



**SCHEME OF EXAMINATION
&
DETAILED SYLLABUS**



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COURSE STRUCTURE OF B.E. CE (III Sem to VIII Sem)							
Semester – III			Theory		Assignment		Aggregate Pass Marks
Subject Code	Subject Name	Total Marks	Max Marks	Min Marks	Max Marks	Min Marks	
BE-301	Mathematics-II	100	70	22	30	12	34
CE-302	Transportation Bridges and Tunnels	100	70	22	30	12	34
CE-303	Strength of Material	100	70	22	30	12	34
CE-304	Engg. Geology	100	70	22	30	12	34
CE-305	Bldg, Design & Drawing	100	70	22	30	12	34
Practical Group			Term End		Lab Work		Aggregate Pass Marks
CE-303	Strength of Material	50	30	12	20	8	
CE-304	Engg. Geology	50	30	12	20	8	20
CE-305	Bldg, Design & Drawing	50	30	12	20	8	20
CE-306	Computer Programming	50	30	12	20	8	20
CE-307	Self study (Internal Assessment)	-	-	50	17	17	17
CE-308	Seminar / Group Discussion (Internal Assessment)	-	-	50	17	17	17
Semester – IV							
Semester – IV			Theory		Assignment		Aggregate Pass Marks
Subject Code	Subject Name	Total Marks	Max Marks	Min Marks	Max Marks	Min Marks	
BE-401	Mathematics III	100	70	22	30	12	34
CE-402	Concrete Technology	100	70	22	30	12	34
CE-403	Surveying	100	70	22	30	12	34
CE-404	Construction Materials & Techniques	100	70	22	30	12	34
CE-405	Fluid Mechanics	100	70	22	30	12	34
Practical Group			Term End		Lab Work		Aggregate Pass Marks
CE-403	Surveying	50	30	12	20	8	
CE-404	Construction Materials & Techniques	50	30	12	20	8	20
CE-405	Fluid Mechanics	50	30	12	20	8	20
CE-406	Computer Programming -II	50	30	12	20	8	20
CE-407	Self study (Internal Assessment)	-	-	50	17	17	17
CE-408	Seminar / Group Discussion (Internal Assessment)	-	-	50	17	17	17
Semester – V							
Semester – V			Theory		Assignment		Aggregate Pass Marks
Subject Code	Subject Name	Total Marks	Max Marks	Min Marks	Max Marks	Min Marks	
CE-501	Transport Engg.-II	100	70	22	30	12	34
CE-502	Advanced Surveying	100	70	22	30	12	34
CE-503	Fluid Mech.-II	100	70	22	30	12	34
CE-504	Structural Design & Drawing -1 (R.C.C.)	100	70	22	30	12	34
CE-505	Theory of Structure – I	100	70	22	30	12	34

Practical Group			Term End		Lab Work		
CE-501	Transport Engg.-II	50	30	12	20	8	20
CE-502	Advanced Surveying	50	30	12	20	8	20
CE-503	Fluid Mech.-II	50	30	12	20	8	20
CE-504	Structural Design & Drawing -I (R.C.C.)	50	30	12	20	8	20
CE-506	Tour/Training	-	-	50	17	17	17
CE-507	Seminar/Group Discussion etc.	-	-	50	17	17	17

Semester -VI			Theory		Assignment		
Subject Code	Subject Name	Total Marks	Max Marks	Min Marks	Max Marks	Min Marks	Aggregate Pass Marks
CE-601	Theory of Structures-II	100	70	22	30	12	34
CE-602	Water Resources & Irrigation Engineering	100	70	22	30	12	34
CE-603	Environmental Engg.-I	100	70	22	30	12	34
CE-604	Quantity Surveying & Costing	100	70	22	30	12	34
CE-605	Structural Design & Drawing - II (Steel)						

Practical Group			Term End		Lab Work		
CE-601	Theory of Structures-II	50	30	12	20	8	20
CE-603	Environmental Engg.-I	50	30	12	20	8	20
CE-604	Quantity Surveying & Costing	50	30	12	20	8	20
CE-605	Structural Design & Drawing - II (Steel)	50	30	12	20	8	20
CE-606	Self study (Internal Assessment)	-	-	50	17	17	17
CE-607	Seminar / Group Discussion (Internal Assessment)	-	-	50	17	17	17

Semester -VII			Theory		Assignment		
Subject Code	Subject Name	Total Marks	Max Marks	Min Marks	Max Marks	Min Marks	Aggregate Pass Marks
CE-701	Design of Hydraulic Structure	100	70	22	30	12	34
CE-702	Advanced Structural Design-II(RCC)	100	70	22	30	12	34
CE-703	Environmental Engg-II	100	70	22	30	12	34
CE-704	Geo. Technical Engg.-I	100	70	22	30	12	34
CE-705	Elective -I Traffic Engineering	100	70	22	30	12	34
Practical Group			Term End		Lab Work		
CE-702	Advanced Structural Design-II(RCC)	50	30	12	20	8	20
CE-703	Environmental Engg-II	50	30	12	20	8	20
CE-704	Geo. Technical Engg.-I	50	30	12	20	8	20

CE-706	Minor Project	50	-	50	17	17	17
CE-707	Tour/Training	-	-	30	17	17	17
CE-708	Seminar / Group Discussion (Internal Assessment)	-	-	30	17	17	17

SEMESTER-I
B.E.-101 - ENGINEERING CHEMISTRY

UNIT- I

WATER AND ITS INDUSTRIAL APPLICATIONS :

Sources, Impurities, Hardness & its units, Industrial water characteristics, softening of water by various methods (External & Internal treatment), Boiler trouble causes, effect & remedies, Characteristics of municipal water & its treatment, Numerical problems based on softening methods.

UNIT - II

FUELS & COMBUSTION:

Fossil fuels & classification, Calorific value, Determination of calorific value by Bomb calorimeter Proximate and Ultimate analysis of coal and their significance, calorific value Computation based on ultimate analysis data, Carbonization, Manufacturing of coke & recovery of by products. Cracking of higher Hydrocarbons & mechanism of cracking, Knocking, relationship between' knocking & structure of hydrocarbon, improvement of anti knocking characteristics of IC engine fuels, Diesel engine fuels, Cetane number, combustion and it related numerical problems.

UNIT- III

A. LUBRICANTS:

Introduction, Mechanism of lubrication, Classification of lubricants, Properties and Testing of lubricating oils, Numerical problems based on testing methods.

B. CEMENT & REFRACTORIES:

Manufacture , IS-code, Setting and hardening of cement, Refractory : Introduction, classification and properties of refractories .

UNIT - IV

HIGH-POLYMER :

Introduction, types and classification of polymerization, Reaction Mechanism, Natural & Synthetic Rubber; Vulcanization of Rubber, Preparation, Properties & uses of the following- Polythene, PVC, PMA, PMMA, Teflon, Poly acrylonitrile, PVA, Nylon, Nylon 6:6, Terylene, Phenol formaldehyde, Urea -Formaldehyde Resin, Glyptal, Silicone Resin, Polyurethanes; Butyl Rubber, Neoprene, Buna N, Buna S. Flow sheet manufacturing diagram of Nylon 6:6 & Decoran.

UNIT - V

A. INSTRUMENTAL TECHNIQUES IN CHEMICAL ANALYSIS :

Introduction, Principle, Instrumentation and applications of IR, NMR,UV, Visible, Gas Chromatography, Lambert's and Beer's Law

B. WATER ANALYSIS TECHNIQUES :

Alkalinity, hardness (Complexo-metric), Chloride, Free chlorine, DO, BOD and COD, Numerical problems based on above techniques.

REFERENCE BOOKS:

- Chemistry for Environmental Engineering - Sawyer, McCarty and Parkin - McGraw Hill, International.
- Engineering Chemistry- B.K. Sharma, Krishna Publication.
- A Text Book of Engineering Chemistry - S. S. Dara & A.K. Singh, S. Chand Publication.
- Applied Chemistry- Theory and Practice, O.P. Viramani, A.K. Narula, New Age Pub.
- Polymer Science - Ghosh, Tata McGraw Hill.

ENGINEERING CHEMISTRY PRACTICAL

NOTE: AT LEAST 10 OF THE FOLLOWING CORE EXPERIMENTS MUST BE PERFORMED DURING THE SESSION.

1. WATER TESTING

- (i) Determination of Total hardness by Complex metric titration method.
- (ii) Determination of mixed alkalinity
 - (a) OH⁻ & CO₃⁻
 - (b) CO₃⁻ & HCO₃⁻
- (iii) Chloride ion estimation by Argent metric method.

2. FUELS & LUBRICANT TESTING

- (i) Flash & fire points determination by
 - (a) Pensky Martin Apparatus,
 - (b) Abel's Apparatus,
 - (c) Cleveland's open cup Apparatus.
 - (d) Calorific value by bomb calorimeter
- (ii) Viscosity and Viscosity index determination by
 - (a) Redwood viscometer No. 1
 - (b) Redwood viscometer No. 2
- (iii) Proximate analysis of coal
 - (a) Moisture content
 - (b) Ash content
 - (c) Volatile matter content
 - (d) Carbon residue
- (iv) Steam emulsification No & Anline point determination (v) Cloud and Pour point determination of lubricating oil

3. ALLOY ANALYSIS

- (i) Determination of percentage of Fe in an iron alloy by redox titration using N-Phenyl anthracitic acid as internal indicator.
- (ii) Determination of Cu and or Cr in alloys by Iodometric Titration.

B.E.-102 MATHEMATICS -I

UNIT - I

DIFFERENTIAL CALCULUS :

Expansion of functions by Maclaurin's and Taylor's theorem. Partial differentiation, Euler's theorem and its application in approximation and errors, Maxima and Minima of function of two variables, Curvature : Radius of curvature, centre of curvature.

UNIT - II

INTEGRAL CALCULUS :

Definite Integrals : Definite Integrals as a limit of a sum , its application in Summation of series, Beta and Gamma Functions , Double and Triple Integrals, Change of Order of Integration, Area, Volume and Surfaces using double and triple Integral.

UNIT- III

DIFFERENTIAL EQUATIONS :

Solution of Ordinary Differential Equation of first order and first degree for Exact differential Equations, Solution of Ordinary Differential Equation of first order and higher degree (solvable for p, x and y, Clairauts Equation), Linear Differential Equations with Constant Coefficients, Cauchy's Homogeneous differential Equation, Simultaneous differential Equations, Method of Variation of Parameters

UNIT - IV

MATRICES :

Rank, Solution of Simultaneous equation by elementary transformation, Consistency of System of Simultaneous Linear Equation, Eigen Values and Eigen Vectors, Cayley-Hamilton Theorem and its Application to find the inverse

UNIT - V

Algebra of Logic, Boolean Algebra, Principle of Duality, Basic Theorems, Boolean Expressions and Functions. Elementary Concept of Fuzzy Logic.

Graph Theory : Graphs, Subgraphs, Degree and Distance, Tree, cycles and Network.

REFERENCES:

- Advance Engg. Mathematics. - By Ramana, Tata McGraw hill.
- Higher Engineering Mathematics - By BS Grewal, Khanna Publication
- Advance Engineering Mathematics - By D.G.Guffy
- Engineering Mathematics - By S S Sastri. P.H.I.
- Mathematics for Engineers - By S. Arumungam, SCITECH Publication
- Advanced Engineering Mathematics - By Erwin Kreyszig, Wiley India

B.E.-103 COMMUNICATION SKILLS

UNIT - I

LANGUAGES AND SKILLS OF COMMUNICATION:

Linguistic techniques, Modern usages, Reading comprehension, English phonetic symbols/sounds, Oral presentation, Audition Communication, Processes of Communication, Verbal and Non Verbal Communication, Barriers to Communication.

UNIT - II

APPLICATION OF LINGUISTIC ABILITY

Writing of definitions of Engineering terms, Objects, Processes and Principles (Listening) Topics of General Interest, Reproduction from business, daily life, travel, health, buying and selling, company structure, systems etc.

UNIT - III

LETTERWRITING:

Applications, Enquiry, Calling quotations, Tenders, Order and Complaint.

UNIT - IV

Precise Writing, Noting and drafting, Technical Description of simple engineering objects and processes (writing), Report writing, precise writing, Note writing, Slogan writing comment, Speech advertising.

UNIT - V

Writing Technical reports of the type of observation report, Survey report, Report of trouble, Laboratory Report and Project Report on the subjects of engineering. (Speaking) Vocabulary, Presentations, Demonstrations, Conversation - Telephone media, socializing, cultural events, debates, speech.

BE 103 - COMMUNICATIVE LANGUAGE LAB

COURSE OBJECTIVE :

The language lab focuses on the production and practice of sounds of English through audio - visual aids and Computer software. It intends to enable the students to speak English correctly with confidence and intends to help them to overcome their inhibitions and self-consciousness while speaking in English.

Topics to be covered in the Language laboratory sessions :

1. Basic Grammar & Vocabulary (Synonyms /Antonyms, Analogies, sentence completion, correctly spelt words, idioms, proverbs, common errors).
2. phonetic symbols and pronunciation.
3. Listening skills (Including Listening Comprehension)3
4. Reading Skills (Including Reading Comprehension)
5. Writing Skills (Including structuring resume and cover letter)
6. Speaking Skills
7. Body Language
8. Oral Presentation : Preparation and delivery using audio - visual aids with stress n body language and voice modulation (Topic to be selected by the teacher.)

Final Assessment Should be based on Assignment, presentation and interview.

REFERENCE BOOKS :-

- Business Correspondence and Report Writing - By Sharma; TMH.
- Living English Structure - By W.S. Allen; Longmans.
- English Grammar - By Ehrlich, Schaum Series; TMH.
- Spoken English for India - By R.K. Bansal and IB Harrison Orient Longman.
- New International Business English - By Joans and Alexander; OUP.
- Effective Technical Communication - By Rizvi; TMH.

B.E.-104 ELECTRICAL & ELECTRONICS ENGINEERING

UNIT - I

Electrical circuit analysis:

Voltage and current sources, dependent and independent sources, source conversion, DC circuits analysis using mesh & nodal method, Thevenin's & superposition theorem, star-delta transformation.

1-phase AC circuits under sinusoidal steady state, active, reactive and apparent power, physical meaning of reactive power, power factor, 3-phase balanced and unbalanced supply, star and delta connections.

UNIT - II

Transformers:

Review of laws of electromagnetism, mmf, flux, and their relation, analysis of magnetic circuits. Single-phase transformer, basic concepts and construction features, voltage, current and impedance transformation, equivalent circuits, phasor diagram, voltage regulation, losses and efficiency, OC and SC test.

UNIT- III

Rotating Electric machines:

Constructional details of DC machine, induction machine and synchronous machine, Working principle of 3-Phase induction motor, Emf equation of 3-Phase induction motor, Concept of slip in 3-Phase induction motor, Explanation of Torque-slip characteristics of 3-Phase induction motor, Classification of self excited DC motor and generator.

UNIT- IV

Digital Electronics-

Number systems used in digital electronics, decimal, binary, octal, hexadecimal, their complements, operation and conversion, floating point and signed numbers, Demorgan's theorem, AND, OR, NOT, NOR, NAND, EX-NOR, EX-OR gates and their representation, truth table, half and full adder circuits, R-S flip flop, J-K flip flop.

UNIT - V

ELECTRONIC COMPONENTS AND CIRCUITS-

Introduction to Semiconductors, Diodes, V-I characteristics, Bipolar junction transistors (BJT) and their working, introduction to CC, CB & CE transistor configurations, different configurations and modes of operation of BJT, DC biasing of BJT.

REFERENCES:

1. Vincent Del Toro, Electrical Engineering Fundamentals, PHI Learning, II Edition
2. S.Ghosh, Fundamentals of Electrical and Electronics Engineering, PHI, II Edition.
3. Millman, Halkias & Parikh, Integrated Electronics, Me Graw Hill, II Edition
4. Nagrath & Kothari, Basic Electrical Engineering, III Edition TMH.
5. J.S. Katre, Basic Electronics Engg, Max Pub. Pune.
6. Hughes, Electrical and Electronic Technology, Pearson Education IX Edition Course: BE104 Electrical and Electronics Engineering List Of Experiments

B.E.-104 ELECTRICAL & ELECTRONICS ENGINEERING

LIST OF EXPERIMENTS

1. Verifications of Thevenin's Superposition theorem.
2. Study of Transformer, name plate rating, determination of ratio and polarity.
3. Determination of equivalent circuit parameters of a single phase transformer by O.C. and S.C. tests and estimation of voltage regulation and efficiency at various loading conditions and verification by load test.
4. Separation of resistance and inductance of choke coil.
5. Measurement of various line & phase quantities for a 3-phase circuit.
6. Identification of different Electronics components.
7. Observing input and output waveforms of rectifiers.
8. Transistor application as amplifier and switch.
9. Verification of truth table for various gates.

B.E.-105 ENGINEERING GRAPHICS

UNIT-I

Scales:

Representative factor, plain scales, diagonal scales, scale of chords. Conic sections: Construction of ellipse, parabola, hyperbola by different methods; Normal and Tangent.

Special Curves: Cycloid, Epi-cycloid, Hypo-cycloid, Involute, Archimedean and logarithmic spirals.

UNIT- II

Projection:

Types of projection, orthographic projection, first and third angle projection, Projection of points and lines, Line inclined to one plane, inclined with both the plane, True Length and True Inclination, Traces of straight lines.

UNIT - III

Projection of planes and solids:

Projection of Planes like circle and polygons in different positions; Projection of polyhedrons like prisms, pyramids and solids of revolutions like cylinder, cones in different positions.

UNIT - IV

Section of Solids:

Section of right solids by normal and inclined planes; Intersection of cylinders.

Development of Surfaces: Parallel line and radial - line method for right solids.

UNIT - V

Isometric Projections:

Isometric scale, Isometric axes, Isometric Projection from orthographic drawing.

Computer Aided Drafting (CAD): Introduction, benefit, software's basic commands of drafting entities like line, circle, polygon, polyhedron, cylinders; transformations and editing commands like move, rotate, mirror, array; solution of projection problems on CAD.

REFERENCES:

1. Visvesvaraya Tech. University; A Premier on Computer Aided Engg drawing; VTU Belgaum
2. Bhatt N.D.; Engineering Drawing, Charotar
3. Venugopal K. Engineering Graphics; New Age
4. John KC; Engg. Graphics for Degree; PHI.
5. Gill P.S.; Engineering Drawing; kataria
6. Jeyopovan T.; Engineering drawing & Graphics Using AutoCAD; Vikas
7. Agrawal and Agrawal; Engineering Drawing;TMH
8. Shah MB and Rana BC; Engg.drawing; Pearson Education
9. Luzadder WJ and Duff JM; Fundamental of Engg Drawing; PHI
10. Jolhe DA; Engg. Drawing an Introduction; TMH

11. Narayana K.L.; Engineering Drawing; Scitech

LIST OF PRACTICAL:

Sketching and drawing of geometries and projections based on above syllabus Term work: A min. of 30 hand drawn sketches (on size A4 graphic sketch Book) plus 5 CAD-printouts on size A4 sheets plus 10 sheets of size A2 or 6 sheets of size A1, (50% marks to be allotted for this record + 25% marks for attendance +25%marks for Teachers Assessment

Practical Marks to be allotted based on written test and viva.

Note:

To cover above syllabus, each Institute must have CAD software and a computer lab (6 to 12 hrs/month/student).

B.E.-106 WORK SHOP PRACTICE

UNIT - I

Introduction:

Manufacturing Processes and its Classification, Casting, Machining, Plastic deformation and metal forming, Joining Processes, Heat treatment process, Assembly process. Powder Metallurgy, introduction to computers in manufacturing.

Black Smithy Shop,

Use of various smithy tools. Forging operations: Upsetting, Drawing down, Fullering, Swaging, Cutting down, Forge welding, Punching and drafting.

Suggested Jobs : Forging of chisel., forging of Screw Driver

UNIT - II

Carpentry Shop:

Timber : Type, Qualities of timber disease, Timber grains, Structure of timber, Timber, Timber seasoning, Timber preservation .Wood Working tools: Wood working machinery, joints & joinery. Various operations of planning using various carpentry planes sawing & marking of various carpentry joints.

Suggested Jobs :Name Plate ,Any of the Carpentry joint like mortise or tennon joint.

UNIT - III

Fitting Shop:

Study and use of Measuring instruments, Engineer steel rule, Surface gauges caliper, Height gauges, feeler gauges, micro meter. Different types of files, File cuts, File grades, Use of surface plate, Surface gauges drilling tapping Fitting operations: Chipping filling, Drilling and tapping.Suggested Jobs : Preparation of job piece by making use of filling, sawing and chipping , drilling and tapping operations.

UNIT- IV

Foundry:

Pattern Making: Study of Pattern materials, pattern allowances and types of patterns. Core box and core print, .Use and care of tools used for making wooden patterns.

Moulding:

Properties of good mould & Core sand, Composition of Green , Dry and Loam sand. Methods used to prepare simple green and bench and pit mould dry sand bench mould using single piece and split patterns.

UNIT - V

Welding:

Study and use of tools used for Brazing, Soldering, Gas & Arc welding. Preparing Lap & Butt joints using gas and arc welding methods, Study of TIG & MIG welding processes . Safety precautions.

REFERENCE BOOKS:

1. Bawa HS; Workshop Practice, TMH
2. Rao PN; Manufacturing Technology- Vol. 18s 2, TMH
3. John KC; Mechanical workshop practice;- PHI
4. Hazara Choudhary; Workshop Practices - Vol. I & II.
5. Jain. R.K. Production Technology

B.E.-201 ENGINEERING PHYSICS

UNIT - I

Quantum Physics:

Group and particle velocities & their relationship. Uncertainty principle with elementary proof and applications (determination of position of a particle by a microscope, non existence of electron in nucleus, diffraction of an electron beam by a single slit). Compton scattering. Wave function and its properties, energy and momentum operators, time dependent and time independent Schrodinger wave equation. Application of time independent Schrodinger wave equation to particle trapped in a one dimensional square potential well (derivation of energy eigen values and wave function)

UNIT - II

Wave Optics:

Interference: Fresnel's biprism, Interference in thin films (due to reflected and transmitted light), interference from a wedge shaped thin film, Newton's rings and Michelson's interferometer experiments and their applications. Diffraction at single slit, double slit and n-slits (diffraction grating). Resolving power of grating and prism. Concept of polarized light, Brewster's laws, Double refraction, Nicol prism, quarter & half wave plate.

UNIT - III

Nuclear Physics:

Nuclear liquid drop model (semi empirical mass formula), nuclear shell model, Linear Particle acceleratos: Cyclotron, general description of Synchrotron, Synchrocyclotron, and Betatron. Geiger-Muller Counter, Motion of charged particles in crossed electric and magnetic fields. Uses of Bainbridge and Auston mass Spectrographs.

UNIT- IV

Solid State Physics:

Qualitative discussion of Kronig Penny model (no derivation), Effective mass, Fermi-Dirac statistical distribution function, Fermi level for Intrinsic and Extrinsic Semiconductors, Zener diode, tunnel diode, photodiode, solar-cells, Hall effect.

Superconductivity: Meissner effect, Type I and Type II superconductors, Di-electric polarization, Complex permittivity, dielectric losses

UNIT-V

Laser and Fiber Optics:

Laser: Stimulated and spontaneous processes, Einstein's A & B Coefficients, transition probabilities, active medium, population inversion, pumping, Optical resonators, characteristics of laser beam.

Coherence, directionality and divergence. Principles and working of Ruby, Nd:YAG, He-Ne & Carbon dioxide Lasers with energy level diagram.. Fundamental idea about optical fiber, types of fibers, acceptance angle & cone, numerical aperture, V-number,

propagation of light through step index fiber (Ray theory) pulse dispersion, attenuation, losses & various uses. Applications of lasers and optical fibers.

REFERENCE BOOKS:

1. Optics By Ghatak, TMH
2. Engineering Physics By V. S. Yadava, TMH
3. Optics By Brijlal and Subhraminiyan.
4. Engineering physics By M.N. Avadhanulu and. S. Chand & Co.(2004)
5. Atomic and Nuclear physics By Brijlal and Subraminiyan.
6. Concepts of Modern Physics By Beiser, TMH
7. Solid State Physics By Kittel ,Wiley India
8. Fundamentals of Physics By Halliday, Wiley India

LIST OF SUGGESTIVE CORE EXPERIMENTS: -

7. Biprism, Newton's Rings, Michelsons Interferometer.
8. Resolving Powers -Telescope, Microscope, and Grating.
9. G.M. Counter
10. Spectrometers-R.L, Wavelength, using prism and grating
11. Optical polarization based experiments: Brewster's angle, polarimeter etc.
12. Measurements by LASER-Directionality, Numerical aperture, Distance etc.
13. Uses of Potentiometers and Bridges (Electrical)..
14. Experiments connected with diodes and transistor.
15. Measurement of energy band gap of semiconductor.
16. To study Hall effect.
17. Solar cell.
18. To find the width of s single slit by f He-Ne Laser.
19. To determine the numeral aperture (NA) of a Optical Fibre.
20. To determine plank's constant.
21. Other conceptual experiments related to theory syllabus.

B.E.- 202 ENERGY , ENVIRONMENT , ECOLOGY & SOCIETY

UNIT - I

Energy- Sources of Energy:

Renewable & Non Renewable, Fossil fuel, coal, oil, Gas, Geothermal, Hydrogen, Solar, Wind, hydal, nuclear sources.

UNIT - II

Ecosystem - Segments of Environment:

Atmosphere, hydrosphere, Lithosphere, biosphere. Cycles in Ecosystem - Water, Carbon, Nitrogen. Biodiversity: Threats and conservation, Food Chain.

UNIT - III

Air Pollution & Sound Pollution:

Air Pollution: Air pollutants, classification, (Primary & secondary Pollutants) Adverse effects of pollutants. Causes of Air pollution chemical, photochemical, Green house effect, ozone layer depletion, acid Rain.

Sound Pollution:

Causes, controlling measures, measurement of sound pollution (deciblage), Industrial and non - industrial.

UNIT - IV

Water Pollution- Water Pollution:

Pollutants in water, adverse effects. Treatment of Domestic & Industrial water effluent.

Soil Pollution - Soil Profile, Pollutants in soil, their adverse effects, controlling measures.

UNIT - V

Society & Ethics:

Impact of waste on society. Solid waste management (Nuclear, Thermal, Plastic, medical, Agriculture, domestic and e-waste). Ethics and moral values, ethical situations, objectives of ethics and its study . Preliminary studies regarding Environmental Protection Acts , Environmental Impact Assessment.

REFERENCES:

1. Harris, CE, Prichard MS, Rabin's MJ, "Engineering Ethics"; Cengage Pub.
2. Rana SVS ; "Essentials of Ecology and Environment"; PHI Pub.
3. Raynold, GW "Ethics in information Technology"; Cengage.
4. Svakumar; Energy Environment & Ethics in society; TMH
5. AK De "Environmental Chemistry"; New Age Int. Publ.
6. BK Sharma, "Environmental Chemistry" ; Goel Publ. House.
7. Bala Krishnamoorthy; "Environmental management"; PHI
8. Gerard Kiely, "Environmental Engineering" ; TMH
9. Miller GT JR; living in the Environment Thomson/cengage
10. Cunningham WP and MA; principles of Environment Sc; TMH

B.E.- 203 BASIC MECHANICAL ENGINEERING

UNIT-I

Materials:

Classification of engineering material, composition of cast iron and carbon steels on iron-carbon diagram and their mechanical properties; Alloy steel and their applications; stress-strain diagram, Hooks law and modulus of elasticity. Tensile, shear, hardness and fatigue testing of materials.

UNIT-II

Measurement:

Temperature, pressure, velocity, flow, strain, force and torque measurement, concept of measurement error & uncertainty analysis, measurement by Vernier caliper, micrometer, dial gauges, slip gauges, sine-bar and combination set; introduction to lath, drilling, milling and shaping machines.

UNIT- 3

Fluids:

Fluid properties, pressure, density and viscosity; pressure variation with depth, static and kinetic energy; Bernauli's equation for incompressible fluids, viscous and turbulent flow, working principle of fluid coupling, pumps, compressors, turbines, positive displacement machines and pneumatic machines. Hydraulic power & pumped storage plants for peak load management as compared to base load plants.

UNIT- 4

Thermodynamics:

First and second law of thermodynamics; steam properties, steam processes at constant pressure, volume, enthalpy & entropy, classification and working of boilers, efficiency & performance analysis, natural and induced draught, calculation of chimney height. Refrigeration, vapor absorption & compression cycles, coefficient of perform (COP), refrigerant properties & eco friendly refrigerants.

UNIT- 5

Reciprocating Machines: Steam engines, hypothetical and actual indicator diagram; Carnot cycle and ideal efficiency; Otto and diesel cycles; working of two stroke & four stroke petrol & diesel IC engines

REFERENCE BOOKS:

1. Narula; Material Science; TMH
2. Agrawal B & CM; Basic Mechanical Engg. Wiley India
3. Nag PK, Tripathi et al; Basic Mechanical Engg; TMH
4. Rajput; Basic Mechanical Engg;
5. Sawhney GS; Fundamentals of Mechanical Engg; PHI
6. Nakra and Chaudhary; Instrumentation & measurement; TMH
7. Nag PK; Engineering Thermodynamics; TMH
8. Ganesan; Combustion Engines; TMH

LIST OF SUGGESTIVE CORE EXPERIMENTS (PLEASE EXPAND IT)

1. Tensile testing of standard mild steel specimen.
2. Experiments on Bernoulli's theorem.
3. Flow measurements by ventury and orifice meters.
4. Linear and angular measurement using, Vernier; micrometer, slip gauge, dial gauge and sine-bar.
5. Study of different types of boilers and mountings.
6. Experiment on mini-boiler (50 Kg/Hour)
7. To find COP of a refrigeration unit.
8. Study of different IC engines & measurement of B.H.P. using rope/belt dynamometer.
9. Analysis of exhaust gases on petrol, diesel & biodiesel engines.

B.E.- 204 BASIC CIVIL ENGINEERING & ENGINEERING MECHANICS

UNIT - I

Building Materials & Construction:

Stones, bricks, cement, lime, timber-types, properties, test & uses, laboratory tests concrete and mortar Materials: Workability, Strength properties of Concrete, Nominal proportion of Concrete preparation of concrete, compaction, curing.

Elements of Building Construction, Foundations conventional spread footings, RCC footings, brick masonry walls, plastering and pointing, floors, roofs, Doors, windows, lintels, staircases - types and their suitability.

UNIT - II

Surveying & Positioning:

Introduction to surveying Instruments - levels, theodolites, plane tables and related devices.

Electronic surveying instruments etc. Measurement of distances - conventional and EDM methods, measurement of directions by different methods, measurement of elevations by different methods. Reciprocal leveling.

UNIT -III

Mapping & Sensing:

Mapping details and contouring, Profile Cross sectioning and measurement of areas, volumes, application of measurements in quantity computations, Survey stations, Introduction of remote sensing and its applications.

Engineering Mechanics.

UNIT - IV

Forces and Equilibrium:

Graphical and Analytical Treatment of Concurrent and nonconcurrent Co-planer forces, free Diagram, Force Diagram and Bow's notations, Application of Equilibrium Concepts: Analysis of plane Trusses: Method of joints, Method of Sections. Frictional force in equilibrium problems.

UNIT-V

Centre of Gravity and moment of Inertia:

Centroid and Centre of Gravity, Moment Inertia of Area and Mass, Radius of Gyration, Introduction to product of Inertia and Principle Axes.

Support Reactions, Shear force and bending moment Diagram for Cantilever & simply supported beam with concentrated, distributed load and Couple.

REFERENCE BOOKS:

1. S. Ramamrutam & R.Narayanan; Basic Civil Engineering, Dhanpat Rai Pub.
2. Prasad I.B., Applied Mechanics, Khanna Publication.
3. Punmia, B.C., Surveying, Standard book depot.
4. Shesha Prakash and Mogaveer; Elements of Civil Engg & Engg. Mechanics; PHI

5. S.P, Timoshenko, Mechanics of structure, East West press Pvt.Ltd.
6. Surveying by Duggal - Tata McGraw Hill New Delhi.
7. Building Construction by S.C. Rangwala- Charotar publications House, Anand.
8. Building Construction by Grucharan Singh- Standard Book House, New Delhi
9. Global Positioning System Principles and application- Gopi, TMH
10. R.C. Hibbler - Engineering Mechanics: Statics & Dynamics.
11. A. Boresi & Schmidt- Engineering Mechanics- statics dynamics, Thomson' Books
12. R.K. Rajput, Engineering Mechanics S.Chand & Co.

LIST OF SUGGESTIVE CORE EXPERIMENTS:

Students are expected to perform minimum ten experiments from the list suggested below by preferably selecting experiments from each unit of syllabus.

1. To perform traverse surveying with prismatic compass, check for local attraction and determine corrected bearings and to balance the traverse by Bowditch's rule.
2. To perform leveling exercise by height of instrument of Rise and fall method.
3. To measure horizontal and vertical angles in the field by using Theodolite.
4. To determine (a) normal consistency (b) Initial and Final Setting time of a cement Sample.
5. To determine the workability of fresh concrete of given proportions by slump test or compaction factor test.
6. To determine the Compressive Strength of brick .
7. To determine particle size distribution and fineness modulus of course and fine Aggregate.
8. To verify the law of Triangle of forces and Lami's theorem.
9. To verify the law of parallelogram of forces.
10. To verify law of polygon of forces
11. To find the support reactions of a given truss and verify analytically.
12. To determine support reaction and shear force at a given section of a simply Supported beam and verify in analytically using parallel beam apparatus.
13. To determine the moment of inertia of fly wheel by falling weight method.
14. To verify bending moment at a given section of a simply supported beam.

B.E.- 205 BASIC COMPUTER ENGINEERING

UNIT-I

Computer:

Definition, Classification, Organization i.e. CPU, register, Bus architecture, Instruction set, Memory & Storage Systems, I/O Devices, System & Application Software.

Computing Ethics, Computer Application in e-Business, Bio-Informatics, health Care, Remote Sensing & GIS, Meteorology and Climatology, Computer Gaming, Multimedia and Animation etc.

UNIT - II

Operating System:

Definition, Function, Types, Management of File, Process & Memory. Programming Languages: Generations, Characteristics & Categorization.

Introduction to Programming : Procedure Oriented Programming VS object oriented programming, , OOPS Features and Merits.

UNIT - III

C++ : Features Character, Tokens, Precedence and Associativity, Program Structure, Data Types, Variables, Operators, Expressions, Statements and control structures, I/O operations, Array, Functions, Structures & Unions, Object & Classes, Constructors & Destructors, Overloading Functions & Operators, Derived Classes and Inheritance,

UNIT - IV

Data base Management System:

Introduction, File oriented approach and Database approach, Data Models, Architecture of Database System, Data independence, Data dictionary, DBA, Primary Key, Data definition language and Manipulation Languages.

UNIT - V

Computer Networking:

Introduction, Goals, ISO-OSI Model, Functions of Different Layers. Internetworking Concepts, Devices, TCP/IP Model. Introduction to Internet, World Wide Web, Network Security & E-commerce,

RECOMMENDED BOOKS:

1. Fundamentals of Computers : E Balagurusamy, TMH
2. Fundamentals of Computers : V Rajaraman, PHI
3. Computer Fundamentals: Anita Goel, Pearson
4. Introduction of Computers : Peter Norton, TMH
5. Object Oriented Programming with C++ : E.Balagurusamy, TMH
6. Object Oriented Programming in C++: Rajesh K.Shukla, Wiley India
7. Information Technology Principles and Application: Ajoy Kumar Ray & Tinku Acharya PHI.
8. Concepts in Computing: Kenneth Hoganson, Jones & Bartlett.
9. Operating Systems : Silberschatz and Galvin - Wiley India
10. Computer Networks: Andrew Tananbaum, PHI

LIST OF EXPERIMENT

1. Study and practice of Internal & External DOS commands.
2. Study and Practice of MS windows - Folder related operations, My-Computer, window explorer, Control Panel,
3. Study and practice of Basic linux Commands - Is, cp, mv, rm, chmod, kill, ps etc.
4. Creation and editing of Text files using MS- word.
5. Creation and operating of spreadsheet using MS-Excel.
6. Creation and editing power-point slides using MS- power point
7. Creation and manipulation of database table using SQL in MS-Access.
8. WAP to illustrate Arithmetic expressions.
9. WAP to illustrate Arrays.
10. WAP to illustrate functions.
11. WAP to illustrate constructor & Destructor.
12. WAP to illustrate Object and classes.
13. WAP to illustrate Operator overloading.
14. WAP to illustrate Function overloading.
15. WAP to illustrate Derived classes & Inheritance.

B.E.- 206 COMMUNICATIVE LANGUAGE

COURSE OBJECTIVE:

This course intends to impart practical training in the use of English Language for Communicative purposes and aims to develop students' personality through Language Lab.

Topics to be covered in the Language laboratory sessions:

1. Introducing oneself, family, social roles, personal image design, building relationships, body language, concept of time and space.
 2. Public Speaking and oral skills with emphasis on conversational practice, Role plays, extempore speech, JAM (Just a minute sessions), describing objects and situations, giving directions, debate, telephonic etiquette.
 3. Reading Comprehension: Intensive reading skills, rapid reading, and reading aloud (Reading material to be selected by the teacher).
 4. Translation from English to Hindi and vice versa.
 5. Oral Presentation: preparation and delivery (Topic to be selected by the teacher.)
- Assessment Criterion:

Oral Presentation	-	10
Assignment	-	20
Viva Voice	-	20

SEMESTER-I
CE-301 ENGINEERING MATHEMATICS-II

UNIT-I

Fourier series: Introduction of Fourier series, Fourier series for Discontinuous functions, Fourier series for even and odd function, Half range series Fourier Transform: Definition and properties of Fourier transform, Sine and Cosine transform.

UNIT-II

Laplace Transform: Introduction of Laplace Transform, Laplace Transform of elementary functions, properties of Laplace Transform, Change of scale property, second shifting property, Laplace transform of the derivative, Inverse Laplace transform & its properties, Convolution theorem, Applications of L.T. to solve the ordinary differential equations.

UNIT-III

Second Order linear differential equation with variable coefficients: Methods one integral is known, removal of first derivative, changing of independent variable and variation of parameter, Solution by Series Method.

UNIT-IV

Linear and Non Linear partial differential equation of first order: Formulation of partial differential equations, solution of equation by direct integration, Lagrange's Linear equation, charpit's method. Linear partial differential equation of second and higher order: Linear homogeneous and Non homogeneous partial diff. equation of nth order with constant coefficients. Separation of variable method for the solution of wave and heat equations.

UNIT-V

Vector Calculus: Differentiation of vectors, scalar and vector point function, geometrical meaning of Gradient, unit normal vector and directional derivative, physical interpretation of divergence and Curl. Line integral, surface integral and volume integral, Green's, Stokes and Gauss divergence theorem.

REFERENCES:

- (i) Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India
- (ii) Higher Engineering Mathematics by BS Grewal, Khanna Publication
- (iii) Advance Engineering Mathematics by D.G.Guffy
- (iv) Mathematics for Engineers by S.Arumungam, SCITECH Publuication
- (v) Engineering Mathematics by S S Sastri. P.H.I.

CE-302 TRANSPORTATION BRIDGES AND TUNNELS

UNIT-I

Introduction, Tractive resistances & Permanent way: Principles of Transportation, transportation by Roads, railways, Airways, Waterways, their importance and limitations, Route surveys and alignment, railway track, development and gauges, Hauling capacity and tractive effort.

- i) Rails: types, welding of rails, wear and tear of rails, rail creep.
- ii) Sleepers: types and comparison, requirement of a good sleeper, sleeper density.
- iii) Rail fastenings: types, Fish plates, fish bolts, spikes, bearing plates, chain keys, check and guard rails.
- iv) Ballast: Requirement of good ballast, various materials used as ballast, quantity of ballast, different methods of plate laying, material trains, calculation of materials required, relaying of track

UNIT-II

Geometric Design; Station & Yards; Points and Crossings & Signaling and interlocking: Formation, cross sections, Super elevation, Equilibrium, Cant and Cant deficiency, various curves, speed on curves. Types, locations, general equipments, layouts, marshalling yards, Definition, layout details, design of simple turnouts, Types of signals in stations and yards, principles of signaling and inter-locking.

UNIT-III

Bridge Site Investigation and Planning; Loading Standards & Component parts: Selection of site, alignment, collection of bridge design data: essential surveys, hydraulic design, scour, depth of bridge foundation, Economical span, clearance, afflux, type of road & railway bridges. : Design loads and forces, Impact factor, Indian loading standards for Railways Bridges and Highway Bridges, Bridge super structure and sub-structures, abutments, piers, wing walls, return walls, approaches, floors & flooring system, choice of super structure.

UNIT-IV

Bridge Foundations, Construction, Testing and Strengthening of Bridges: Different types of foundation: piles and wells, sinking of wells, coffer-dams. Choice of bridges and choice of materials, details of construction underwater and above water, sheet piles coffer dams, Erection of bridges, girders, equipments and plants, inspection and Data collection, strengthening of bridges, Bridge failure.

UNIT-V

Tunnels: 1. Selection of route, Engineering surveys, alignment, shape and size of tunnel, bridge action, pressure relief phenomenon, Tunnel approaches, Shafts, pilot shafts 2, Construction of tunnels in soft soil, hard soil and rock, Different types of lining, methods of lining, Mucking operation, Drainage and ventilation, Examples of existing important tunnels in India and abroad.

REFERENCES:

1. Chakraborty and Das; Principles of transportation engineering; PHI
2. Rangwala SC; Railway Engineering; Charotar Publication House, Anand
3. Rangwala SC; Bridge Engineering; Charotar Publication House, Anand
4. Ponnuswamy; Bridge Engineering; TMH
5. Railway Engineering by Arora & Saxena - Dhanpat Rai & Sons
6. Railway Track by K.F. Antia
7. Principles and Practice of Bridge Engineering S.P. Bindra - Dhanpat Rai & Sons
8. Bridge Engineering - J.S. Alagia - Charotar Publication House, Anand
9. Railway, Bridges & Tunnels by Dr. S.C. Saxena
10. Harbour, Docks & Tunnel Engineering - R. Srinivasan
11. Essentials of Bridge Engg. By I.J. Victor; Relevant IS & IRS codes

CE- 303 STRENGTH OF MATERIALS

UNIT - I

Simple Stress and Strains: Concept of Elastic body, stress and Strain, Hooke's law, various types of stress and strains, Elastic constants, Stresses in compound bars, composite and tapering bars, Temperature stresses. Complex Stress and Strains: Two dimensional and three dimensional stress system. Normal and tangential stresses, Principal Planes, Principal Stresses and strains, Mohr's circle of stresses, Combined Bending and Torsion, Theories of failure.

UNIT - II

Bending & Deflection: Theory of simple bending: Concept of pure bending and bending stress, Equation of bending. Neutral axis, Section-Modulus, Determination of bending stresses in simply supported, Cantilever and Overhanging beams subjected to point load and uniformly distributed loading. Bending & shear stress distribution across a section in Beams. Deflection of beams: Double Integration Method. Conjugate Beam Method, Macaulay's Method Area Moment Method.

UNIT - III

Torsion of Shafts: Concept of pure torsion, Torsion equation, Determination of shear stress and angle of twist of shafts of circular section, Hollow shafts, Open and closed coil springs, Leaf Spring, Spiral Spring, Pressure Vessels: Thin and Thick walled cylinders and spheres. Stress due to internal pressure, Change in diameter and volume, Compound cylinders and shrink fittings.

UNIT - IV

Unsymmetrical Bending: Principal moment of Inertia, Product of Inertia, Bending of a beam in a plane which is not a plane of, symmetry. Shear center; Curved beams: Pure bending of curved beams of rectangular, circular and trapezoidal sections, Stress distribution and position of neutral axis.

UNIT - V

Columns and Struts: Euler's buckling load for uniform section, various end conditions, slenderness Ratio, Stress in columns, Rankine formulae, Eccentric loading on columns.

REFERENCE:

1. Nash; Strength of Materials (Schaum), TMH.
2. Rattan SS; strength of Materials; TMH
3. Negi; Strength of materials; TMH
4. Sadhu Singh; Strength of Materials, ,
5. Ramamrutham; Strength of Materials,,
6. Subramaniam; Strength of Materials; R; Oxford
7. National Building Code of India, Part-IV

LIST OF EXPERIMENTS:

The experimental work to cover tension, compression, bending and impact test etc. on steel, cast iron, RCC and timber, Fire Resistant Test of Structures and Combustibility of Building Materials Test as per I.S.I, and other experiments based on the syllabus.

CE- 304 ENGINEERING GEOLOGY

UNIT - I

Introduction and Physical Geology: Objects and scope of geology. The crust and the interior of the earth, origin and age of the earth, Sub-aerial and sub-terrain weathering, denudation and deposition, wind, river, glacial and marine erosion, volcanoes , soil formation, soil profile, geological classification of soil and concept of earthquake Plate-tectonics.

UNIT - II

Mineralogy and Crystallography: Fundamentals of mineralogy, study of common rock forming minerals, ores and minerals of economic importance to civil engineering,, elements of crystallography and introduction to crystal systems.

UNIT - III(1)

Petrology: Composition of earth's crust, study of igneous, sedimentary and metamorphic rocks and their formation, characteristics classification, Rocks of civil engineering importance.

(2) Geology of India: Physical features of India, Brief geological history of India, occurrence of important ores and minerals in India.

UNIT - IV

Structural Geology: Structures related to rocks, Dip, Strike and outcrops, Classification and detailed studies of geological structures i.e. folds, Faults, Joints, Unconformity and their importance in Civil Engineering.

UNIT - V

Applied Geology: Introduction to applied geology and its use in civil engg., properties of rocks, selection of sites for roads, bridges, dams, reservoirs and tunnels. Prevention of engineering structures from seismic shocks, stability of hill sides, water bearing strata, artesian wells, Use of remote-sensing techniques in selection of above sites.

REFERENCE:

1. Prabin Singh - "Engineering and General Geology"
2. Gulati; Geotechnical Engineering; TMH
3. P.K. Mukerjee - " A text Book of Geology"
4. S.K. Garg - " A text Book of Physical and Engineering Geology"

LIST OF EXPERIMENT (EXPANDABLE)

1. Identification of simple rock forming minerals and important ores.
2. Identification of rock
3. Simple map Exercises.
4. Field Visit / Geological Excursion

CE – 305 BUILDING DESIGN & DRAWING

UNIT - I

Drawing of Building Elements - Drawing of various elements of buildings like various types of footing, open foundation, raft, grillage, pile and well foundation, Drawing of frames of doors, window, various types of door, window and ventilator, lintels and arches, stairs and staircase, trusses, flooring, roofs etc.

UNIT - II

Building Planning - Provisions of National Building Code, Building bye-laws, open area, set backs, FAR terminology, principle of architectural composition (i.e. unity, contrast, etc.), principles of planning, orientation.

UNIT - III

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

UNIT - IV

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

UNIT - V

Perspective Drawing - Elements of perspective drawing involving simple problems, one point and two point perspectives, energy efficient buildings.

REFERENCES:

1. Malik & Meo; Building Design and Drawing By
2. Shah, Kale & Patki; Building Design and Drawing; TMH
3. Gurucharan Singh & Jgdish Singh Building Planning, Design and Scheduling

LIST OF EXPERIMENTS (EXPANDABLE):

1. Sketches of various building components.
2. One drawing sheet of various building components containing doors, windows ventilators, lintels and arches stairs foundations etc.
3. One drawing sheet each for services and interiors of buildings.
4. One drawing sheet containing detailed planning of one/two bed room residential building (common to all student)
5. One drawing sheet each of residential and institutional building (Each student perform different drawing).
6. Use of AutoCAD for preparation of drawings.

CE- 306 COMPUTER PROGRAMMING

UNIT-I

Basic Java Features - C++ Vs JAVA, JAVA virtual machine, Constant & Variables, Data Types, Class, Methods, Objects, Strings and Arrays, Type Casting, Operators, Precedence relations, Control Statements, Exception Handling, File and Streams, Visibility, Constructors, Operator and Methods Overloading, Static Members, Inheritance: Polymorphism, Abstract methods and Classes

UNIT-II

Java Collective Frame Work - Data Structures: Introduction, Type-Wrapper Classes for Primitive Types, Dynamic Memory Allocation, Linked List, Stack, Queues, Trees, Generics: Introduction, Overloading Generic Methods, Generic Classes, Collections: Interface Collection and Class Collections, Lists, Array List and Iterator, Linked List, Vector. Collections Algorithms: Algorithm sorts, Algorithm shuffle, Algorithms reverse, fill, copy, max and min Algorithm binary Search, Algorithms add All, Stack Class of Package java. Util, Class Priority Queue and Interface Queue, Maps, Properties Class, Un-modifiable Collections.

UNIT-III

Advance Java Features - Multithreading: Thread States, Priorities and Thread Scheduling, Life Cycle of a Thread, Thread Synchronization, Creating and Executing Threads, Multithreading with GUI, Monitors and Monitor Locks. Networking: Manipulating URLs, Reading a file on a Web Server, Socket programming, Security and the Network, RMI, Networking, Accessing Databases with JDBC: Relational Database, SQL, MySQL, Oracle

UNIT-IV

Advance Java Technologies - Servlets: Overview and Architecture, Setting Up the Apache Tomcat Server, Handling HTTP get Requests, Deploying a web Application, Multitier Applications, Using JDBC from a Servlet, Java Server Pages (JSP): Overview, First JSP Example, Implicit Objects, Scripting, Standard Actions, Directives, Multimedia: Applets and Application: Loading, Displaying and Scaling Images, Animating a Series of Images, Loading and playing Audio clips

UNIT-V

Advance Web/Internet Programming (Overview): J2ME, J2EE, EJB, XML.

REFERENCES:

1. Deitel & Deitel, "JAVA, How to Program"; PHI, Pearson.
2. E. Balaguruswamy, "Programming In Java"; TMH Publications
3. The Complete Reference: Herbert Schildt, TMH
4. Peter Norton, "Peter Norton Guide To Java Programming", Techmedia.
5. Merlin Hughes, et al; Java Network Programming , Manning Publications/Prentice Hall

LIST OF PROGRAM TO BE PERFORM (EXPANDABLE)

1. Installation of J2SDK
2. Write a program to show Concept of CLASS in JAVA
3. Write a program to show Type Casting in JAVA
4. Write a program to show How Exception Handling is in JAVA
5. Write a Program to show Inheritance.
6. Write a program to show Polymorphism
7. Write a program to show Interfacing between two classes
8. Write a program to Add a Class to a Package
9. Write a program to demonstrate AWT.
10. Write a program to Hide a Class
11. Write a Program to show Data Base Connectivity Using JAVA
12. Write a Program to show "HELLO JAVA" in Explorer using Applet
13. Write a Program to show Connectivity using JDBC
14. Write a program to demonstrate multithreading using Java.
15. Write a program to demonstrate applet life cycle.

CE-307 SELF STUDY (INTERNAL ASSESSMENT)

Objective of Self Study: is to induce the student to explore and read technical aspects of his area of interest / hobby or new topics suggested by faculty.

Evaluation will be done by assigned faculty based on report/seminar presentation and viva.

CE-308 SEMINAR / GROUP DISCUSSION (INTERNAL ASSESSMENT)

Objective of GD and seminar is to improve the MASS COMMUNICATION and CONVINCING/ understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves.

Evaluation will be done by assigned faculty based on group discussion and power point presentation.

SEMESTER-IV
CE 401 ENGINEERING MATHEMATICS III

UNIT-I

Functions of complex variables : Analytic functions, Harmonic Conjugate, Cauchy-Riemann Equations, Line Integral, Cauchy's Theorem, Cauchy's Integral Formula, Singular Points, Poles & Residues, Residue Theorem , Application of Residues theorem for evaluation of real integrals

UNIT-II

Errors & Approximations, Solution of Algebraic & Trancedental Equations (Regula Falsi , Newton-Raphson, Iterative, Secant Method), Solution of simultaneous linear equatins by Gauss Elimination, Gauss Jordan, Crout's methods , Jacobi's and Gauss-Siedel Iterative methods

UNIT-III

Difference Operators, Interpolation (Newton Forward & Backward Formulae, Central Interpolation Formulae, Lagrange's and divided difference formulae), Numerical Differentiation and Numerical Integration.

UNIT-IV

Solution of Ordinary Differential Equations(Taylor's Series, Picard's Method, Modified Euler's Method, Runge-Kutta Method, Milne's Predictor & Corrector method), Correlation and Regression, Curve Fitting (Method of Least Square).

UNIT V

Concept of Probability : Probability Mass function, Probability density function. Discrete Distribution: Binomial, Poisson's, Continuous Distribution: Normal Distribution, Exponential Distribution .Gamma Distribution .Beta Distribution .Testing of Hypothesis |:Students t-test, Fisher's z-test, Chi-Square Method

REFERENCE:

1. Numerical Methods using Matlab by J.H.Mathews and K.D.Fink, P.H.I.
2. Numerical Methods for Scientific and Engg. Computation by MKJain, Iyengar and RK
3. Jain, New Age International Publication
4. Mathematical Methods by KV Suryanarayan Rao, SCITECH Publuication
5. Numerical Methods using Matlab by Yang.Wiley India
6. Pobability and Statistics by Ravichandran .Wiley India
7. Mathematical Statistics by George R., Springer

CE- 402 CONCRETE TECHNOLOGY

UNIT-I

Introduction Classification, properties, grades, advantage & disadvantages of concrete, Ingredients of concrete, types of cement, aggregates, water, admixtures, Inspection & testing of materials as per Indian Standard Specifications.

UNIT-II

Properties of Fresh and Hardened Concrete : Introduction, Workability, Testing of concrete, Factors affecting, Rheology of concrete, Compressive & Tensile strength, Stress and strain characteristics, Shrinkage and temperature effects. Creep of concrete, Permeability, durability, thermal properties & micro-cracking of concrete.

UNIT-III

Design of Concrete Mix : Various classical methods of concrete mix design, I.S. code method, basic considerations and factors influencing the choice of mix design, acceptance criteria for concrete, concrete mixes with Surkhi and other Pozzolan materials, design of plastic concrete mix, computer aided design of concrete mix.

UNIT-IV

Production and Quality Control of Concrete : Production of crushed stone aggregate, batching equipments for production and concreting, curing at different temperatures, Concreting underwater, hot & cold weather condition, statistical quality control, field control, non-destructive testing, repair technology for concrete structures, Inspection & Testing of Concrete.

UNIT V

Special Concretes : Light weight concrete, Ready mix concrete, Vacuum concrete, Ferrocement, Fiber reinforced concrete, Polymer concrete composites, Shotcrete, Guniting, Rubble concrete, Resin concrete, Prestressed concrete, Heat resistant concrete, Mass concrete, Temperature control of mass concrete.

REFERENCES:

1. Varshney RS; Concrete Technology; Oxford & IBH publishing co.
2. Gambhir ML; Concrete Technology - TMH
3. Sinha SN; Reinforced Concrete Technology; TMH
4. New Building Materials Published by B.M.T.P.C, New Delhi
5. Hand books on Materials & Technology - Published by BMTPC & HUDCO
6. Mohan Rai & M.P. Jai Singh; Advances in Building Materials & Construction
7. Jackson N; Civil Engineering materials.
8. Properties of Concrete - A.M. Neville - Pearson Education

CE- 403 SURVEYING

UNIT-I

Traversing by theodolite, Field work checks, traverse computations, latitude and departures, adjustments, computations of co-ordinates, plotting & adjusting or traverse, Omitted measurements, Measurement EDM, Trigonometrical leveling.

UNIT-II

Tachometry: Tachometric systems and principles, stadia system, uses of anallatic lens, tangential system, sublevel system, instrument constant, field work reduction, direct-reading tachometers, use of tachometry for traversing and contouring.

UNIT-III

Curves: Classification and use; elements of circular curves, calculations, setting out curves by offsets and by theodolites, compound curves, reverse curves, transition curves, cubic spiral and lemniscate, vertical curves, setting out.

UNIT-IV

Control Surveys: Providing frame work of control points, triangulation principle, co naissance, selection and marking of stations, angle measurements and corrections, baseline measurement and corrections, computation of sides, precise traversing.

UNIT-V

Hydrographic Surveying: Soundings, methods of observations, computations and plotting. Principles of photographic surveying: aerial photography, tilt and height distortions, Remote sensing, simple equipments, elements of image interpretation, image-processing systems.

REFERENCE:

1. T.P. Kanetkar, Surveying & Levelling, Vol. I & II.
2. Duggal; Surveying vol I and II; TMH
3. Basak; Surveying and Leveling; TMH
4. R.E.Devis, Surveying theory & Practice, Mc.Graw Hill, New York
5. David Clark & J Clendinning, Plane & Geodetic surveying Vol. I & II, constable & Co. London.
6. S.K. Roy, Fundamentals of surveying, prentice - Hall of India New Delhi
7. B.C. Punmia, Surveying Vol. I, II, III, Laxmi Publications New Delhi
8. K.R. Arora, Surveying Vol. I & II, standard book House, New Delhi

LIST OF EXPERIMENTS/ FIELD WORK (EXPANDABLE):

1. Theodolite traversing
2. Profile leveling, contouring & cross sectioning
3. Determination of tachometric constants & uses of tachometer in various field works
4. Curve setting by different methods.

CE- 404 CONSTRUCTION MATERIALS & TECHNIQUES

A) CONSTRUCTION MATERIALS:

UNIT-I

STONES :

Occurrence, varieties, Characteristics and their testing, uses, quarrying and dressing of stones. Timber: Important timbers, their engineering properties and uses, defects in timber, seasoning and treatment, need for wood substitutes, Alternate materials for shuttering doors/windows, Partitions and structural members etc. Brick and Tiles: Manufacturing, characteristics, Classification and uses, improved brick from inferior soils, Hand molding brick table, Clay-fly ash brick table, Flooring tiles and other tiles and their characteristics.

UNIT-II

ADVANCE CONSTRUCTION MATERIALS :

Use of fly ash in mortars, concrete, Fly ash bricks, stabilized mud blocks, non-erodible mud plinth, D.P.C. materials, Building materials made by Industrial & agricultural waste, clay products P.V.C. materials, advance materials for flooring, doors & windows, facial material, interiors materials for plumbing, sanitation & electrification.

(B) CONSTRUCTION TECHNIQUES:

UNIT-III

FOUNDATION:

Type of soils, bearing capacity, soil slablisation and improvement of bearing capacity, settlement and safe limits. Spread foundations, wall footings, grillage, foundations well foundation, causes of failure and remedial measures; under reamed piles, foundation on shrinkable soils, black cotton soil, timbering for trenches, dewatering of foundations. Hyperbolic paraboloid footing, Brick arch foundation. Simple methods of foundation design, Damp proof courses, Repairs Techniques for foundations.

UNIT-IV

MASONRY AND WALLS :

Brick masonry, Bonds, Jointing, Stone masonry, casting and laying, masonry construction, Brick cavity walls, code provisions regarding load bearing and non load bearing walls. Common defects in construction and their effect on strength and performance of walls, designed Brick masonry, precast stone masonry block, Hollow concrete block, plastering and pointing, white and colorwashing, distempering, dampness and its protection, Design of hollow block masonry walls. Doors, Windows and Ventilators: Types based on material etc., size location, fittings, construction sunshades, sills and jambs, RCC doors/windows frames. Stairs types, rule of proportionality etc., Repairs techniques for masonry, walls, doors & windows.

UNIT-V

FLOORS AND ROOFS :

Types, minimum thickness, construction, floor finishes, Flat roofs, RCC jack arch, reinforced brick concrete, solid slab and timber roofs, pitched roofs, false ceiling,

roof coverings, Channel unit, cored unit, Waffle unit, Plank and Joist, Brick panel, L-Panel, Ferro cement roofing units, water proofing .Services : Water supply & Drainage, Electrification, Fire protection, thermal insulation, Air Conditioning, Acoustics & Sound insulation, Repairs to damaged & cracked buildings, techniques and materials for low cost housing., Repairs techniques for floors & roofs.

REFERENCES:

1. Mohan Rai & M.P. Jai Singh; Advance in Building Materials & Construction,.
2. S.C. Rangwala; Engineering Materials
3. Sushil Kumar; Building Construction,
4. B.C. Punmia; Building Construction ,.
5. Building Construction, Metchell
6. Construction Technology, Chudley R.
7. Civil Engineering Materials, N. Jackson.
8. Engineering Materials, Surendra Singh.

LIST OF EXPERIMENTS:

1. Tests on Bricks
2. Tests on Aggregates
3. Tests on Cement
4. Determination of compressive strength of concrete with different cement grades.
5. Determination of workability of concrete by slump test
6. Determination of workability by compacting factor apparatus.
7. Determination of workability by Vee Bee consist meter.
8. Nondestructive testing of concrete by Rebound hammer test
9. Nondestructive testing of concrete by ultrasonic Method.
10. Test for the effect of admixtures on the concrete compressive strength
11. Testing of micro concrete
12. Design of concrete mix.

CE- 405 FLUID MECHANICS

UNIT-I

Review of Fluid Properties: Engineering units of measurement, mass, density, specific weight, specific volume, specific gravity, surface tension, capillarity, viscosity, bulk modulus of elasticity, pressure and vapor pressure. Fluid Static's : Pressure at a point, pressure variation in static fluid, Absolute and gauge pressure, manometers, Forces on plane and curved surfaces (Problems on gravity dams and Tainter gates); buoyant force, Stability of floating and submerged bodies, Relative equilibrium.

UNIT-II

Kinematics of Flow : Types of flow-ideal & real, steady & unsteady, uniform & nonuniform, one, two and three dimensional flow, path lines, streaklines, streamlines and stream tubes; continuity equation for one and three dimensional flow, rotational & irrotational flow, circulation, stagnation point, separation of flow, sources & sinks, velocity potential, stream function, flow nets- their utility & method of drawing flow nets.

UNIT-III

Dynamics of Flow: Euler's equation of motion along a streamline and derivation of Bernoulli's equation, application of Bernoulli's equation, energy correction factor, linear momentum equation for steady flow; momentum correction factor. The moment of momentum equation, forces on fixed and moving vanes and other applications. Fluid Measurements: Velocity measurement (Pitot tube, Prandtl tube, current meters etc.); flow measurement (orifices, nozzles, mouth pieces, orifice meter, nozzle meter, venturimeter, weirs and notches).

UNIT-IV

Dimensional Analysis and Dynamic Similitude: Dimensional analysis, dimensional homogeneity, use of Buckingham-pi theorem, calculation of dimensionless numbers, similarity laws, specific model investigations (submerged bodies, partially submerged bodies, weirs, spillways, rotodynamic machines etc.)

UNIT-V

Laminar Flow: Introduction to laminar & turbulent flow, Reynolds experiment & Reynolds number, relation between shear & pressure gradient, laminar flow through circular pipes, laminar flow between parallel plates, laminar flow through porous media, Stokes law, lubrication principles.

REFERENCES:

1. Modi & Seth; Fluid Mechanics; Standard Book House, Delhi
2. Som and Biswas; Fluid Mechanics and machinery; TMH
3. Cengel; Fluid Mechanics; TMH
4. White ; Fluid Mechanics ; TMH
5. Essential of Engg Hyd. By JNIK DAKE; Afrikan Network & Sc **Instit.** (ANSTI)
6. A Text Book of fluid Mech. for Engg. Student by Franiss JRD
7. R Mohanty; Fluid Mechanics By; PHI
8. Fluid Mechanics; Gupta Pearson.

LIST OF EXPERIMENT (EXPANDABLE):

1. To determine the local point pressure with the help of pitot tube.
2. To find out the terminal velocity of a spherical body in water.
3. Calibration of Venturimeter
4. Determination of C_c , C_v , C_d of Orifices
5. Calibration of Orifice Meter
6. Calibration of Nozzle meter and Mouth Piece
7. Reynolds experiment for demonstration of stream lines & turbulent flow
8. Determination of metacentric height
9. Determination of Friction Factor of a pipe
10. To study the characteristics of a centrifugal pump.
11. Verification of Impulse momentum principle.

CE- 406 COMPUTER PROGRAMMING -II

UNIT-I

Introduction .NET framework, features of .Net framework, architecture and component of .Net, elements of .Net.

UNIT-II

Basic Features Of C# Fundamentals, Classes and Objects, Inheritance and Polymorphism, Operator Overloading, Structures. Advanced Features Of C# Interfaces, Arrays, Indexers and Collections; Strings and Regular Expressions, Handling Exceptions, Delegates and Events.

UNIT-III

Installing ASP.NET framework, overview of the ASP .net framework, overview of CLR, class library, overview of ASP.net control, understanding HTML controls, study of standard controls, validations controls, rich controls. Windows Forms: All about windows form, MDI form, creating windows applications, adding controls to forms, handling Events, and using various Tolls

UNIT-IV

Understanding and handling controls events, ADO.NET- Component object model, ODBC, OLEDB, and SQL connected mode, disconnected mode, dataset, data-reader Data base controls: Overview of data access data control, using grid view controls, using details view and frame view controls, ado .net data readers, SQL data source control, object data source control, site map data source.

UNIT V

XML: Introducing XML, Structure, and syntax of XML, document type definition (DTD), XML Schema, Document object model, Presenting and Handling XML. xml data source, using navigation controls, introduction of web parts, using Java script, Web Services

REFERENCES:

1. C#for Programmers by [Harvey Deitel, Paul Deitel](#), Pearson Education
2. Balagurusamy; Programming in C#; TMH
3. Web Commerce Technology Handbook by Daniel Minoli, Emma Minoli, TMH
4. Web Programming by Chris Bates, Wiley
5. XML Bible by Elliotte Rusty Harold ,
6. ASP .Net Complete Reference by McDonald, TMH.
7. ADO .Net Complete Reference by Odey, TMH

LIST OF EXPERIMENTS/ PROGRAM (EXPANDABLE):

1. Working with call backs and delegates in C#
2. Code access security with C#.
3. Creating a COM+ component with C#.
4. Creating a Windows Service with C#
5. Interacting with a Windows Service with C#
6. Using Reflection in C#
7. Sending Mail and SMTP Mail and C#
8. Perform String Manipulation with the String Builder and String Classes and C#:
9. Using the System .Net Web Client to Retrieve or Upload Data with C#

10. Reading and Writing XML Documents with the XML Text-Reader/-Writer Class and C#.
11. Working with Page using ASP .Net.
12. Working with Forms using ASP .Net
13. Data Sources access through ADO.Net,
14. Working with Data readers , Transactions
15. Creating Web Application.

SEMESTER-V
CE-501 TRANSPORTATION ENGINEERING - II

UNIT -I

High way planning, Alignment & Geometric Design: Principles of highway planning, road planning in India and financing of roads, classification patterns. Requirements, Engg. Surveys for highway location.

Cross sectional elements- width, camber, super-elevation, sight distances, extra widening at curves, horizontal and vertical curves, numerical problems.

UNIT-II

Bituminous & Cement Concrete Payments: Design of flexible pavements, design of mixes and stability, WBM, WMM, BM, IBM, surface dressing, interfacial treatment- seal coat, tack coat, prime coat, wearing coats, grouted macadam, bituminous concrete specification, construction and maintenance. Advantages and disadvantages of rigid pavements, general principles of design, types, construction, maintenance and joints, dowel bars, tie bars. Brief study of recent developments in cement concrete pavement design, fatigue and reliability.

UNIT-III

Low Cost Roads, Drainage of Roads, Traffic Engg. & Transportation Planning:

Principles of stabilization, mechanical stabilization, requirements, advantages, disadvantages and uses, quality control, macadam roads-types, specifications, construction, maintenance and causes of failures.

Surface and sub-surface drainage, highway materials: properties and testing etc.

Channelised and unchannelised intersections, at grade & grade separated intersections, description, rotary-design elements, advantages and disadvantages, marking, signs and signals, street lighting. Principles of planning, inventories, trip generation, trip distribution, model split, traffic assignment, plan preparation.

UNIT - IV

Airport Planning, Runway & Taxiway: Airport site selection. air craft characteristic and their effects on runway alignments, windrose diagrams, basic runway length and corrections, classification of airports. Geometrical elements: taxi ways and runways, pattern of runway capacity.

UNIT - V

Airport, Obstructions, Lightning & Traffic control: Zoning regulations, approach area, approach surface-imaginary, conical, horizontal. Rotating beacon, boundary lights, approach lights, runway and taxiway lighting etc. instrumental landing system, precision approach radar, VOR enroute traffic control.

LIST OF EXPERIMENTS:

1. Aggregate Crushing Value Test
2. Determination of aggregate impact value

3. Determination of Los Angeles Abrasion value
4. Determination of California Bearing Ratio values
5. Determination of penetration value of Bitumen
6. Determination of Viscosity of Bituminous Material
7. Determination of softening point of bituminous material
8. Determination of ductility of the bitumen
9. Determination of flash point and fire point of bituminous material
10. Determination of Bitumen content by centrifuge extractor
11. Determination of stripping value of road aggregate
12. Determination of Marshall stability value for Bituminous mix
13. Determination of shape tests on aggregate

REFERENCE BOOKS & STUDY MATERIALS:

1. Highway Engineering by Gurucharan Singh
2. Principles of Pavement Design by E.J. Yoder & M.W. Witzech
3. Highway Engineering by O'Fleherly
4. Highway Engineering by S.K. Khanna & C.E.G. Justo
5. Airport Planning & Design by S.K. Khanna & M. G. arora
6. Foresch, Charles "Airport Planning"
7. Horonjeff Robert "The Planning & Design of Airports"
8. Sharma & Sharma, Principles and Practice of Highway Engg.
9. Haung, Analysis and Design of Pavements
10. Relevant IRC & IS codes
11. Laboratory Manual by Dr. S.K. Khanna
12. Highway Engg. By Hews & Oglesby
13. Highway Material by Walker

CE- 502 ADVANCED SURVEYING

UNIT-I

Modern equipments for surveying : Digital levels and theodolites, Electronic Distance measurement(EDM), Total Station and Global Positioning Systems (GPS), Digital Planimeter.

UNIT-II

Surveying Astronomy: Definitions of astronomical terms, coordinate systems for locating heavenly bodies, geographic, geodetic, geocentric, Cartesian, local and projected coordinates for earth resources mapping, convergence of meridian, parallel of latitude, shortest distance between two points on the earth, determination of latitude and longitude.

UNIT-III

GPS Surveying: Introduction & components of GPS, Space segment, control segment and user segment, Elements of Satellite based surveys-Map datums, GPS receivers, GPS observation methods and their advantages over conventional methods. Digital Terrain Model (DTM): Topographic representation of the terrain and generation of DTM on computers using spot heights and contour maps.

UNIT-IV

Photogrammetry : Principle, definitions and classifications of terrestrial and aerial photogrammetry, flight planning for aerial photography, scale and relief displacements of vertical aerial photographs, stereoscopic vision on vertical photographs, computation of position, length and elevations of objects using photographs and photo mosaic.

UNIT-V

Remote Sensing: Principle, components, classification, remote sensing data acquisition process, different types of remote sensing satellite imagery with special relevance to Indian Remote Sensing Satellites (IRS) and applications. Geographic Information Systems (GIS): Definition, components and advantages.

Surveying Project - Student will go for one week Surveying Camp to carry out Project Work.

SUGGESTED TEXT BOOKS AND REFERENCES :

1. Surveying and Leveling-Part-I & II by T.P. Kanetkar and S.V. Kulkarni, Pune Vidyarthi Griha Prakashan, Pune.
2. Engineering Surveying : Theory and Examination Problems for Students by W. Schofield, Butterworth, Heinemann, Oxford.
3. Surveying: Problems Solving with theory and objective type questions by A.M. Chandra, New Age International Publishers N. Delhi.
4. Advance Surveying by A.M. Chandra, New Age International Publishers N. Delhi.
5. Surveying Vol. II by S.K. Duggal, Tata McGraw Hill Publishing Company Ltd. New Delhi.
6. Remote Sensing and image interpretation by Lillesand T.M. and Kiefer R.W.

CE- 503 FLUID MECH. - II

UNIT-I

Turbulent flow : Laminar and turbulent boundary layers and laminar sublayer, hydrodynamically smooth and rough boundaries, velocity distribution in turbulent flow, resistance of smooth and artificially roughened pipes, commercial pipes, aging of pipes.

Pipe flow problems : Losses due to sudden expansion and contraction, losses in pipe fittings and valves, concepts of equivalent length, hydraulic and energy gradient lines, siphon, pipes in series, pipes in parallel, branching of pipes.

Pipe Network : *Water Hammer (only quick closure case). transmission of power.

*Hardy Cross Method

UNIT-II

Uniform flow in open channels : Channel geometry and elements of channel section, velocity distribution, energy in open channel flow, specific energy, types of flow, critical flow and its computations, uniform flow and its computations, Chezy's and Manning's formulae, determination of normal depth and velocity, Normal and critical slopes, Economical sections, Saint Venet equation.

UNIT-III

Non uniform flow in open channels : Basic assumptions and dynamic equations of gradually

varied flow, characteristics analysis and computations of flow profiles, rapidly varied flow hydraulic

jump in rectangular channels and its basic characteristics, surges in open channels & channel flow routing, venturi flume.

UNIT-IV

Forces on immersed bodies: Types of drag, drag on a sphere, a flat plate, a cylinder and an

aerofoil development of lift, lifting vanes, magnus effect.

UNIT-V

FLUID MACHINES:

Turbines : Classifications, definitions, similarity laws, specific speed and unit quantities, Pelton

turbine-their construction and settings, speed regulation, dimensions of various elements, Action of jet, torque, power and efficiency for ideal case, characteristic curves. Reaction turbines: construction & settings, draft tube theory, runaway speed, simple theory of design and characteristic curves, cavitation.

PUMPS:

Centrifugal pumps : Various types and their important components, manometric head, total

head, net positive suction head, specific speed, shut off head, energy losses, cavitation, principle

of working and characteristic curves.

Reciprocating pumps: Principle of working, Coefficient of discharge, slip, single acting and

double acting pump, Manometric head, Acceleration head.

LIST OF EXPERIMENT

1. Study the performances characteristics of Pelton Wheel
2. Study the performances characteristics of Francis Turbine
3. Study the performances characteristics of Kaplan Turbine
4. Calibration of multistage (Two) Pump & Study of characteristic of variable speed pump
5. To study the performance & details of operation of Hyd. Ram
6. Determination of coefficient of discharge for a broad crested weir & to plot water surface Profile over weir
7. Study of the characteristic of the Reciprocating pump

SUGGESTED BOOKS & STUDY MATERIAL:

1. Fluid Mechanics - Modi & Seth - Standard Book house, Delhi
2. Open Channel Flow by Rangaraju - Tata Mc Graw - Hill Publishing Comp. Ltd., New Delhi
3. Fluid Mechanics - A.K. Jain - Khanna Publishers, Delhi
4. Fluid Mechanics, Hydraulics & Hydraulic Mechanics - K.R. Arora - Standard Publishers Distributors 1705-B, Nai Sarak, Delhi-6
5. Hyd. of open channels By Bakhmetiff B.A. (McGraw Hill, New York)
6. Open Channel Hyd. By Chow V.T. (McGraw Hill, New York)
7. Engineering Hydraulics By H. Rouse
8. Centrifugal & Axial Flow Pump By Stenpanoff A.J. New York
9. Relevant IS codes.

CE- 504 STRUCTURAL DESIGN & DRAWING - I (RCC)

UNIT -I

Basic Principles of Structural Design : Assumptions, Mechanism of load transfer, Various properties of concrete and reinforcing steel, Introduction to working stress method and limit state methods of design, partial safety factor for load and material. Calculation of various loads for structural design of singly reinforced beam, Partial load factors.

UNIT - II

Design of Beams: Doubly reinforced rectangular & Flanged Beams, Lintel, Cantilever, simply

supported and continuous beams, Beams with compression reinforcement: Redistribution of

moments in continuous beams, Circular girders: Deep beams. Design of beam for shear and

bond.

UNIT-III

Design of Slabs: Slabs spanning in one direction. Cantilever, Simply supported and Continuous

slabs, Slabs spanning in two directions, Circular slabs, Waffle slabs, Flat slabs, Yield line theory.

UNIT -IV

Columns & Footings: Effective length of columns, Short and long columns- Square, Rectangular and Circular columns, Isolated and combined footings, Strap footing, Columns subjected to axial loads and bending moments (sections with no tension), Raft foundation.

UNIT -V

Staircases: Staircases with waist slab having equal and unequal flights with different support conditions, Slabless tread-riser staircase.

NOTE :- All the designs for strength and serviceability should strictly be as per the latest version of IS:346. Use of SP-16 (Design aids)

SUGGESTED BOOKS: -

1. Plain & Reinforced Concrete Vol. I & II - O.P. Jain & Jay Krishna
2. Limit State Design by P.C.Varghese ; Prentice Hall of India, New Delhi
3. Design of Reinforced Concrete Elements by Purushothman; Tata McGraw Hill, New Delhi
4. Reinforced Cement Concrete by Gupta & Mallick, Oxford and IBH
5. Reinforced Cement Concrete by P. Dayaratnam, Oxford and IBH
6. Plain & reinforced concrete - Rammuttham
7. Plain & reinforced concrete - B.C. Punnia
8. Structural Design & Drawing by N.K.Raju.

CE- 505 THEORY OF STRUCTURES -I

UNIT- I

Virtual work and Energy Principles: Principles of Virtual work applied to deformable bodies, strain energy and complementary energy, Energy theorems, Maxwell's Reciprocal theorem, Analysis of Pin-Jointed frames for static loads.

UNIT- II

Indeterminate Structures-I: Static and Kinematics indeterminacy, Analysis of Fixed and continuous beams by theorem of three moments, Effect of sinking and rotation of supports, Moment distribution method (without sway)

UNIT-III

Indeterminate Structures - II: Analysis of beams and frames by slope Deflection method,

Column Analogy method.

UNIT-IV

Arches and Suspension Cables: Three hinged arches of different shapes, Eddy's Theorem, Suspension cable, stiffening girders, Two Hinged and Fixed Arches - Rib shortening and temperature effects.

UNIT- V

Rolling loads and Influence Lines: Maximum SF and BM curves for various types of Rolling

loads, focallength, EU DL, Influence Lines for Determinate Structures- Beams, Three Hinged

Arches.

REFERENCE BOOKS:

1. Ghali A & Neville M., Structural Analysis - A Unified classical and matrix Approach, Chapman and Hall, New York.
2. Wang C.K. Intermediate structural analysis, McGraw Hill, New York.
3. Kinney Streling J. Indeterminate structural Analysis, Addison Wesley.
4. Reddy C.S., Basic Structural Analysis, Tata McGraw Hill Publishing Company, New Delhi.
5. Norris C.H., Wilbur J.B. and Utkys. Elementary Structural Analysis, McGraw Hill International, Tokyo.

CE- 601 THEORY OF STRUCTURES -II

UNIT- I

Moment distribution method in analysis of frames with sway, analysis of box frames, analysis of portals with inclined members, analysis of beams and frames by Kani's method.

UNIT - II

Plastic analysis of beams and frames.

UNIT - III

Analysis of tall frames, wind and earthquake loads, codal provisions for lateral loads. Approximate analysis of multistory frames for vertical and lateral loads.

UNIT - IV

Matrix method of structural analysis: force method and displacement method..

UNIT - V

Influence lines for intermediate structures, Muller Breslau principle, Analysis of Beam-Columns.

REFERENCE BOOKS :

1. Wang C.K. Intermediate structural analysis, McGraw Hill, New York.
2. Kinney Streling J. Indeterminate structural Analysis, Addison Wesley.
3. Reddy C.S., Basic Stgtructural Analysis, Tata McGraw Hill Publishing Company, New Delhi.
4. Norris C.H., Wilbur J.B. and Utkys. Elementary Structural Analysis, McGraw Hill International, Tokyo.
5. Weaver W & Gere JM, Matrix Methods of Framed Structures, CBS Publishers & Distributors, Delhi.

CE- 602 WATER RESOURCES AND IRRIGATION ENGINEERING

UNIT-I

Hydrology : Hydrological cycle, precipitation and its measurement, recording and non recording rain gauges, estimating missing rainfall data, rain gauge net works, mean depth of precipitation over a drainage area, mass rainfall curves, intensity-duration curves, depth-area duration curves, Infiltration and infiltration indices, evaporation stream gauging, run off and its estimation, hydrograph analysis, unit hydrograph and its derivation from isolated and complex storms, S- curve hydrograph, synthetic unit hydrograph.

UNIT-II

Floods and Ground water: Types of floods and their estimation by different methods, probability and frequency analysis, flood routing through reservoirs and channels, flood control measures, economics of flood control, confined and unconfined aquifers, aquifer properties, hydraulics of wells under steady flow conditions, infiltration galleries. Ground water recharge- necessity and methods of improving ground water storage. Water logging-causes, effects and its prevention. Salt efflorescence-causes and effects. reclamation of water logged and salt affected lands.

UNIT-III

Water resources planning and management : Planning of water resources projects, data requirements, economic analysis of water resources projects appraisal of multipurpose projects, optimal operation of projects introduction to linear programming and its application to water resources projects. Role of water in the environment, rain water harvesting, impact assessment of water resources development and managerial measures.

UNIT - IV

Irrigation water requirement and soil-water-crop relationship: Irrigation, definition, necessity, advantages and disadvantages, types and methods. Irrigation development.

Soils - types and their occurrence, suitability for irrigation purposes, wilting coefficient and field capacity, optimum water supply, consumptive use and its determination. Irrigation methods- surface and subsurface, sprinkler and drip irrigation. Duty of water, factors affecting duty and methods to improve duty, suitability of water for irrigation, crops and crop seasons, principal crops and their water requirement, crop ratio and crop rotation, intensity of irrigation.

UNIT - V

Canal irrigation: Types of canals, alignment, design of unlined and lined canals, Kennedy's and Lacey's silt theories, typical canal sections, canal losses, linings-objectives, materials used, economics. Canal falls & cross drainage works, - description and design, head and cross regulators. escapes and outlets, canal transitions.

Well irrigation: Types of wells, well construction, yield tests, specific capacity level and specific yield, hydraulic design of open wells and tube wells, methods of raising well water, characteristics of pumps and their selection, interference of wells, well losses, advantages and disadvantages of well irrigation.

SUGGESTED BOOKS :

1. Engg. Hydrology - J.NEMEC - Prentice Hall
2. Hydrology for Engineers Linsley, Kohler, Paulnus - Tata Mc.Graw Hill.
3. Engg. Hydrology by K. Subhramanya - Tata Mc Graw Hills Publ. Co.
4. Hydrology & Flood Control by Santosh Kumar - Khanna Publishers
5. Engg. Hydrology by H.M. Raghunath

CE- 603 ENVIRONMENTAL ENGG.-I

UNIT - I

Estimation of ground and surface water resources. quality of water from different sources, demand & quantity of water, fire demand, water requirement for various uses, fluctuations in demand, forecast of population.

UNIT - II

Impurities of water and their significance, water-borne diseases, physical, chemical and bacteriological analysis of water, water standards for different uses. Intake structure, conveyance of water, pipe materials, pumps - operation & pumping stations.

UNIT - III

Water Treatment methods-theory and design of sedimentation, coagulation, filtration, disinfection, aeration & water softening, modern trends in sedimentation & filtration, miscellaneous methods of treatment.

UNIT - IV

Layout and hydraulics of different distribution systems, pipe fittings, valves and appurtenances, analysis of distribution system. Hardy cross method, leak detection, maintenance of distribution systems, service reservoir capacity and height of reservoir.

UNIT - V

Rural water supply schemes, financing and management of water supply project, water pollution control act, conservancy & water carriage system, sanitary appliance and their operation, building drainage system of plumbing.

SUGGESTED BOOKS AND READING MATERIALS:

1. Water Supply Engineering by B.C. Punmia - Laxmi Publications (P) Ltd. New Delhi.
2. Water Supply & Sanitary Engg. by G.S. Birdi - Laxmi Publications (P) Ltd. New Delhi.
3. Water & Waste Water Technology by Mark J.Hammer - Prentice - Hall of India, New Delhi.
4. Environmental Engineering - H.S. Peavy & D.R.Rowe - Mc Graw Hill Book Company, New Delhi.
5. Water Supply & Sanitary Engg. by S.K. Husain.
6. Water & Waste Water Technology - G.M. Fair & J.C. Geyer.
7. Relevant IS Codes.

LIST OF EXPERIMENTS:

1. To study the various standards for water
2. To study of sampling techniques for water
3. Measurement of turbidity
4. To determine the coagulant dose required to treat the given turbid water sample
5. To determine the conc. of chlorides in a given water samples
6. Determination of hardness of the given sample
7. Determination of residual chlorine by “Chloroscope”
8. Determination of Alkalinity in a water samples
9. Determination of Acidity in a water samples
10. Determination of Dissolved Oxygen (DO) in the water sample.

CE- 604 QTY. SURVEYING & COSTING

UNIT - I

Introduction: Purpose and importance of estimates, principles of estimating. Methods of taking out quantities of items of work. Mode of measurement, measurement sheet and abstract sheet; bill of quantities. Types of estimate, plinth area rate, cubical content rate, preliminary, original, revised and supplementary estimates for different projects.

UNIT - II

Rate Analysis: Task for average artisan, various factors involved in the rate of an item, material and labour requirement for various trades; preparation for rates of important items of work. Current schedule of rates. (C.S.R.)

UNIT - III

Detailed Estimates: Preparing detailed estimates of various types of buildings, R.C.C. works, earth work calculations for roads and estimating of culverts Services for building such as water supply, drainage and electrification.

UNIT - IV

Cost of Works: Factors affecting cost of work, overhead charges, Contingencies and work charge establishment, various percentages for different services in building. Preparation of DPR.

UNIT - V

Valuation: Purposes, depreciation, sinking fund, scrap value, year's purchase, gross and net income, dual rate interest, methods of valuation, rent fixation of buildings.

SUGGESTED BOOKS:

1. Quantity Surveying & Costing - B.N. Datta
2. Estimating & Costing for Civil Engg. - G.S. Birdi
3. Quantity surveying & costing - Chakraborty
4. Estimating & Costing - S.C. Rangawala

PRACTICAL & SESSIONAL WORKS:

1. Preparation of detailed estimate.
2. Detailed estimate for services of plumbing and water supply or Electrification work.
3. Detailed estimate for earth work for the road construction or arched culvert.
4. Rate analysis for at least 8 items of construction.
5. Preparation of DPR of Civil Engineering Project.

CE- 605 STRUCTURAL DESIGN AND DRAWING-II (STEEL)

UNIT - I

Various loads and mechanism of the load transfer, partial load factors, structural properties of steel, Design of structural connections - Bolted, Rivetted and Welded connections.

UNIT - II

Design of compression members, Tension members, Roof Trusses - Angular & Tubular, Lattice Girders.

UNIT-III

Design of simple beams, Built-up beams, Plate girders and gantry girders.

UNIT - IV

Effective length of columns, Design of columns-simple and compound, Lacing & battens. Design of footings for steel structures, Grillage foundation.

UNIT - V

Design of Industrial building frames, multistory frames, Bracings for high rise structures, Design of transmission towers.

NOTE:

All the designs for strength and serviceability should strictly be as per the latest version of IS:800.

REFERENCE BOOKS :

1. Design of steel structures by Arya & Azmani Nemchand & Bros, Roorkee.
2. Design of steel structures by P.Dayaratnam.
3. Design of steel structures Vol. I & II by Ramchandra.
4. Design of steel structures by L.S. Negi.
5. Design of steel structures by Ramammutham iv) Design of steel structures by Punmia.

SEMESTER – VII
CE701 DESIGN OF HYDRAULIC STRUCTURE

UNIT - I

Gravity dams: Design Criteria, forces acting on gravity dams, elementary profile, low and high gravity dams, stability analysis, evaluation of profile by method of zoning, practical profile, foundation treatment, construction joints, galleries in gravity dams.

UNIT - II

EARTH AND ROCK FILL DAMS :

Earth Dams: Types, causes of failure and design criteria, soils suitable for earth dam construction, construction methods, foundation requirements, typical earth dam sections, estimation of seepage through and below the dam, seepage control, stability of slopes by slip circle method of analysis, pore pressures, sudden draw down, steady seepage and construction pore pressure condition.

Rock fill dams: Types, merits and demerits, conditions favourable for their adoption.

UNIT - III

Spillways : Ogee spillway and its design, details of syphon, shaft, chute and side channel spillways, emergency spillways.

UNIT - IV

Energy dissipations and gates : Principles of energy dissipation Energy dissipators based on tail water rating curve and jump height curves Spillway crest gates - vertical lift and radial gates, their design principles and details. Design of canal regulating structures, Detailed design of Sarda Falls, design of cross drainage works, sphypon aquaduct.

UNIT - V

Hydropower Plants: Introduction of Hydropower development, assessment of power potential, types of hydropower plants, general features of hydro-electric schemes, selection of turbines, draft tubes, surge tanks, penstocks, power house dimensions, development of micro hydel stations, tidal plants, pumped storage plants and their details.

REFERENCE BOOKS:

1. Engineering for Dams (Volumes I, II & III) by Creager, Justin & Hinds
2. Hydroelectric Hand Book by Creager
3. Hydraulic Structures by Varshney
4. Irrigation & Water Power Engg. by Punmia & Pandey
5. Water Power Engineering by Dandekar

CE 702 ADVANCED STRUCTURAL DESIGN - II (RCC)

UNIT - I

Design of Multistory Buildings - Sway and nonsway buildings, Shear walls and other bracing elements.

UNIT II

Earth Retaining Structures: Cantilever and counter fort types retaining walls.

UNIT - III

Water Tanks: Tanks on ground and underground tanks: Square, rectangular, circular tanks, Overhead tanks: square, rectangular, circular & intze tanks.

UNIT - IV

Silos and Bunkers

UNIT - V

T-beam & Slab bridges- for highway loading (IRC Loads).

Prestressing concepts materials, systems of prestressing & losses Introduction to working & limit State Design.

SUGGESTED BOOKS:

1. R.C.C. by O P. Jain Vol. II
2. R.C.C. by B.C. Punmia
3. Essentials of Bridge engineering - D.J. Victor
4. Bridge Engineering - Ponnuswamy
5. Advanced R.C.C. Design by N.K. RAJU
6. N.Krishna Raju, Prestressed Concrete, Tata Mc Graw Hill, New Delhi.
7. Pre stresses concrete - T.Y. Lin

CE 703 ENVIRONMENTAL ENGG. - II

UNIT - I

Sewerage schemes and their importance, collection & conveyance of sewage, storm water quantity, fluctuation in sewage flow, flow through sewer, design of sewer, construction & maintenance of sewer, sewer appurtenances, pumps & pumping stations.

UNIT -II

Characteristics and analysis of waste water, cycles of decomposition, physical, chemical & biological parameters. Oxygen demand i.e. BOD & COD, TOC, TOD, Th OD, Relative Stability, population equivalent, instrumentation involved in analysis, natural methods of waste water disposal i.e. by land treatment & by dilution, self purification capacity of stream, Oxygen sag analysis.

UNIT -III

Unit operations for waste water treatment, preliminary treatment such as screens, grit chamber, floatation tank, sedimentation and chemical clarification, role of micro-organism in biological treatment, Sewage filtration- theory & design.

UNIT - IV

Methods of Biological Treatment (Theory & Design) - Activated Sludge process, Oxidation ditch, stabilization ponds, aerated lagoon, anaerobic lagoons, septic tank & imhoff tank, sources & treatment of sludge, sludge thickening and digestion sludge drying beds, sludge disposal.

UNIT - V

Advanced Waste Water treatment - Diatomaceous earth filters, ultrafiltration, Adsorption by activated carbon, Phosphorus removal, Nitrogen removal, Physico chemical waste water treatment, Solid waste disposal - classification, composition, collection, & disposal methods. Rural sanitation - collection & disposal of refuse, sullage & night soil

Laboratory work shall be based on the topics of environmental engineering I & II and consist of experiments of water and waste water quality as per facility available in the institution.

LIST OF EXPERIMENT:

1. To study the various standards for waste water
2. To study the sampling techniques for waste water
3. To determine the alkalinity in water sample
4. To determine the acidity in water sample
1. 5. Determination of Dissolved Oxygen in the water and waste water sample
2. 6. Determination of Biological Oxygen demand of a waste water sample
3. 7. Determination of Chemical Oxygen demand of a waste water sample
4. 8. Determination of various types of solids in the waste water sample
5. 9. Determination of bacterial number by membrane filter Technique
6. 10. Determination of bacterial colonies by standard plat count method

REFERENCE BOOKS :

1. Water Supply & Sanitary Engg. - G. S. Birdie - Dhanpat Rai Publishing Company, (P) Ltd. New Delhi
2. Waste Water Engg. by B.C. Punmia - Laxmi Publication (P) Ltd. New Delhi
3. Environmental Engg. - M.L. Davis & D.A. Cornwell - Mc Graw Hill Company
4. Chemistry for Environmental Engg. - Sawyer & Mc Carty - Mc Graw Hill Book Company New Delhi
5. Water & Waste Water Technology - Mark J Hammer - Prentice - Hall of India, New Delhi
6. Waste Water Engineering - Metcalf & Eddy - Mc Graw Hill Book Company New Delhi
- 7.

CE704 GEO-TECHNICAL ENGG. -1

UNIT - I

Basic Definitions & Index Properties: Definition and scope of soil mechanics, Historical development. Formation of soils. Soil composition. Minerals, Influence of clay minerals on engineering behaviour. Soil structure. Three phase system. Index properties and their determination. Consistency limits. Classification systems based on particle size and consistency limits.

UNIT - II

Soil Water and Consolidation: Soil water, Permeability Determination of permeability in laboratory and in field. Seepage and seepage pressure. Flownets, uses of a flownet, Effective, neutral and total stresses. Compressibility and consolidation, Relationship between pressure and void ratio, Theory of one dimensional consolidation. Consolidation test, Fitting Time curves. Normally and over consolidated clays. Determination of preconsolidation pressure, settlement analysis. Calculation of total settlement.

UNIT - III

Stress Distribution in Soils and Shear Strength of Soils: Stress distribution beneath loaded areas by Boussinesq and water gaurd's analysis. Newmark's influence chart. Contact pressure distribution.

Mohr - Coulomb's theory of shear failure of soils, Mohr's stress circle, Measurement of shear strength, Shear box test, Triaxial compression test, unconfined compression test, Value shear test, Measurement of pore pressure, pore pressure parameters, critical void ratio, Liquefaction.

UNIT - IV

Stability of Slopes: Infinite and finite slopes. Types of slope failures, Rotational slips. Stability number. Effect of ground water. Selection of shear strength parameters in slope stability analysis. Analytical and graphical methods of stability analysis. Stability of Earth dams.

UNIT - V

Lateral Earth Pressure: Active, passive and earth pressure at rest. Rankine, Coulomb, Terzaghi and Culmann's theories. Analytical and graphical methods of determination of earth pressures on cohesionless and cohesive soils. Effect of surcharge, water table and wallfriction. Arching in soils. Reinforced earth retaining walls.

LABORATORY WORK :

Laboratory work will be based on the above course as required for soil investigators of engineering projects.

LIST OF EXPERIMENTS:

1. Determination of Hygroscopic water content
2. Particle - size analysis
3. Determination of Specific gravity of soil particles

4. Determination of plastic limit
5. Determination of liquid limit
6. Determination of shrinkage limit
7. Permeability tests
8. Direct shear test
9. Consolidation test

SUGGESTED BOOKS:

1. Soil Mech. & Found. Engg. by Dr. K.R. Arora - Std. Publishers Delhi.
2. Soil Mech. & Found. by Dr. B.C.Punmia- Laxmi Publications, Delhi.
3. Modern Geotech Engg. by Dr. I Aram Singh - IBT Publishers, Delhi.
4. Geotech Engg. by C. Venkatramaiah - New Age International Publishers, Delhi.
5. 5. Soil Mech. & Found. Engg. by S.K. Garg- Khanna Publishers, Delhi.
6. Soil Testing for Engg. by T.W. Lambe - John Wiley & Sons. Inc.
7. Relevant I.S. Codes

CE -7102 TRAFFIC ENGINEERING

UNIT -I

Traffic Characteristics : (i) Road user's characteristics - general human characteristics, physical, mental and emotional factors, factors affecting reaction time, PIEV theory. (ii) Vehicular characteristics: Characteristics affecting road design-width, height, length and other dimensions. weight, power, speed and braking capacity of a vehicle.

UNIT -II

Traffic Studies : (i) Spot Speed Studies and Volume Studies. (ii) Speed and Delay Studies- purpose, causes of delay, methods of conducting speed and delay studies. (iii) Origin and Destination Studies (O & D) : Various methods, collection and interpretation of data, planning and sampling. (iv) Traffic Capacity Studies: Volume, density, basic practical and possible capacities, level of service. (v) Parking Studies: Methods of parking studies cordon counts, space inventories, parking practices.

UNIT -III

Traffic Operations and Control : (i) Traffic regulations and various means of control.

(ii) One way streets- advantages and limitations. (iii) Traffic signals- isolated signals, coordinated signals, simultaneous, alternate, flexible and progressive signal systems. Types of traffic signals, fixed time signals, traffic actuated signals, speed control signals, pedestrian signals, flashing signals, clearance interval and problems on single isolated traffic signal.

UNIT -IV

Street Lighting : (i) Methods of light distribution. (ii) Design of street lighting system. (iii) Definitions- Luminaire, foot candle, Lumen, utilization and maintenance factors. (iv) Different types of light sources used for street lighting. (v) Fundamental factors of night vision.

UNIT -V

Accident Studies & Mass Transportation : (i) Accident Studies : Causes of accidents, accident studies and records, condition and collision diagram, preventive measures. (ii) Expressways and freeways, problems on mass transportation and remedial measures, brief study of mass transportation available in the country.

REFERENCE BOOKS :

1. Traffic Engineering and Transport Planning by L.R. Kadiyali, Khanna Publishers, Delhi.
2. Traffic Engineering by Matson, W.S.Smith & F.W. Hurd.
3. G.J. Pingnataro, Principles of Traffic Engineering.
4. D.R.Drew, Traffic Flow Theory.
5. W.R. Mchsne and R.P. Roess "Traffic Engg".
6. Wohl & Martin, Traffic System Analysis for Engineering & Planners.

CE706 MINOR PROJECT

Each candidate shall work on an approved project of a public building or any other civil engineering work and shall submit design and a set of drawings.

OR

Shall submit a detailed report of experimental work/ software package on any specific problem of importance.