FOUR YEAR DEGREE COURSE IN CIVIL ENGINEERING

SEMESTER PATTERN (CREDIT GRADE SYSTEM)

SEMESTER - FIFTH **Appendix - A**

			TEACHING SCHEME					EXAMINATION SCHEME								
			HOURS / WEEK			Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL			
Sr. No.	Subject Code	Subject	Lecture	Tutorial	P/D			DURATION OF PAPER (Hr.)	MAX. MARKS THEORY PAPER	MAX. MARKS COLLEGE ASSESMENT	TOTAL	MIN. PASSING MARKS	MAX. MARKS EXTERNAL	MAX. MARKS INTERNAL	TOTAL	MIN. PASSING MARKS
THEORY																
01	5CE01	Reinforced Cement Concrete-II	3	1	-	4	4	4	80	20	100	40	-	-	-	-
02	5CE02	Fluid Mechanics-II	3	1	-	4	4	3	80	20	100	40	-	-	-	-
03	5CE03	Building Planning & CAD	2	-	-	2	2	4	80	20	100	40	-	-	-	-
04	5CE04	Surveying-II	4	-	-	4	4	3	80	20	100	40	-	-	-	-
05	5FECE05	Free Elective-I	3	-	-	3	3	3	80	20	100	40	-	-	-	-
06	5CE06	Communication Skills	2	-	-	2	2	2	40	10	50	20	-	-	-	-
PRACTICALS / DRAWING / DESIGN																
07	5CE07	Fluid Mechanics-II - Lab	-	-	2	2	1	-	-	-	-	-	25	25	50	25
08	5CE08	Building Planning & CAD-lab	-	-	4	4	2	-	-	-	-	-	25	25	50	25
09	5CE09	Surveying-II - Lab	-	-	2	2	1	-	-	-	-	-	25	25	50	25
10	5CE10	Communication Skills-Lab	-	-	2	2	1	-	-	-	-	-	25	25	50	25
		Total	17	2	10	29	24				550				200	
															GRAND TOTAL : 750	

Free Elective I : (i) Introduction To Earthquake Engineering (ii) Basics of Building Construction (iii) Watershed Management

SEMESTER : SIXTH

THEORY																
01	6CE01	Numerical Methods & Computer Programming	4	-	-	4	4	3	80	20	100	40	-	-	-	-
02	6CE02	Structural Design-I	4	-	-	4	4	4	80	20	100	40	-	-	-	-
03	6CE03	Water Resources Engineering-I	3	-	-	3	3	3	80	20	100	40	-	-	-	-
04	6CE04	Transporatation Engineering-II	3	1	-	4	4	3	80	20	100	40	-	-	-	-
05	6FECE05	Free Elective-II	3	-	-	3	3	3	80	20	100	40	-	-	-	-
06	6CE06	Estimating & Costing	3	1	-	4	4	4	80	20	100	40	-	-	-	-
PRACTICALS / DRAWING / DESIGN																
07	6CE07	Numerical Methods & Computer Programming - Lab	-	-	2	2	1	-	-	-	-	-	25	25	50	25
08	6CE08	Structural Design-I - Lab	-	-	2	2	1	-	-	-	-	-	25	25	50	25
09	6CE09	Estimating & Costing-Lab	-	-	2	2	1	-	-	-	-	-	25	25	50	25
10	6CE10	Minor Project - Lab	-	-	2	2	1	-	-	-	-	-	25	25	50	25
		Total	18	2	10	30	26				600				200	
															GRAND TOTAL : 800	

Free Elective II : (i) Disaster Management (ii) Environmental Management

Note: Students will have to opt the Free Electives offered from other courses of their College / Institution / University Department.

SYLLABUS PRESCRIBED FOR
BACHELOR OF ENGINEERING
CIVIL ENGINEERING EXAMS.
SEMESTER PATTERN (CREDIT GRADE SYSTEM) 5CE01:

REINFORCED CEMENT CONCRETE – II SECTION – A

Unit I : 1. Design of circular tanks with rigid and flexible base resting on firm ground by working stress method.
Design of rectangular water tanks resting on firm ground by using IS code method (working stress method).

LIMIT STATE METHOD:

Unit-II : 1) Introduction to limit state method, basic concept of singly, doubly reinforced and flanged beams, shear and comparison with working stress method.
Analysis and design of one way single span and continuous slabs.

Unit-III 1) Analysis and design of two way solid slabs.
2) Staircases, Design of Dog legged type staircase only.

SECTION-B

Unit-IV: Analysis and complete design of beams, rectangular and flanged sections for bending moment and shear.

Unit-V: 1) Analysis and design of columns for axial load, uniaxial and biaxial bending. (Problem on uniaxial bending only)
Design of Isolated footings: Square and rectangular footings subjected to axial load only, Design problem on footing with uniform & non-uniform depth.

Unit-VI:1) Design of grid slab by I.S. code method.
Detailing for earthquake resistant construction. Introduction, Cyclic behavior of concrete and reinforcement, significance of Ductility, Ductility of detailing for beams, Columns, joints & shear walls.

Note: Students should use the latest I.S. codes.

BOOKS RECOMMENDED:

Jain A.K.: Plain & Reinforced Concrete, Vol. I & II

Sinha S.K. & Roy S.K.: Fundamentals of RCC.

Pillai & Menon: RCC Design.

Dr.Shah V.L. & Karve S.R.: Limit State Design.

5CE02: FLUID MECHANICS-II
SECTION – A

Unit-I : Turbulent flow through pipes: Karman-Prandtl's equation (No Proof), Nikuradse's experiment, Velocity distribution laws & universal resistance laws, Hydraulically smooth & rough pipes.

Unit -II: Uniform flow, Open channel flow, Types of flow, , geometric elements of rectangular & trapezoidal sections, Chezy's & Mannings equations, most efficient rectangular & trapezoidal section, Energy & momentum principles, Normal & critical depth, specific energy diagram, discharge diagram. Analysis of surface profile by Ven-Te-Chow method.

Unit-III: Gradually varied flow, Dynamic equation of G.V.F. with proof, Analysis of Surface profiles, single step method. Rapidly varied flow; Hydraulic jump in horizontal rectangular channel, specific force diagram, elements of jump, relation between conjugate depth.

SECTION - B

Unit-IV: Dimensional Analysis ; Buckingham's Pie theorem, it's application, similitude, Dimensionless numbers, Re, Fr, We, Predominant forces & their ratio, Model Analysis - Geometrically similar models, Reynolds law, Froudes law, Model study of spillways.

Unit V : Impact of jet on stationary & moving plates, symmetrical, asymmetrical curved vanes; Moment of momentum equation (statement only), velocity diagrams. Elements of Hydroelectric Plant, Hydraulic turbines; classification of turbines, Description of Pelton wheel & Francis turbine, calculation of work done, power & efficiency, specific speed.

UnitVI: Classification of pumps ; centrifugal pumps, main parts & working, velocity diagrams, work done, efficiency, priming of pumps, brief introduction of reciprocating pump, Jet pump, Submersible pump, Hydraulic Ram (No numerical).

BOOKS RECOMMENDED:

Modi P.N. & Seth S.M. : Hydraulics & Fluid Mechanics, SI Edition, Standard Book House, New Delhi-6

Ranga Raju : Open Channel Flow.

Dr. Jain A.K. : Fluid Mechanics.

Subramanya K. : Flow in Open Channel.

Chow V.T. : Open Channel Hydraulics.

Garde & Mirajgaonkar : Fluid Mechanics.

5CE03 : BUILDING PLANNING AND CAD

SECTION – A

Unit- I : Introduction: Importance of building drawing for Civil Engineering in construction & estimation, Method of drawing – Selection of scales for various drawings, types of line, methods of dimensioning in architectural drawing.

Abbreviations & graphical symbols used in Civil Engineering Drawing as per IS : 962. Combined first angle & third angle method of projection. Layout of sheet for civil engineering drawing, Requirements of drawing as per plan sanctioning authorities.

Unit-II : Concept of line plan & working drawings of the building. Developing working drawings of the building from the given line plan Details to be incorporated in the working drawing. Necessity and use of working drawing. Concept of site plan, block plan and layout plan. Importance and details to be incorporated. Concept of foundation plan, importance and use. Developing working drawing and foundation plan for load bearing and framed structures. Plumbing & electric plan.

SECTION - B

Unit-III: Planning of residential building. Introduction, general principles of planning viz. aspect, prospect, roominess, privacy, grouping, circulation, ventilation, furniture requirement. Climate and design consideration. Orientation of buildings, requirement of the owner, alternatives of building types viz. individual bungalows, semidetached houses, row houses, apartments. Provision of mezzanine floor, balconies and porches in the building. Common utilities such as parking, security, water supply, sanitation, etc. for apartments. Criteria for earthquake resistant planning of building.

Unit-IV: Building rules and by laws, for residential buildings, conversion of land to non-agricultural lands, layout for a housing project. Types of public building and their requirements, planning of public building. Preparing line plans of different public buildings such as schools, commercial market, primary health center, workshop, college building, post-office. Free-hand sketching : Importance in Civil engineering. Free hand sketching of components of buildings and elevation features of building such as balconies, chajjas, etc. Perspective drawing, Staircase planning & drawing.

UNIT-V: (Only for laboratory work)

AUTOCAD: Understanding basic concepts such as Absolute, relative & world Co-ordinates, Drawing units, drawing limits, extend, layers, line types, object snapping, filters.

Drawing entities in AutoCAD/Felix CAD, various drawing commands, use of object snaps & filters, Editing the drawing different editing commands, Dimensioning commands, Text commands, Hatching commands viewing the drawing different views, view ports, zooming in & out, panning, saving & printing in different scales.

IMPORTANT NOTE:-

Theory questions only on unit first four units.
No theory questions on unit V

BOOKS RECOMMENDED:

Shah, Kale & Patki, Building Planning & Drawing, Tata McGraw-Hill plubication

Dr. Kumar Swamy & Rao Swamy, Charotar publications

Chery R ,Auto cad Pocket reference, BPB Publication.

5CE04 : SURVEYING-II

SECTION- A

Unit-I: Tacheometry: Stadia methods, fixed hair and movable hair and tangential method, formulae for distance and reduce level determination. Theory of analytic lens, Beaman's stadia arc, Auto reduction tacheometer such as Jeffcot Hammer fennel.

Unit-II : 1. Curves : Classification, degree of curve, elements of circular and compound curves, theory and methods of setting out simple curves, Instrumental method of setting out compound curves.

Transition curves. : Ideal transition curves, characteristics methods of determination of length, Elements of different types and methods of setting out.

Unit-III 1. Triangulation : principles, classification of triangulation system, triangulation figures, their choice of station, phase of signals, towers, satellite station, reduction to center, field work, Reconnaissance, Inter-visibility, angular measurements.

Basenet, extension of Basenet, adjustment of field observation, errors in observation, method of least square, weighted observations, figure adjustment (Triangle only).

SECTION B

Unit-IV: 1. Hydrographic surveying: necessity, controls, shore line surveys, gauges, sounding equipments and procedure of taking soundings, methods of location of sounding, three point problem in hydrographic surveying, analytical and graphical methods. Station pointer.

Underground Surveying: surface alignment, correlation of surface and underground surveys; Weisbach triangle, transferring levels underground.

Unit-V: 1. Elements of photogrammetry: Basic definitions, terrestrial and aerial photography, scale of vertical photograph, Relief and relief displacements, heights from parallel measurements, flight planning, photographs required.

Remote sensing : Introduction, definitions, remote sensing systems, advantages over conventional system, energy interaction in the atmosphere, Indian remote sensing satellite series and their characteristics.

Unit-VI: 1. Field Astronomy : Elements of spherical trigonometry, Napier's rules of circular parts, celestial sphere, ecliptic, circumpolar stars, astronomical terms, Astronomical triangle, co-ordinate systems.

GIS & GPS : Components of geographical information system (GIS), advantages, function of GIS, advantages and disadvantages, global positioning system. (GPS), introduction, definitions, GPS receivers, antenna, advantages of GPS.

BOOKS RECOMMENDED :

D.Clark. : Plane and Geodetic Surveying Vol II
T.P.Kanetkar & S.V.Kulkarni : Surveying and Levelling Part II
B.C.Punmia : Surveying Vol. II and III
Prof.Agor : Surveying
Prof. Shahane : Advanced Surveying.

5FECE05: FREE ELECTIVE-I
(i) INTRODUCTION TO EARTHQUAKE ENGINEERING

SECTION A

Unit-I: Interior of earth, Engineering geology of earthquakes, plate tectonics, Seismicity of the world, tectonics features of India, Faults, Propagation of earthquake waves .

Unit-II: Quantification of earthquake (magnitude, energy, intensity of earthquake), Measurements of earthquake (accelerograph,

accelerogram recording), Determination of magnitude, Epicenter distance, Ground motion and their characteristics, Factors affecting ground motions.

Unit-III: Guidelines for achieving efficient seismic resistant planning, selection of sites, importance of architectural features in earthquake resistant buildings

SECTION B

Unit-IV: Projections & suspended parts, special construction features like separation of adjoining structure, crumble section, stair case etc, twisting of building, seismic effects on structures, inertia forces, horizontal & vertical shaking.

Unit-V: Behavior of masonry structure during earthquake, bands & reinforcement in masonry building opening in walls, importance of flexible structures,

Unit-VI: Behavior of R.C. building in past earthquakes. Concept of earthquake Resistant design, Introduction to IS: 1893

Reference Books:

Duggal S. K., Earthquake Resistant Design of Structures, Oxford University Press 2007
Amita Sinvhal; Understanding Earthquake Disasters, Tata McGraw Hill
P. N. Agraval; Engineering Seismology Oxford & IBH Publishing
C.V.R.Murty; Earthquake Tips National Information Centre of Earthquake Engineering I I T Kanpur
Pankaj Agrawal & Manish Shrikhande ; Earthquake Resistant Design of Structures Prentice- Hall of India

5FECE05: FREE ELECTIVE-I (ii) BASICS OF BUILDING CONSTRUCTION SECTION –A

Unit-I : Introduction: Definition of building as per national building code, components of buildings and their function , Types of structure-load bearing structure and frame structures, their relative advantages and disadvantages, load bearing walls and partition walls. Types of foundation- Definition and necessity and types of foundations, precautions to be taken against failure of foundations

Unit-II : Stone Masonry- Technical term, general principles to be observed during construction, selection of stone masonry. Brick Masonry Construction- Technical term, general principles to be observed during construction, commonly used types of bonds

such as Stretcher, Header, English bond Flemish bond and their suitability.

Unit-III: Floors- Types of floors-Basement floor, ground floor and upper floor. Types of upper floors-R.C.C. slab floor, R.C.C. slab and beam floor, R.C.C. grid floor, R.C.C. flat slab floor. Floor Finishes-Types of flooring material, Shahabad , Kota, Granite, Ceramic tiles, Plain tiles, mosaic tiles ,glazed tiles ,different types of floor finishes , their suitability. Method of construction, criteria of selection. Roofs-Flat and pitched roof ,steel roof trusses-types and suitability ,fixing details at supports ,types of roof covering ,AC and GI sheets, acrylic sheets, fixing details of roof covering.

SECTION –B

Unit IV: Door –Purpose, criteria for location, size of door, door frames and its types, method of fixing Windows- Purpose, criteria for location, size and shapes of windows, types of windows and their suitability. Ventilators – Types and their suitability. Fixtures and Fastening for doors and windows. Glass- Types of glass and their suitability. Arches and Lintels - Types and their suitability. Details of R.C.C. lintels and chajja, precast lintels and arches

Unit-V: Stairs- Function, technical terms, criteria for location, types of staircases and their suitability. Plastering and Pointing-Necessity, types, processes of different types of plastering, defects in plaster work Painting and Coloring – Necessity, types, processes of painting and coloring to the wall surface, wooden surfaces, iron and steel surfaces, types of paints and their uses Scaffolding- Purposes, types, suitability.

Unit VI: Special Aspects of Construction, Damp proofing-causes of dampness, its effects, various methods of damp proofing, material used for damp proofing. Fire proof construction-Points to be observed during planning and construction. Fire protection requirement for a multistoried building, Sound proof construction –Sound absorbents and their characteristic. Joints-Expansion and construction joints necessity, details of expansion joint at foundation level and roof level of load bearing structure and framed structure, Provision of construction joints in slabs, beams and columns.

BOOKS RECOMMENDED:

Deshpande R.S.. and Vartak C.V.: A Treatise on Building Construction.
Sharma S.K. Kaul and B.K. :A.T.B. Building Construction ,S Chand and co.
Gurucharan Sing : Building Construction Engineering, Standard Book House ,Delhi-06

Sane L.S.: Construction Engineering, Manak Talas, Mumbai
Chudley R.: Construction Technology ,Volume I.II.III. and IV,Longmans Group Ltd.
ISE National Building code of India,1970

5FECE05: FREE ELECTIVE-I

(iii) WATERSHED MANAGEMENT

SECTION-A

Unit I Engineering Hydrology: Definition and its importance, Hydrological Cycle, Hydrologic equation. Storages, concept of storages, the watershed
Water and Energy: Energy movement, quality of energy, geometry of energy. The energy budget, Instruments and limitations. The role of water in energy sphere.

Unit II Precipitation: Forms, Types. Factor affecting, Measurement
Evaporation: Processes, factor affecting, measurement and estimation
Evapotranspiration: Processes, factor affecting, measurement and estimation
Infiltration: Processes, factor affecting, measurement and infiltration indices

Unit III Run-off: Factor affecting, estimation of runoff, Rainfall-Runoff co-relation
Floods: Floods classification importance, estimation of flood, flood control techniques, Brief description of flood routing.

SECTION-B

Unit IV Common aquifer: Exploration of ground water hydraulics of ground water flow-Measurement of permeability of formations, flow net and their construction .
Boundary Conditions: Unconfined and confined, steady and unsteady flow in to wells and infiltration galleries.

Unit V : Watershed development management-Definition, Need and scope, characterization of watershed criteria survey, Basic data collection and interpretation, Establishment of watershed research stations.
Hydrographs: Typical flood Hydrograph, base flow separation, Unit hydrograph, S-curve hydrograph.

Unit VI Rain water harvesting: Necessity, method of rain water harvesting, water harvesting potentially, elements of typical water harvesting system, cost of water harvesting.
Roles of NGO's Government and Municipal Corporation Limitations, quality assurance of stored water.

Books Recommended:

Sharma R.K.: Hydrology and Water Resources Engineering .
Peter E.Black: Watershed Hydrology.
Dr. Reddy Jayarami P. :Hydrology, Laxmi Pub..Delhi.
R.N.Chaturvedi: Water Resources Systems,Planning and Management.
Raghunath H.M. :Hydrology,Wiley Eastern Ltd., New Delhi.
Subramanya S. : Hudrology, Tata McGRAW Hill

5CE06: COMMUNICATION SKILLS

Unit I : Word Study : synonym, antonym, meanings, matching words, adjectives, adverbs, prefix and suffix, correct forms of commonly misspelled words, understanding of the given passage. Comprehension over an unseen passage. Most commonly spoken sentences.

Unit II : (a) Verbal communication, its significance, types of written communication, organization of a text (titles, summaries, headings, sequencing, signaling, cueing etc.), important text factors (length of paragraph, sentences, words, clarification and text difficulty).Evaluation of written communication for its effectivity and subject content.

Non-verbal communication, types of graphics and pictorial devices, body language.

Unit III :(a) Specific formats for written communication like business correspondence, formal reports, technical proposals, research papers and articles, advertising and graphics. Format for day-to- day written communication like application, notices, minutes, quotations, orders, enquiries etc.

Oral communications - important objectives of interpersonal skills, (verbal and non-verbal), face to face communications, group discussion and personal interviews. Methodology of conduction of meetings, seminars, symposia, conferences and workshops.

BOOKS RECOMMENDED :

Krishna Mohan, Meera Banerjee : Developing Communication Skills, MacMillan India Limited.

Chrissie Wright (Editor) : Handbook of Practical Communication Skills, Jaico Pub. House.

Curriculum Development Centre, TTTI WR, Bhopal : A Course in Technical Engish, Somaiya Pub. Pvt. Ltd.]

F. Frank Candlin : General English for Technical Students, University of London Press Ltd.

5CE07: FLUID MECHANICS -II – Lab

PRACTICALS –

Minimum 8 practicals out of the list given below are to be performed: The practical examination shall consist of viva-voce based on theory & practicals.

Verification of momentum equation.

Determination of Chezy's coefficient.

Determination of coefficient of discharge of Venturiflume.

Study of Gradually Varied Flow.

Study of hydraulic jump, calculations of height of jump, length & energy loss.

Trial on Pelton wheel.

Trial on Francis turbine.

Trial on Reciprocating pump.

Trial on Centrifugal pump.

Trial on Hydraulic Ram.

Study of Hot wire Anemometer, Laser Doppler Anemometer.

5CE08: BUILDING PLANNING AND CAD –Lab

Creating drawing of following, manually & by Auto CAD/Felix CAD and printouts to be submitted along with 10 free hand sketches on quarter of the imperial size sheet.

Developing working drawing of single storied residential building from the given line plan.

Preparing line plan of residential building from the given data. Developing submission drawing of the above as per requirement of the plan sanctioning authority. (Separate data should be given to every student).

Developing working drawing of multistoried framed structures (Apartment building) from given line plan.

Developing line plans of public building from the given data (minimum 2 line plans)

Free hand sketches: development of free hand sketches of components of building and elevation features of building such as balconies, chajjas, etc.

5CE09: SURVEYING -II - Lab

PRACTICALS –

Minimum 8 practicals from the list mentioned below shall be performed by each student and observations, calculation and relevant work shall be submitted as a sessional work.

Practical examination shall consist of field exercise and vivavoce examination based on the above syllabus & practicals.

LIST OF EXPERIMENTS :

Ranging circular curve by offsets from Long Chord.

Ranging circular curve by offset from tangents.

Ranging circular curve by offset from chord produced.

Ranging circular curve by single theodolite.

Ranging circular curve by double theodolite.

Ranging of transition curve.

Finding out tachometric constants.
Finding out height & distances by tachometry.
Practical on Stereoscope.
Location of true meridian at the given point.
Triangulation by satellite station.
Base line measurement.
Triangulation
Finding out Latitude and Longitude of a place.
To find horizontal distance and difference in elevation between two points by using Total station.

5CE010: COMMUNICATION SKILL - Lab

Interactive Language Laboratory.
Group Discussion
Submission of Technical Report.
Mock Interview.

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6CE01: NUMERICAL METHODS AND COMPUTER PROGRAMMING
SECTION - A

Unit-I : 1. Basic grammar of FORTRAN, use of library functions
FORTRAN coding sheet, input output statements, format for input output statement, flowchart
File input output

Unit-II : 1. Control statements: GO TO, computed GO TO, Assigned GO TO, arithmetic IF, logical IF, block IF, DO statement, implied DO loop
Type declaration statement, DIMENSION statement, subscripted variables, DATA statement

Unit-III : 1. Sub – programs: Statement function, function sub – program, subroutine sub program. Dummy and actual arguments.
2. COMMON statement, labeled and blank COMMON,

SECTION-B

Computer Programming using FORTRAN 77

Unit-IV: 1. Matrix operations such as:
Addition and substraction
Multiplication
Transpose
Testing summary etc.

Fourth order, Runge - Kutta method for solution of first order, second order differential equations and two simultaneous equations.

Unit-V : 1. Solution of quadratic equation
Numerical integral using Trapezoidal and Simpson rule
Finding root of equation f (x) = 0 by Newton -Raphson, Regula -Falsi and Bisection method.

Unit VI :1. Centre of gravity, moment of inertia & radius of gyration of Tee section.
Bending moment and shear force ordinates for simply supported beam subjected to point and uniformly distributed load only.
Design of singly reinforced beam by limit state method.
Determination of coefficient of permeability in parallel and perpendicular direction of bedding plane
Reduce level by height of instrument method.
Determination of Chezy's constant.

BOOKS RECOMMENDED:

Rajaraman, Computer Programming in FORTRAN
Schaum Series, FORTRAN Programming.

6CE02: STRUCTURAL DESIGN-I (Steel structures by Limit State method using IS 800: 2007) **Section - A**

Unit I: 1. Introduction to WSM, LSM & plastic analysis.
Design of bolted & welded connections subjected to axial loading.

Unit II: 1. Design of compression & tension member.
Design of Industrial shed

Section - B

Unit III: 1. Design of simple & compound columns for axial & eccentric loading.
Design of column bases subjected to axial load & moment, gusseted base & solid slab base.

Unit IV: 1. Design of simple & compound Beams.
2. Design of welded Plate girder.

BOOKS RECOMMENDED:

Duggal, S. K., Design of Steel Structures, Tata McGraw Hill Pub. Company Ltd.
N. Subrramanyam, Design of Steel Structures, Oxford University Press, 2008.

Shah & Karve, Design of steel structures.
Sheyakar, Design of steel structure.
Bhavikatti, Design of steel structure

6CE03: WATER RESOURCES ENGINEERING – I
SECTION – A

Unit-I : Engineering Hydrology: Definition and its importance, Hydrological Cycle, Hydrologic equation, Precipitation: Forms, Types, Factors affecting, Measurement, Rain gauge Network, Estimation of Missing data, Consistency of data, Mean Areal Precipitation, Brief introduction of Intensity-duration-Frequency relationship and Artificial rain.

Unit II : Evaporation: Process, factors affecting, measurement and estimation, control of evaporation. Evapotranspiration: Factors affecting, measurement, and estimation Infiltration: Process, factors affecting, measurement, Infiltration indices. Run-off: Factors affecting, estimation of runoff, Rainfall- Runoff co-relation.

Unit-III: Floods: Flood classification, importance, estimation of flood, flood control techniques, Brief description of flood routing. Hydrographs: Typical flood hydrograph, base flow separation, Unit hydrograph, S-curve hydrograph.

SECTION-B

Unit IV: Irrigation Engineering: Necessity and advantages of irrigation, suitability of soils for different crops, standards for irrigation water. Minor Irrigation Works: Necessity and general layout of Bandhara and percolation Tank. Lift Irrigation: Necessity and general layout, main components

Unit-V: Crop Water Requirements: Principal Indian crop seasons and water requirements for different crops, Duty and Delta, Consumptive use of water and its estimation, Irrigation efficiency. Irrigation methods: Comparative study of different irrigation methods with special emphasis on sprinkler and drip irrigation.

Unit VI: Ground water: Aquifer parameters, Well hydraulics for steady flow condition, safe yield and yield tests. Water Harvesting: Definition, Need for water harvesting, water harvesting potentially, elements of typical water harvesting system, Methods of water harvesting, cost of water harvesting,

BOOKS RECOMMENDED :

Hydrology

Sharma R.K. : Hydrology & Water Resources Engg.
Raghunath H.M. : Hydrology, Wiley Eastern Ltd., New Delhi.

Dr.Reddy Jayarami P. : Hydrology, Laxmi Pub., Delhi.
Subramanya S. : Hydrology, Tata McGraw Hill.

6CE04: TRANSPORTATION ENGINEERING - II
SECTION – A

Unit-I : RAILWAY: Railway transportation, classification Railway surveying, track standard terminology, track sections in embankment & cutting, high speed trains. Traction and tractive resistance, hauling capacity and tractive effort of locomotives, different types of traction.

Unit-II: Permanent way: requirement, gauges, coning of wheels, components of permanent way, Rail types and functions, defects in Rails, Rail joints, Sleeper density, Rail fixtures & fastening. Geometric design of railway track, gauge, gradients, speed, superelevation, cant deficiency, negative superelevation, grade compensation, curves, Railway accidents and causes.

Unit-III: Points and crossing Left & right hand turnouts, design calculations for turnout & cross over, types of Track junction, long welded rails. Station and yards : types, function, facilities equipment. Railway signalling and interlocking: objects, classification & types of signals, control & movement of trains.

SECTION - B

Unit-IV: AIRPORT: Development of air transportation in India, Agencies controlling national & international aviation, Various surveys to be conducted, airport site selection, Airport drainage, Aeroplane component parts, Aircraft characteristics. Airport obstructions: Zoning laws, imaginary surfaces approach and turning zone Runway and Taxiway design: orientation of runway, wind rose diagram, basic runway length and corrections, runway geometric design standards.

Unit-V: Airport layout, Terminal area, unit terminal concept, Apron, Apron layout, Aircraft parking & parking system. Visual aids, Airport parking & lighting of runway, taxiway and other areas. Airport traffic control, need of control aids, instrumental landing systems, accidents in the air.

Unit-VI: TUNNELS: Tunnels necessity, types, tunnel economics, tunnel alignment, tunneling methods in soft soil & hard rock. Needle beam method, drift method. Size and shape of tunnels, Tunnel lining, drainage, ventilation & lighting of tunnels.

BOOKS RECOMMENDED :

Saxena & Arora : Railway Engineering.
Agrawal M.M. : Railway Engineering.
Khanna S.K., Arora M.G., Jain S.S. : Airport Planning & Design,
Srinivasan : Tunnel Engineering.

6FECE05 : FREE ELECTIVE-II
(i) DISASTER MANAGEMENT
SECTION – A

Unit I: What is disaster, types, damage caused, pre-disaster preparedness, post-disaster preparedness, early warning strategies, National disaster management guidelines, role of NGO'S in disaster management.

Unit II: Principles of emergency management, crisis management, International organizations such as Red cross, United Nations, European Union, Indian organizations, Natural hazards in coastal states in India, what is Tsunami, its characteristics.

Unit III: Monsoon in India, its calculations, flood hazard in India. Regions of country prone to floods, flash floods, damages caused due to floods, Do's and Don'ts in Earthquake.

SECTION - B

Unit IV: Application of remote sensing in disaster management, flood forecasting and warning in India, coordination of central water commission and Indian meteorological department, action plan for flood forecasting and warning.

Unit V : Disaster risk reduction programme, institutional strengthening and capacity building for DRR by Central Govt., State disaster management authority, its functions human resource support required at SDMA, need of psychosocial support and mental health in disasters.

Unit VI : Training of human resource in disaster risk reduction planning at state level, awareness among people, key responsibility of engineers in disaster reduction techniques, medical preparedness aspect of disaster, plan to counter, threats to water supply.

Books Recommended;

Cuny,Fred C; Disasters and management, oxford Uni. Press.

Alexander,David; Principles of emergency planning and management, Terra publishing, ISBN 1-903544-10-6

National Disaster Management Authority, Govt. of India, Report.

A.S. Arya Action Plan For Earthquake, Disaster, Mitigation in V.K. Sharma (Ed)

Disaster Management IIPA Publication New Delhi, 1994

6FECE05 : FREE ELECTIVE-II
(ii) ENVIRONMENTAL MANAGEMENT
SECTION – A

Unit I : The nature, scope and components of environmental management.

Environmental impact analysis- need and importance, step involved methods of EIA, public participation and communication.

Unit II: Environmental policy analysis- micro level and macro level, methods of policy analysis, steps involved. : Operational methods, quantitative methods, statical analysis public policy analysis resource allocation, environmental economics etc.

Unit III: Environmental management plan (EMP): components of Environmental Management Plan, Preparation of Environmental Management Plan

SECTION – B

Unit IV: Environmental Legislation and Acts: Water (prevention and control of pollution) Act1974,Air (prevention and control of pollution) Act 1981, Environmental protection Act (EPA) 986, Hazardous waste rules1989, Factory Act 1984 amendments in 1987, Environmental Management System: ISO 14000(EMS) Environmental Audits: methods, components and preparation.

Unit V: Various agencies for Environmental Managements in India: Ministry of environment and forest, central pollution control boards, state pollution control boards, local bodies, - their scopes, organizational and functional issues, their working etc.

Unit VI: Basics of Data Base Management System (DBMS), Geographic Information System (GIS) and remote sensing in Environmental Management.

Information of software for EIA

Books Recommended :

Environmental Impact Analysis- a decision Making Tool: By R K Jain

Theory and Practice of Environmental Impact Assessment: By Abbasi AND Ramesh

Environmental Impact Assessment: By Shrivastava

Environmental laws and policy in India, Armin Rozencaranz, Sham Diwan Marhta L. Nobel, Tripathi publication.

Environmental Legislation: V Krishnamurthi

6CE06: ESTIMATING AND COSTING

SECTION – A

Unit-I : General: Importance of the subject, purpose of quantity estimates, Modes of measurement and units of measurement as IS1200. Methods of cost estimating in general, various methods of stage-I (approximate) estimates.

Specification: Purpose and principles of specification writing, types of specification writing and developing detailed specification of a few items related to building, Irrigation Work, Road work. Problem on Four rooms for measurement only

Unit–II : Cost Building-up: purpose and principles, importance of Schedule of Rates in cost estimates, factors affecting analysis of rates. Fixed, variable prime and supplementary cost, overhead costs and its allocation. Recommendations from N.B.O. for Task work, No. of workman etc., Schedule of rates, market rate analysis of some specific items including transportation cost. Workout quantities of various materials required for construction, such as cement, steel, bricks, aggregates, timber.

Unit-III: Cost & Quantity Estimate: Methods of detailed estimates, forms used, detailed estimates of Civil Engineering works, Building, Quantity estimates:

SECTION – B

Unit-IV: Earth work estimates in Roads including hill road. Earthwork calculations for earthen dam.

Unit-V : Valuation - Purpose of valuation, value and cost, market value, potential value, sentimental value, scrap value, etc.

Real estate, Guilt edged security. Net & gross return, tenure of land, free hold & lease hold property. Sinking fund, Depreciation, capitalized value, annualized value, of a old building.

Unit-VI: Organisation for construction industry specific to Govt. organisation. P.W.D.Organisation, Site administration, Labour contracts, BOT. Role of Govt.deptt. as a construction agency, Arranging Works: Methods of carrying out works, Arranging contract work, Tender Notices, acceptance of tender, essentials of contracts, types of contracts, contract documents,

Indian contract law and Engineering contracts, land acquisition Act, Legal aspects of various contract provision. Cost accounting, various methods; classification of cost, direct & indirect charges, distribution of overheads, MAS account, issue rate of store account.

BOOKS RECOMMENDED:

R.H.Namavati. : Estimating and Valuation

D.N.Datta : Estimating & Costing – Datta Lucknow.

Vazirani: C.E.Estimating & Costing, Chandola Khanna Publisher Delhi.

B.S.Patil: Estimating Costing – Orient Longmans.

P.W. & H.Deptt. Govt. of Maharashtra: Standard Specification

Namavati: Valuation

Rangawala: Valuation Charotar Book Stall

Dhanpat Rai: Text book of Estimates Costing – Anand & Sons, Delhi.

B.C.Chakraborty: Principles of Estimation & Costing.

Indian Contract Act.

6CE07 : NUMERICAL METHODS AND COMPUTER PROGRAMMING -Lab

PRACTICALS:

Preparation and execution of at least eight computer programs using FORTRAN. A journal/report on experiments conducted shall be submitted by each student. Practical examination shall be viva-voce based on above practical and the syllabus of the course.

6CE08 : STRUCTURAL DESIGN-I – Lab

PRACTICALS:

Candidates are required to prepare at least two designs of steel structures based on theoretical course detailed workings are necessary.

A compulsory site visit for studying the various aspect and prepare a report. An Journal/report on experiments conducted shall be submitted by each student. Practical examination shall be viva-voce based on above practical and the syllabus of the course.

6CE09: ESTIMATING AND COSTING –Lab

PRACTICALS –

The candidates submit the following:

i) Detailed estimate of a single story building with minimum four room with a flat roof (Given problem.)

Detailed estimate of road of minimum 1 KM length with Hot mix coat.

Detailed estimate of any two of the following.
- R.C.C. Frame structure Residential building.
- Culvert
- Septic tank for a colony.

Specification for 10 items as below.
- Building works 6 Items.
- Road Work 2 Items.
- Irrigation work 2 Items.

Analysis of 8 Items.

Valuation of building, existing Building should be taken for valuation work.

Submission of one working drawing by actual (field visit) visit to the construction site & its estimate.

Tender documents for the Building in problem No. 1
- Tender Notice.
- Tender.
- Schedule A and Schedule B.
- Conditions of contracts regarding time, labour payment, damages.

Use of Computer software for detailed estimate of building.

Writing specification for any item.

NOTE:- Practical Examination shall consists of viva-voce and a test based on syllabus and sessional work.

6CE10: MINOR PROJECT – Lab

Any one Group Project in details.

Irrigation Project
Rehabilitation of Village / Town
Water Supply Project
Sewerage System
Bridge on River

Students should conduct a detailed survey in a seven day camp.

Data Analysis, Design & Submit Report & Drawing sheets.