jhon Wiley & Sons .

Sanitary Engineering Volume I & II by Kshirasagar.

Manual of treatment - A Government of India Publication.

Water Supply and Sanitary Engineering By G.S.Birdi

Foundation Engineering
Code – CE- 604
Contacts-2L+2T
Credits-3

COURSE OBJECTIVES:
The subject aims to provide the student with:
1) An introduction to site investigation & soil exploration
2) The capability to know about the classification of foundations:
3) The ability to know about the shallow foundations
4) An understanding about the settlement
5) The introduction to allowable bearing capacity
6) An understanding about the deep foundations
7) An capability to know about ground improvement technique
8) An ability to know about the foundation on problematic soil

LEARNING OUTCOMES:
1) Ability to describe about the site investigation & soil exploration
2) Ability to describe the classification of foundations:
3) An ability to demonstrate the shallow foundations
4) An ability to demonstrate about the settlement
5) Ability to describe about the allowable bearing capacity
6) An ability to understand about the deep foundations
7) An ability to demonstrate about the ground improvement technique
8) Ability to describe about the solution regarding foundation on problematic soil

Site Investigation & Soil Explanation : Planning of sub-surface explanation , methods , sampling, samples, Insitu tests: SPT, SCPT, OCPT, field vane shear , Plate load test, Bore log, preparation of sub-soil Investigation report .

4

Foundations: Classification, selection- shallow and deep foundations.

2

Shallow foundations : Bearing capacity, Terzaghi's bearing capacity theory, effect of depth of embedment, eccentricity of load, Foundation shape on bearing capacity , Bearing capacity on layered media, Bearing capacity as per 1S 6403.

6

Settlement : Immediate and consolidation settlement , correction for rigidity and dimensional effects, settlement in various types of soil , IS-1904 recommendations.

4

Allowable bearing capacity : Definition , Determination of allowable bearing capacity from insitu test- SPT , SCPT and Plate load test.

5

Deep foundations : Pile : Types, load transfer mechanism , method of installation of piles- classification base on material , Installation Techniques – Selection and uses, Determination of load carrying capacities of piles by static and Dynamic formulae, Pile group . Group efficiency, Negative skin friction, pile load test

5

Introduction to Ground Improvement Technique : Stabilization using admixtures , stone columns , sand drains, grouting,n geotextiles ibroflotation.

3

Foundation on problematic soil : Foundation on expansive soil: Foundation on expansive soil, swelling potential , swelling and It's prevention , foundation on swelling soils.

3

Reference:

1.Foundation Analysis & Design By J.E. Bowels (Mc Graw Hill)

2. Principles of Foundation Engg. By B.M. Das (PWS Publishing)

3. Soil Mechanics & foundation Engg. By WNS Murthy.

4. SP- 36 (Part I & Part II)

5 Foundation Engineering By S.P Brahma (TMH)

6. Relevant IS Codes.

TRANSPORTATION & HIGHWAY ENGINEERING LAB.
CODE: CE691
Credits –2

Tests on highway materials – Aggregates- Impact value, los-Angeles Abrasion value water absorption, Elongation & Flakiness
Index.

Bitumen & bituminous materials – specific gravity, penetration value, Ductility, softening point, loss on heating, Flash & Fire
point test.
Stripping value test

Design of mix gradation for mix seal surfacing

Design of B.M. & S.D.B.C. Mix

Marshal Stability Test.

Benkelman Beam Test.

Reference:

BIS codes on Aggregates & Bituminous Materials
Highway material testing (Laboratory Manual)
- S.K. Khanna and CE.G. Justo,
- I.R.C. codes.

Structural Design/Drawing
Code CE: 692
Contact 3P
Credits-2

General considerations , design principle of R.C.C. sections, limit state method of design. Loads and stresses to be considered in
the design as per I.S. code provision.

Design & detailing of a i) Simply supported R.C.C. Beam. ii)Continuous T- Beam.

Design & detailing of a i) Simply supported one way slab i) One way continuous slab.

Design of different units –slab , beam column, roofing and staircase from floor plan of a multistoried frame building – two way
action of floor slab.

Reference:-

1. Fundamental of Reinforced concrete- N.C. Sinha & S.K.Roy.
2. Design of concrete structures – Ramachandra.
3. Limit State Method of Design – Varghese,PHI Ltd.
4. I.S- 456-2000
5. I.S.875
6. SP-16

Computer programme in Civil Engineering
Code CE: 693
Contact 2P
Credits: – 1

Introduction and important features of a software dealing with analysis and design of structures
Analysis and design of a multistoried building using software, Preparation of detailed drawings of different structural
elements including ductility detailing
RCC Slab, beam, column and footing design.

Soil Mechanics Lab.-II
Code-CE694
Contact: 3P
Credit –2

Determination of compressibility characteristics of soil by Oedometer test (co-efficient of consolidation & compression
Index)

Determination of unconfined compressive strength of soil

Determination of Shear parameter of soil by Direct shear test

Determination of undrained shear strength of soil by Vane shear test.

Determination of shear parameter of soil by Triaxial test (UU)

Standard Penetration Test

Expt No. 6 by large groups in the field.

References:-

1. Soil testing by T.W. Lamb (John Willey)
2. SP-36 (Part-I & Part –II)
3. Soil Mechanics Laboratory Manual by B. M. Das, OXFORD UNIVERSITY PRESS
4. Measurement of engineering properties of soil by E.Jaibaba Reddy & K. Ramasastri.

Water Resource Engineering
Code – CE 701
Contact – 2L +2T
Credits- 3

COURSE OBJECTIVES:
The subject aims to provide the student with:
1) An introduction to catchment area and hydrologic cycle
2) The capability to know about the evaporation, evapo-transpiration and infiltration
3) The ability to know about the stream flow measurement
4) An understanding about the hydrographs characteristics
5) The introduction to types of Irrigation systems, methods of irrigation
6) An understanding about the canal Irrigation
7) An capability to know about design of unlined alluvial channels by silt Theories
8) An ability to know about the water logging and drainage
9) An ability to know about the Introduction to ground water flow, darcy law; wells

LEARNING OUTCOMES:
1) Ability to describe about the catchment area and hydrologic cycle
2) Ability to describe the evaporation, evapo-transpiration and infiltration
3) An ability to demonstrate the stream flow measurement
4) An ability to demonstrate about the hydrographs characteristics
5) Ability to describe about the types of Irrigation systems, methods of irrigation
6) An ability to understand about the canal Irrigation
7) An ability to demonstrate about the design of unlined alluvial channels by silt Theories
8) Ability to describe about the solution regarding water logging and drainage
9) Abilty to discuss about the Introduction to ground water flow, darcy's law; wells

Catchment area and Hydrologic cycle, Measurement of rainfall – Rain gauges, Estimation of missing rainfall data, checking of consistency, Optimum number of Rain gauges. Calculation of average rainfall over area – different methods, Frequency analysis of rainfall intensity duration curve. Rainfall mass curve, hyetograph, Examples

4

Evaporation, evapo-transpiration and infiltration: Processes, Factors affecting run off, estimation of run-off, rainfall run off relationship

4

Stream flow measurement: Direct and indirect methods, Examples. Stage discharge Relationships

4

Hydrographs; characteristics: Base flow separation. Unit Hydrographs. Derivation of unit hydrographs, S-curve, flood routing.

4

Types of Irrigation systems, methods of irrigation: Water requirements of crops: Crop period or Base period, Duty & Delta of a crop, relation between Duty & Delta, Duty at various places, flow Duty & quantity Duty, factors affecting Duty, measures for improving Duty of water, crop seasons

4

Canal Irrigation: Introduction, classification of irrigation canals, Efficient section, certain important definitions, Time factor, Capacity factor, full supply coefficient, Nominal duty, Channel losses, Examples.

4

Design of unlined alluvial channels by silt Theories: Introduction, Kennedy's theory, procedure for design of channel by Kennedy's method, Lacey's theory, concept of True regime Initial regime and final regime, design procedure using Lacey's theory, examples 4

Water logging and drainage: Causes, effects and prevention of water logging. Type of drains-open drains and closed drains (introduction only), Discharge and spacing of closed drains. Examples. Lining of Irrigation Canals: Objectives, advantages and disadvantages of canal lining, economics and requirements of canal lining, Design of lined Canals examples 4

Introduction to ground water flow, Darcy law; Wells: Definition, Types-open well or Dug well, Tube well, open well-shallow open well, deep open well, cavity formation in open wells, construction of open wells, Yield of an open well –Equilibrium pumping test, Recuperating test, examples, Tube wells – Strainer type, cavity type, slotted type. Examples.4

References:-

1. Engineering Hydrology K. Subramanya Tata McGraw-Hill

2. A Text Book of Hydrology- P. Jaya Ram Reddy Laxmi Publications-New Delhi

3. Hydrology & Water Resource Engineering- S.K Garg Khanna Publishers.

4. Hydrology Principles, Analysis and Design H. M. Raghunath. .

5. Hydraulics of Groundwater J. Bear McGraw-Hill

6. Water Resources Engineering Through Objective Questions K. Subramanya Tata McGraw-Hill

7. Irrigation & Water Power Engineering- B.C Purnia, S Pande- Standard Publication- New Delhi.

8. Irrigation Engineering G.L Aswa Wiley Eastern-New Delhi

9. Irrigation, Water Resource & Water Power Engineering- .Dr. P.N Modi- Standard Book House- New Delhi

Professional Elective-I
Bridge Engineering
Code: CE 702/A
Contact: 3L
Credits: 3

COURSE OBJECTIVES:
The subject aims to provide the student with:
1) An introduction to bridge
2) The capability to know about the Reinforced concrete solid slab bridge:
3) The ability to know about the Box Culvert: Introduction
4) An understanding about the Beam and Slab Bridges
5) The introduction to types of Balanced Cantilever Bridges
6) An understanding about the Steel Bridges
7) An capability to know about design Plate Girder Bridge
8) An ability to know about the Composite Bridges
9) An ability to know about the Cable Stayed Bridge

LEARNING OUTCOMES:
1) Ability to describe about the bridge
2) Ability to describe the Reinforced concrete solid slab bridge
3) An ability to demonstrate the Box Culvert: Introduction
4) An ability to demonstrate about the Beam and Slab Bridges
5) Ability to describe about the Balanced Cantilever Bridges
6) An ability to understand about the Steel Bridges
7) An ability to demonstrate about the design Plate Girder Bridge
8) Ability to describe about the Composite Bridges
9) Abilty to discuss about the Introduction to Cable Stayed Bridge

Introduction, - Definition and Basic Forms, Component of bridge, classification of bridge, short history of bridge development.I.R.C Loads. Analysis of IRC Loads, Impact factors, other loads to be considered, Importance of Hydraulic
Factors in Bridge Design.

3

Reinforced concrete solid slab bridge: Introduction, General design features, Effective width method. Simply supported and cantilever Slab Bridge, analysis and design 3
Box Culvert: Introduction, Design method and Design example

3

Beam and Slab Bridges Introduction, Design of interior panel of slab. Pigeauds method, Design of longitudinal girder, Calculation of longitudinal moment, design example. 3
Balanced Cantilever Bridges: General Features, Arrangement of supports, design features Articulation, Design example.

3

Steel Bridges: General features, types of stress, Design example.

3

Plate Girder Bridge: Elements, design, lateral bracing, Box- girder Bridges.

3

Composite Bridges: General aspects, method of construction, analysis of Composite section, shear connectors, design of composite beam.

4

Cable Stayed Bridge: General features, Philosophy of design.

3

References:-

1.	Principle & Practice of Bridge Engineering	S.P. Bindra– DhanpatRai Pub
2 .	Essentials of bridge engineering	D.J. Victor
3.	Bridge engineering	Ponnuswamy
4.	Design of Bridge Structures	T.R. Jagadesh, M.A. Jayaram
5.	Bridge engineering by	Krishnaraju
6 .	Design of concrete bridges by	Aswani, Vizirani , Ratwani
7.	Design of steel structures	Arya&Ajmani
8.	Concrete Structures	Vaziram&Ratwani
9.	Structures design and drawing	Krishnamurthy
10 .	Relevant IS & IRC codes	

Prestressed Concrete
Code: CE702/B
Contact: – 3L
Credits: 3
COURSE OBJECTIVES:
The subject aims to provide the student with:
1) An introduction of prestressed concrete
2) The capability to know about the limit state design criteria
3) The ability to know about the anchorage zone stresses
4) An understanding about the composite construction
5) The introduction to prestressed concrete poles and sleepers:
6) An understanding about the prestressing
LEARNING OUTCOMES:
1) Ability to describe about the Prestressed concrete
2) Ability to describe the limit state design criteria
3) An ability to demonstrate the anchorage zone stresses
4) An ability to demonstrate about the composite construction
5) Ability to describe about the prestressed concrete poles and sleepers:
6) An ability to understand about the prestressing

Introduction of Prestressed concrete: Materials, prestressing system, analysis of prestress andbending stress, losses Shear and torsional resistance: design of shear reinforcement, design of reinforcement for torsion shear and bending. Deflections of prestressed concrete members: Importance, factors, short term and long term deflection

6

Limit state design criteria: Inadequacy of elastic and ultimate load method, criteria for limit states, strength and serviceability. Design of sections for flexure: methods by Lin and Magnel

5

Anchorage Zone stresses in post tensioned members: Stress distribution in end block, anchorage zone reinforcement

5

Composite construction of prestressed and in-situ concrete: Types, analysis of Stresses Statically Indeterminate structures: advantages of continuous member, effect of prestressing, methods of achieving continuity and method of analysis of secondary moments.

5

Prestressed concrete poles and sleepers: Design of sections for compression and bending5

prestressing: partial prestressing and non prestressed reinforcement

5

References:-

1 Prestressed Concrete, Fourth Edition, N Krishna Raju McGraw Hill

2 Design of Prestressed Structures, T.Y.Lin and N.H.Burns, Wiley Eastern Ltd

3 Fundamentals of Prestressed Concrete, N.C.Sinha and S.K.Roy

4 Prestressed Concrete, S.Ramamurthan

Advance Transportation Engineering
Code : CE – 702/C
Contact : 3L
Credits : 3

COURSE OBJECTIVES:
The subject aims to provide the student with:
1) An introduction to railway engineering
2) The capability to know about the airports :
3) The ability to know about the transportation planning

LEARNING OUTCOMES:
1) Ability to describe about the railway engineering
2) Ability to describe the airports
3) An ability to demonstrate the transportation planning for rural area

Railway Engineering :-

Introduction to Railway Engg.: Railway terminology, survey for track alignment, railway track component parts, gauges, wheel and axle arrangements.

3

Tractive Resistance : Resistance to traction, various resistances and their evaluation, hauling capacity and tractive effort.

3

Permanent way : Permanent way component parts, rails, railway sleepers, types, railway creep, anti creep devices check and guard rails, ballast requirements, types specification, formation, cross section and drainage.

3

Geometric Design : Alignment, horizontal curves, super elevation, equilibrium cant and cant deficiency, Gradients and grade compensation.

3

Railway Station Yard : Site, requirements, classification of railway stations.

2

Signaling and Inter looking : Objectives, principles of signaling, classification and types of signals in stations and yards & methods of interlocking.

3

Airports :

Introduction to airport planning and development : General philosophy of airport planning and development, ICAO classification of airports, site selection factors characteristics and jet aircraft.

4

Airport design standards ; Orientation of runways, length of runways and corrections, width of runways, sight distances, gradients and clearance, taxiways and Aprons.

4

Airport planning : Centralized and decentralized planning concepts, terminal requirements, terminal facilities and Typical layout of airports.

4

Transportation planning : Transportation planning at different levels; Transport Project planning– Planning studies and investigation; Elements of Urban Transportation Planning; Transport Demand Analysis; Preparation of Project Report

8

References:-

A Text Book of Railway Engineering – S.P. Arora & S.C. Saxena

Docks, Harbours and Tunnels by Srinivasan

Transportation Engineering by Vazirani & Chandola

Airport planning and Desigri. S.K.Khanna & M.G.Arora

Construction Planning & Management
Code –CE 703
Contact- 2L+2T
Credits –3
COURSE OBJECTIVES:
The subject aims to provide the student with:
1) An introduction to planning
2) The capability to know about the regulation and bye laws
3) The ability to know about the requirements
4) An understanding about the fire protection
5) The introduction to construction plants & equipments
6) An understanding about the plants &Equipments for concrete construction
7) An capability to know about planning & scheduling of constructions projects
8) An ability to know about the management
LEARNING OUTCOMES:
1) Ability to describe about the planning
2) Ability to describe the regulation and bye laws
3) An ability to demonstrate the requirements
4) An ability to demonstrate about the fire protection
5) Ability to describe about the construction plants & equipments
6) An ability to understand about the plants &Equipments for concrete construction
7) An ability to demonstrate about the planning & scheduling of constructions projects
8) Ability to describe about the management

***Planning* :** General consideration , Definition of aspect, prospect, roominess, grouping, circulation privacy, acclusion.

3

***Regulation and Bye laws* :** Bye Laws is respect of side space, Back and front space , Covered areas, height of building etc., Lavatory blocks , ventilation .

3

Requirements : for stair lifts in public assembly building, offices,

3

Fire Protection :- Fire fighting arrangements in public assembly buildings, planning , offices, auditorium.

3

Construction plants & Equipments:- Plants & equipments for earth moving , road constructions, excavators, dozers, scrapers, Spreaders, rollers, their dues, choices.

5

Plants &Equipments for concrete construction :- Batching plants, Ready mix concrete mixer ,Vibrators etc., quality control.

3

Planning & Scheduling of constructions Projects :-Planning by CPM & PERT,Preparation of network, Determination of slacks or floats. Critical activities. Critical path, project duration . expected mean time , probability of completion of project, Estimation of critical path, problems.

7

Management : Professional practice, Defination, Rights and responsibilities of owner, engineer, Contractors, types of contract, Invitation of tender, tender notice, acceptance of tender (EMD, SD, EOI) Arbitration.

4

Reference:

P.P.Dharwadkar, 'Management in construction industry'. Oxford and IBH Publishing company New Delhi (1979)

J.O.Brien, 'Construction Management', Critical path Methids in Contruction', Wiley Interscience. (1966)

Puerifoy, R.L. 'Construction Planning, Equipments and methods', McGraw Hill. (1973)

B.C.Punmia and K.K.Kandelwal, 'Project planning and control with PERT and CPM' (1977)

PWD codes A and D code.

PERT and CPM by L.S. Srinath

Construction equipments and its management by S.C.Sharma

ENVIRONMENTAL ENGINEERING LAB
CODE- CE-791
Contact 3P
CRDIT-2

Experiments :-

pH colour , turbidity

Solids – suspended , dissolved , settleable and volatile ,

Dissolved oxygen, BOD , COD

Determination of fluorides and Iron
Hardness , Chlorides
Nitrite – Nitrogen and Ammonical – Nitrogen

Available chlorine in bleaching powder,Residual chlorine in water &
Chlorine demand .

Bacteriological quality of water – presumpting test,confirmation test
and Determination of MPN

Jar Test.

Structural Dynamics and Earthquake Engineering
Code – CE 801/A
Contacts-3L
Credits-3

COURSE OBJECTIVES:
The subject aims to provide the student with:
1) An introduction to theory of vibrations
2) The capability to know about the response of single degree freedom system
3) The ability to know about the response due to transient loading
4) An understanding about the elements of seismology
5) The introduction to principles of earthquake resistant design

LEARNING OUTCOMES:
1) Ability to describe about the theory of vibrations
2) Ability to describe the response of single degree freedom system
3) An ability to demonstrate the response due to transient loading
4) An ability to demonstrate about the elements of seismology
5) Ability to describe about the principles of earthquake resistant design

Theory of vibrations:
Degrees of freedom, Undamped single degree freedom system, Damped single degree freedom system, Natural frequency, modes of vibration, Introduction to multiple degree freedom system.

5

Response of single degree freedom system due to harmonic loading:
Undamped harmonic excitation, Damped Harmonic excitation.

5

Response due to Transient loading:
Duhamel's Integral, Response due to constant force, Rectangular load, Introduction to numerical evaluation of Duhamel's integral of undamped system.

6

Elements of seismology:
Fundamentals: Elastic rebound theory, Plate tectonics, Definitions of magnitude, Intensity, Epicenter etc., Seismographs, Seismic zoning, Response of Simple Structural Systems.

4

Principles of earthquake resistant design:
Terminology, General principles and Design criteria, Methods of Analysis, Equivalent lateral force method of Analysis for multistoried building as per Indian Standard Code of Practice, Introduction to Response Spectrum Method, Fundamental concepts of Ductile detailing.

6

References:

Structural Dynamics (Theory and Computation) ,Mario Paz., CBS Publishers and Distributor.
Dynamics of Structure (Theory and Application to Earthquake Engineering) ,A.K.Chopra ,Pearson Education.
Elements of Eathquake Engineering Jai Krishna, A. R. Chandrashekhar and Brijesh Chandra,South Asian Publishers.
Earthquake Resistant Design , D. J. Dowrick John ,Willey & Sons.
IS 1893 (Part 1): 2002, IS 3920, IS 4326 -------- Bureau of Indian Standard

Finite Element Analysis
Code –CE801/B
Contacts 3L
Credits- 3
COURSE OBJECTIVES:
The subject aims to provide the student with:
1) An introduction to basic concepts
2) The capability to know about the matrices related to structural analysis
3) The ability to know about the energy principles:
4) An understanding about the finite element method
LEARNING OUTCOMES:
1) Ability to describe about the basic concepts
2) Ability to describe the matrices related to structural analysis
3) An ability to demonstrate the energy principles
4) An ability to demonstrate about the finite element method

Basic concepts : Introduction to Finite Elements

2

Matrices related to structural analysis:

Matrix Algebra- Method for matrix invention and solution of simultaneous equation.
Structural Analysis – Flexibility and stiffness method. Elements of Elasticity- Two dimensional problems, Plate bending etc.

5

Energy Principles:
Weighted residual methods- Governing differential equations of beams & plates and their finite difference force . Concept of disortification .

6

Finite Element Method:
Displacement approach- Element, Trust element etc. Isoparametric Elements- Shape function, natural co-ordinates. Numerical integration Technecques.
4 - Nodal Iso parametrics element.
8 –Nodat Iso parametrics element.
Plane elasticity problems- Plate stress problems, Plane strain problems
Different Triangular Elements CET, LST etc.
Plate Bending problems- General formulation Triangular Plate
Bending Rectangular plate bending elements etc.

15

Reference:-

1.Energy and Finite Element methods in Structural Mechanics – Z.H. Shames and C.L. Dym (New Age International Publishers
Ltd. Wiley eastern Ltd. , India.)
2.Matrix Finite Element computer and Structural analysis- M. Mukhopadhayay,(Oxford & IBM)
3.Finite element analysis – C.S. Krishnamurthy(TMH – Tata Mc Graw Hill.
4.Finite element method – by R.D. Cook.
5.The finite element method- Vol.I & II – O.C.Zienkarcz & R.L. Taylar Mc Graw Hill – New York

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Soil Stabilization and Ground Improvement Technique
Code – CE 802/A
Contact – 3L
Credits- 3
COURSE OBJECTIVES:
The subject aims to provide the student with
1) An introduction to soil stabilization
2) The capability to know about the specific methods of soil stabilization
3) The ability to know about the in-situ densification
4) An understanding about the geo-textiles
5) The introduction to grouting
6) An understanding about the soil stability
LEARNING OUTCOMES:
1) Ability to describe about soil stabilization
2) Ability to describe the specific methods of soil stabilization
3) An ability to demonstrate the in-situ densification
4) An ability to demonstrate about the geo-textiles
5) Ability to describe about the grouting
6) An ability to understand about the soil stability

Soil Stabilization:
Introduction, Stabilization of soil with granular skeleton and soil withoutgranular skeleton, common nomenclature of stabilized soil systems and stabilization methods,
3
specific methods of soil stabilization:
Stabilization with cement, lime fly-ash

3
In-situ densification: Introduction,

2
Compaction: methods and controls

2
Densification of granular soil: Vibration at ground surface, Impact at ground surface, Vibration at depth (Vibroflotation), Impact at depth.

4
Densification of Cohesive Soils: Preloading and dewatering, Design of Sand drains and Stone columns, Electrical and thermal methods.

4
Geo-textiles: Over view: Geotextiles as separators, reinforcement. Geotextiles in filtration and Drainage, geotextiles in erosion control.

4

Grouting: Over view: Suspension and Solution grout, Grouting equipment and methods, Grout Design and layout, Grout monitoring schemes.

5

Soil stability: Reinforced earth fundamentals, Soil nailing, Soil and Rock Anchors, Underpinning

5

References:-

1. Foundation Analysis & Design, J.E. Bowels, McGraw Hill
2. Principles of Foundation Engineering, B.M. Das, Thomson Book
3. Foundation Design Manual ,N. V. Nayak ,Dhanpat Rai Publication Pvt. Ltd
4. Construction and Geotechnical methods in Foundation engineering , R.M. Koener, McGraw Hill
5. Technology in tunnelling and dam construction, A.V. Shroff. & D.L. Shah, Oxford and IBH Publishing Co.Pvt.Ltd
6. Reinforced Earth T S Ingold Thoam Telford
7. Designing with Geosynthetics R M Koerner Prentice Hall

Environmental Pollution and Control
Code – CE 802/B
Contact – 3L
Credits- 3
COURSE OBJECTIVES:
The subject aims to provide the student with
1) An introduction to introduction
2) The capability to know about the air pollution
3) The ability to know about the noise pollution
4) An understanding about the water pollution
5) The introduction to global environmental issues
6) An understanding about the administrative control on environment
7) An understanding about the environmental laws

LEARNING OUTCOMES:
1) Ability to describe about introduction
2) Ability to describe the air pollution
3) An ability to demonstrate the noise pollution
4) An ability to demonstrate about the water pollution
5) Ability to describe about the global environmental issues
6) An ability to understand about the administrative control on environment
7) An ability to demonstrate environmental laws

Introduction:
Environment. Pollution, Pollution control
Air Pollution:
(i)Air Pollutants:
Types, Sources, Effects;
(ii) **Air Pollution Meteorology:**
Lapse Rate, Inversion, Plume Pattern; Air Pollution Dispersion Model: Point SourceGaussian Plume Model, Stability Classes, Stability Charts, Design of Stack Height.
(iii)Air pollution Control:
Self cleansing properties of the environment; Dilution method;
(iv)Engineered Control of Air Pollutants:
Control of the particulates, Control of Gaseous Pollutants, Control of Air pollution from Automobiles.

10

Noise Pollution:
Definition; Sound Pressure, Power and Intensity;
(ii)**Noise Measurement:**
Relationships among Pressure, Power and Intensity, Levels, Frequency Band, Decibel Addition, Measures of community Noise i.e. LN, Leq, Ldn,, LNP; Sources, ; Effects; Control.

6

Water pollution:
Pollution Characteristics of Typical Industries, Suggested Treatments.

4

4. Global Environmental Issues:
Ozone Depletion, Acid Rain, Global Warming-House Effects

4

Administrative Control on Environment:
Functions of Central and State Pollution Control Boards; Environmental Clearance Process for Industries and Infrastructural Projects

5

Environmental Laws:
Water Act, Air Act, Motor Vehicle Act

3

References:

Introduction to Environmental Engineering and Science G. Masters, W. Ela PHI

Environmental Engineering: A Design Approach A. Sincero, G. Sincero PHI

Environmental Engineering P. V. Rowe TMH

Environmental Engineering, S.K . Garg, Khanna Publishers

Air Polution Rao and Rao TMH

Water Supply, Waste Disposal and Environmental Pollution Engineering, A.K.Chatterjee Khanna Publishers

Environmental Engineering, Vol.II, P. N. Modi
,
Environmental Modelling, , Rajagopalan Oxford University Press.

Principles of Management
Code: HU801
Contact: 3L
Credits: 3

Basic concepts of management:
Definition – Essence, Functions, Roles, Level.

2

Functions of Management:
Planning – Concept, Nature, Types, Analysis, Management by objectives; Organisation Structure – Concept, Structure, Principles, Centralization, Decentralization, Span of Management; Organisational Effectiveness.

5

Management and Society –
Concept, External Environment, CSR, Corporate Governance, Ethical Standards.
3

People Management –
Overview, Job design, Recruitment & Selection, Training & Development, Stress Management.

2

Managerial Competencies –
Communication, Motivation, Team Effectiveness, Conflict Management, Creativity, Entrepreneurship. 2

Leadership:
Concept, Nature, Styles.

3

Decision making:
Concept, Nature, Process, Tools & techniques.

3

Economic, Financial & Quantitative Analysis –

Production, Markets, National Income Accounting, Financial Function & Goals, Financial Statement & Ratio Analysis, Quantitative Methods – Statistical Interference, Forecasting, Regression Analysis, Statistical Quality Control. 5

Customer Management –

Market Planning & Research, Marketing Mix, Advertising & Brand Management.

3

Operations & Technology Management –

Production & Operations Management, Logistics & Supply ChainManagement, TQM, Kaizen & Six Sigma, MIS.

4

References:-

1. Management: Principles, Processes & Practices – Bhat, A & Kumar, A (OUP).

2. Essentials for Management – Koontz, Revised edition, Tata McGraw Hill (TMH)

3. Management – Stoner, James A. F. (Pearson)

4.Management - Ghuman, Tata McGraw Hill(TMH)

Remote Sensing and GIS
Code: CE803/C
Contact: – 3L
Credits: 3
COURSE OBJECTIVES:
The subject aims to provide the student with
1) An introduction to introduction
2) The capability to know about the photogrammetry
3) The ability to know about the satellite survey
4) An understanding about the astronomy
5) The introduction to geoinformatics

LEARNING OUTCOMES:
1) Ability to describe about introduction
2) Ability to describe the photogrammetry
3) An ability to demonstrate the satellite survey
4) An ability to demonstrate about the astronomy
5) Ability to describe about the global environmental issues geoinformatics

Introduction: Definition and types of remote sensing, Tacheometry (Planimetry/ altimetry), Triangulation (Frame work / adjustment), Trilateration (EDM/ Total Station), Geodetics (physical/geometrical geodesy), Error Analysis (causes / law of weights), Numerical example

6

Photogrammetry: Camera System (phototheodolite/ aircraft), Ground photograph (oblique/orthogonal streophoto), Aerial photograph (perspective scale/ flight planning), distortion (relief / tilt), Geometrix (parallax / mapping), application (topographics / interpretation), NumericalExamples

6

Satellite survey: Satellite Sensing (Sensors / platforms), energy sources (electromagnetic /atmospheric interaction), visual interpretation (Band width), digital processing (imageries /enhancement), data integration (multi-approach / GIS), microwave imaging (active system / radars), Applications

6

Astronomy: Celestial sphere (star-coordinates / transformation), field astronomy (azimuth, solar and polar method), 3D computation (local vs global), spherical trigonometry, Multilateration, Observation, Corrections in astronomy, Correlation of low, medium, remote objects, Global Positioning Systems

Geoinformatics: GIS concept (Introduction/ definition), planning and management, spatial data model, database and DBMS, linking of attributes, geospatial analysis, modern trends
6

References:-

1 Surveying (Volume 2): Duggal S.K. Tata McGraw Hill
2 Remote Sensing & GIS: Bhatta B. Oxford Univ Press
3 Geographic Information System: Tor Bern Herdgen Wiley
4 Surveying: Bannister, Raymond & Baker Pearson Education
5 Remote Sensing & Image Interpretation: Lilesand, Kiefer and Chipman Wiley
6 Surveying (Volume 2): Kanetker.&Kulkarni
7 Remote Sensing & Geographical information System Reddy M.A. BS publication
8 Advanced Surveying Rampal K.K.
9 Fundamantals of Geographic Information System: Demers M.N.