

SCHEME OF INSTRUCTION & EXAMINATION

B.E III YEAR (REGULAR)

(CIVIL ENGINEERING)

SEMESTER – II

Sl. No.	Syllabus Ref.No	SUBJECT	Scheme of Instructions		Scheme of Examination		
			Periods per Week	L/T D/P	Duration in Hrs	Maximum Marks Univ. Exam	Sessi- onals
THEORY							
1.	CE 351	Solid Mechanics	4	-	3	75	25
2.	CE 352	Steel Structures	4	2	3	75	25
3.	CE 353	Theory of Structures-II	4	2	3	75	25
4.	CE 354	Structural Engineering Design & Drawing-I(RCC)	4	2	3	75	25
5.	CE 355	Water Resources Engg.-I	4	-	3	75	25
6.	CE 356	Water & Waste Water Engineering	4	-	3	75	25
PRACTICALS							
1.	CE 381	Soil Mechanics Laboratory	-	3	3	50	25
2.	CE 382	Environmental Engineering Laboratory	-	3	3	50	25
3.	CE 383	Industrial Visit/Study	-	-	-	-	Gr*
TOTAL			24	12	-	550	200

*Excellent/Good/Satisfactory/Unsatisfactory

CE 351

SOIL MECHANICS

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examinations	75 Marks
Sessionals	25Marks

UNIT – I

Physical properties of soils: physical parameters of soil, void ratio, porosity, degree of saturation, water content, densities, relative density; classification and identification test, specific gravity (pycnometer and specific gravity bottle method), water content determination (oven dry method, pycnometer); grain size distribution curves, consistency limits, density determination (core cutter methods, sand replacement method), classification and identification of soils according to IS code 1984-1970.

UNIT – II

Permeability of soils: Darcy's law of seepage water through soils, determination of coefficient of permeability (a) constant head permeameter (b) variable head permeameter (c) pumping out test for permeable soils (d) pumping out test for artesian case (e) pumping in test with and without pressure.

Capillarity in Soils: capillary rise in narrow tubes, surface tension and capillary rise in soil suction in soils, PF values.

Seepage in soil: principles of drawing flownet for homogeneous section of earth dam by using Kozeny's parabola, computation of seepage quantities by using flownet. Effective and neutral stresses and quick sand phenomena, critical hydraulic gradient.

UNIT – III

Compaction: water content and density relationship, difference between proctor's test and AASHO test, IS specifications for light and heavy compaction, field compacting equipment, tandem rollers, sheep foot rollers, frog hammers, smooth rollers with vibrating equipment, field control of compaction.

Consolidation: spring analogy for consolidation, assumption in Terzaghi's theory of consolidation and derivation of differential equation of coefficients of consolidation and volumetric change settlement computation due to consolidation.

UNIT – IV

Shear Strength: shear parameters cohesion and angle of internal friction coulomb's law of shear strength, shear test (i) direct test (ii) unconfined test (iii) triaxial compression test (iv) vane shear test, factors affecting shear strength of soils.

UNIT – V

Earth Pressure: definition of active earth pressure, earth pressure at rest and passive earth pressure, computation of active and passive earth on the back of the retaining wall in cohesion

less and cohesion soils, coulomb's wedge of earth pressure and Rebhan's construction for cohesion less soil. Stability of earth retaining structures.

Slope stability: concept of factor of safety for stability of earth slopes, method of slice for homogeneous slope section, stability number and factor and their use in computation of factor of safety.

Suggested Reading:

1. C.Venkatramaiah, Geotechnical Engineering, New Age International Publications, 1995.
2. B.C. Punmia, Soil Mechanics and Foundation Engineering, Laxmi Publication, 1998.
3. K.R. Arora, Soil Mechanics and Foundation Engineering, Standard Publishers, 1997.
4. Gopal Ranjan and AS Rao, Basic and Applied Soil Mechanics, Wiley Eastern Limited, 1996.

CE 352

STEEL STRUCTURES

Instruction	4 Periods per week + 2 Drawing
periods/week	
Duration of University Examination	3 Hours
University Examinations	75 Marks
Sessionals	25Marks

UNIT – I

Properties of standard section, selection of working stresses as per IS code; Design of simple and compound beams.

Riveted joints: modes of failure and efficiency of a joint, design of lap and butt joints.

Welded joints: different types of welds, permissible stresses; design of butt and fillet welds.

UNIT – II

Design of tension members and splices: permissible stresses, forms of tension members, connection.

Connections: design of riveted and welded eccentric bracket connection, stiffened and unstiffened beam end connections.

UNIT – III

Compression members: slenderness ratio different forms of compression members, plain and built-up stanchions; IS formula for design; design of built up columns with battens and lacing; splicing of columns; design of slab and gusseted bases for columns.

UNIT – IV

Roof trusses: types of trusses for different spans, kinds of end supports, economics spacing of trusses, estimation of loads for different roof coverings, self weight of truss, wind effects, design of purlins for dead loads, live load and wind loads, detailed design of a roof truss including joints and connections.

UNIT – V

Plastic Analysis: basic principles of plastic theory of flexure, plastic modulus, shape factor, load factor, analysis of fixed beams, continuous beams and propped cantilevers with degree of redundancy not exceeding two.

Suggested Reading:

1. A.S. Arya and J.L. Ajmani, Design of Steel Structure, Nem Chand Publishers, 1996.
2. Ramachandandra, Design of Steel Structures, Standard Book House, 1992.
3. S.K. Duggal, Design of Steel Structure, Tata McGraw Hill Publishing Co. Ltd. 2000.
4. B.C Punnia et al, Design of Steel Structures, Laxmi Pub. 2001.

CE 353

THEORY OF STRUCTURES – II

Instruction	4 Periods per week
	2 Drawing Periods/week
Duration of University Examination	3 Hours
University Examinations	75 Marks
Sessionals	25Marks

UNIT – I

Moving Loads: determination of maximum bending moment and shear force for moving load systems on simply supported girders, influence line for reaction, bending moment and shear force.

Curves of maximum bending moment and shear force for simply supported girders transversed by (i) single point load (ii) two point load (iii) uniformly distributed load longer than span and (iv) uniformly distributed load shorter than span, enveloping parabola and EIDLL.

UNIT – II

Elasticity theory of Arches: Eddy's theorem, 3 hinged parabolic and segmental arches, determination of horizontal thrust, bending moment, normal thrust and radial shear for static loading, influence lines for horizontal thrust, bending moment, normal thrust and radial shear.

Two Hinged Arches: parabolic and segmental, determination of horizontal thrust, bending moment normal thrust and radial shear for static loading.

UNIT – III

Forces in members of statically determinate plane framed structures under moving loads for warren girder, pratt truss and curved flange truss; influence lines, counter-bracing.

Suspension Bridges: stresses in suspended loaded cables, length of cable, simple suspension bridge with 3 – hinged stiffening girders for static loading, influence lines for horizontal and vertical components of tension in the cable, tension in the cable, bending and shear force.

UNIT – IV

Kani's method: applied to continuous beams and single bay single storey portal frames with degree of freedom not exceeding three.

UNIT – V

Approximate methods of analysis of indeterminate structure by portal and cantilever methods.
Graphic Statics: Line of thrust diagram for three hinged arches, Eddy's theorem, influence lines for horizontal thrust, bending moment, normal thrust and radial shear in three hinged parabolic and segmental arches.

Suggested Reading:

1. S.B. Junarkar and Shah, Mechanics of Structures, Chartar Pub. House, 2001.
2. D.S. Prakas Rao, Structural Analysis – A Unified Approach, University Press. 1996.
3. B.C. Punmia, Ashok Jain and Arun K. Jain, Theory of Structures, Laxmi Publication, 2000.
4. S.P. Gupta and G.S Pandit, Theory of Structures, Tata McGraw Hill, 1999.
5. D.S. Prakash Rao, Graphical Methods in Structural Analysis, University Press. 1997.

CE 354

STRUCTURAL ENGINEERING & DRAWING – I (RCC)

Instruction	4 Periods per week + 2 Drawing
Periods/week	
Duration of University Examination	3 Hours
University Examinations	75 Marks
Sessionals	25Marks

UNIT – I

Elastic design of combined rectangular and trapezoidal footing and retaining walls – cantilever and counter fort types.

UNIT – II

Elastic design for RCC circular and rectangular ground level and over-head tanks. Design of staging by IS code method and design of Intze tanks.

UNIT – III

Bridges: IRC loading; elastic design and detailing of (i) RC bridge deck slab using effective width method and Pigeaud's method (ii) slab Bridges (iii) T-beam Bridges.

Suggested Reading:

1. S. Ramamrutham, Design of Reinforced Concrete Structures, Dhanpat Rai & Sons, 2002.
2. Vazirani and Ratwani, Concrete Structures, Khanna Publishers, 1998.
3. N. Krishna Raju, Structural Design and Drawing: Reinforced Concrete, University Press, 1992.
4. D.S. Prakash rao, Design Principles and Detailing of Concrete Structures, Tata McGraw Hill Publishing Co. Ltd. 1995.

CE 355

WATER RESOURCE ENGINEERING – I

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examinations	75 Marks
Sessionals	25Marks

UNIT – I

Canals: convergence of water, open and closed conduits, function and classification of canals, canal alignment, balancing depth. Design of unlines canals, critical velocity, regime theory, Kennedy's and Lacey's regime theories, necessity and advantages of canal lining, methods of lining, design of lines canals.

UNIT – II

Diversion head works: weirs and barrages, layout of diversion head works and components, failure of hydraulic structures on previous foundations, Bligh's creep theory, Lane's weighted theory and Khosla's theory, concept of low net, u/s and d/s cutoffs and protection measures, design of vertical drop weir.

UNIT – III

Canal Structures: Types of falls and their location, design principles and trapezoidal notch fall, siphon well drop, straight glacis fall. Canal regulation works, alignment of off taking canal. Distributary head regulators and cross regulation and their design. Canal escapes, types of metering flumes, types of canal modules and proportionality, sensitivity, flexibility.

UNIT – IV

Cross drainage works: types, selection of site, Aqueducts and super passages, design consideration.

Bridge & Culverts: discharge, waterway and scour depth computations, depth of bridge foundation, spans and vertical clearance, efflux computations, pipe culverts and box culverts.

UNIT – V

Water power: classification of hydropower plants, definition of terms, load, head, power, efficiency, load factor, installed capacity, utilization factor, capacity factor, use of mass curve and flow duration curve. Components of power plant-intakes, fore/bay, penstocks, functions and types of sewage tanks, general arrangement of power house, sub-structure and super-structure.

Suggest Reading:

1. Modi P.N; Irrigation and Water Resources and Water Power, Standard Book House, 1998.
2. Larry W. May's, Water Resource Engineering, John Wiley & Sons, 2001.
3. B.C. Punnia and B.B. Lal, Irrigation and Water Power Engineering, Laxmi Pub. 2000.
4. S.k. Garg, Irrigation Engineering and Hydraulic Structures, Standard Book House. 1998.

CE 356

WATER AND WASTE WATER ENGINEERING

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examinations	75 Marks
Sessionals	25Marks

UNIT – I

Public health Engineering – necessity of protected water supply and sanitation – role of civil engineer. Water demand and per capita consumption, factor affecting – population forecast. Water supply – source of water and quality parameters. Standard of potable water. Infiltration pipes & galleries, intake structure, pipes, joints, valves & pumps. Water distribution systems and solution of a simple network using Hardy Cross method.

UNIT – II

Treatment of water – clarification, sedimentation – principles. Design of sedimentation tanks, coagulation and flocculation, design of a clari-flocculator. Filtration – types of filters and filter media. Design principles of slow and rapid sand filters. Backwash mechanism. Pressure filters. Disinfection – necessity and methods, chlorination of water supplied. Action of chlorine, breakpoint chlorination. Ozone and u-v radiation, removal of hardness, tastes & odour control.

UNIT – III

Domestic sewage – quantity estimation. Quality parameters – BOD, COD and TOC. Sewage systems. Ultimate disposal of sewage – Land, water bodies. Sewage conveyance – sewer types and appurtenance. Velocity in sewer, design of a simple sewerage systems. Storm water sewers – storm water estimation by rational method.

UNIT – IV

Waste water treatment – preliminary treatment. Screens, grit chambers. Primary treatment – sedimentation – rectangular and circular sedimentation tanks. Secondary treatment – sewage filtration – trickling design. Activated sludge process – design parameters, secondary clarifier. Design aspects of a sewage treatment facility.

UNIT – V

Sludge – sludge digestion and disposal methods – septic – design parameters and working principle. Low cost waste treatment – oxidation ponds, RBS
Solid waste – types, source and composition of solid waste. Methods of collection, transportation and disposal. Noise pollution and control.

Suggest Reading:

1. G.S. Birdi, water supply and Sanitation Engineering, Dhanpat Rai & son's, 2002.
2. BSN Raju, Water Supply and Sanitary Engineering, Tata McGraw Hill, 1998.
3. P.Venugopal Rao, Text Book of Environmental Engineering, Prentice Hall of India, 2003.
4. BC Punnia, Water Supply and Waste Water Engineering, Laxmi Pub. 1998.

CE 381

SOIL MECHANICS LABORATORY

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examinations	50 Marks
Sessionals	25Marks

1. Determination of specific gravity by specific gravity bottle method.
2. Determination of specific gravity and water content by pycnometer bottle method.
3. Determination of grain size distribution by sieving.
4. Determination of liquid limit, plastic limit and shrinkage factor of soil.
5. Determination of field density by sand replacement method and core cutter method.
6. Determination of permeability by constant head and falling head methods.
7. Determination of compaction properties.
8. Determination of unconfined compressive strength of soil.
9. Determination of shear strength by vane shear test.
10. Determination of shear strength by direct shear test.
11. Determination of shear strength by triaxial test.

CE 382

ENVIRONMENTAL ENGINEERING LABORATORY

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examinations	50 Marks
Sessionals	25Marks

1. Determination of alkalinity
2. Determination of hardness
3. Determination of chlorides
4. Determination of calcium
5. Determination of variation of PH
6. Determination of BOD
7. Determination of total solids, total inorganic solids & total volatile solids.
8. Determination of residual chlorine
9. Determination of turbidity
10. Determination of coagulant dose – jar test
11. Determination of D.O.
12. Determination of sodium & potassium present in water using flame photometer

CE 383

INDUSTRIAL – VISIT / STUDY

Atleast 3 days in Semester	4 * 6 = 24
Sessional/ Examination	Grade*

Students are expected to visit at least two works of civil engineering importance in and around Hyderabad and submit a detail report on the same to the department. The department should evaluate the reports through a committee consisting of Head of the department and two more members of the senior faculty.

*Excellent/ Very Good/ Good/ Satisfactory/ Unsatisfactory.

