Department of Civil Engineering

Teaching and Evaluation Scheme (2014-15)

TE(Full-Time) in Civil Engineering SEMESTER-I

THEORY COURSES												
Sr. No.	**Course Code**	**Subject**	**Scheme of Teaching (Hrs/Week)**			**Total Credits**	**Scheme of Evaluation (Marks)**					
							Theory			**Term Work**	**Practical /Viva-voce**	**Total**
			L	**T**	**P**		**Test**	**TA**	**ESE**			
1	AM-341	Theory of Structures II	3	1	-	4	20	20	60	-	-	100
2	AM-342	Design of Steel Structures	3	1	-	4	20	20	60	-	-	100
3	AM-343	Concrete Technology	3	-	-	3	20	20	60	-	-	100
4	CE-344	Town Planning & Building Planning & Design	3	-	-	3	20	20	60	-	-	100
5	CE-345	Transportation Engineering I	3	-	-	3	20	20	60	-	-	100
LABORATORY COURSES												
1	AM-346	Lab: Structural Design & Drawing-I	-	-	4	2	-	-	-	25	50	75
2	AM-347	Lab: Concrete Technology	-	-	2	1	-	-	-	25	25	50
3	CE-348	Lab: Town Planning & Building Planning & Design	-	-	4	2	-	-	-	25	50	75
4	CE-349	Lab: Transportation Engineering I	-	-	2	1	-	-	-	25	25	50
5	CE-350	Seminar	-	-	2	1	-	-	-	25	25	50
		Total Semester I	**15**	**02**	**14**	**24**	**100**	**100**	**300**	**125**	**175**	**800**

SEMESTER-II

THEORY COURSES												
S. No.	**Course Code**	**Subject**	**Scheme of Teaching (Hrs/Week)**			**Total Credits**	**Scheme of Evaluation (Marks)**					
							Theory			**Term Work**	**Practical/Viva-voce**	**Total**
			L	**T**	**P**		**Test**	**TA**	**ESE**			
1	AM-351	Design of Reinforced Concrete Structures I	3	1	-	4	20	20	60	-	-	100
2	CE-352	Engineering Geology	3	-	-	3	20	20	60	-	-	100
3	CE-353	Environmental Engineering I	3	1	-	4	20	20	60	-	-	100
4	CE-354	Geotechnical Engineering	3	-	-	3	20	20	60	-	-	100
5	CE-355	Water Resources Engineering I	3	-	-	3	20	20	60	-	-	100
LABORATORY COURSES												
1	AM-356	Lab: Structural Design & Drawing-II	-	-	4	2	-	-	-	50	25	75
2	CE-357	Lab: Engineering Geology	-	-	2	1	-	-	-	25	-	25
3	CE-358	Lab: Environmental Engineering I	-	-	2	1	-	-	-	25	25	50
4	CE-359	Lab: Geotechnical Engineering	-	-	2	1	-	-	-	25	25	50
5	CE-360	Lab: Water Resources Engineering I	-	-	2	1	-	-	-	25	25	50
6	CE-361	Professional Training*	-	-	2	1	-	-	-	25	25	50
		Total Semester II	**15**	**02**	**14**	**24**	**100**	**100**	**300**	**175**	**125**	**800**
		Grand Total	**31**	**04**	**24**	**48**	**200**	**200**	**600**	**300**	**300**	**1600**

L-Lectures, T-Tutorials, P-Practicals, TA-Teacher Assessment, ESE-End-Semester Examination

****Training after first semester***

AM-341 Theory of Structures- II

Teaching Scheme		**Evaluation Scheme**	
Lectures	3 Hrs/Week	Test	20 Marks
Tutorials	1 Hr/Week	Teacher Assessment	20 Marks
Total Credits	4	End-Semester Examination	60 Marks

Prerequisites:

The students should have learned about mechanics of rigid and elastic bodies, energy principles, concept of statically determinate and indeterminate problems

Course Educational Objectives:

1) To make the students understand methods of analysis of statically indeterminate structures
2) To make the students understand plastic theory of analysis of structures and its applications to beams

Course Outcomes Expected:

1) The student will be able to analyse statically indeterminate structures using various methods
2) The student will be able to analyse beams using plastic theory

Unit 1. Theory of Elasticity and Plastic Analysis of Structures:

Theory of Elasticity**:** Generalised Hooke's law, Strain displacement relation, strain compatibility equations, Plane stress and Plane strain conditions

Plastic Analysis: Introduction, shape factor, plastic modulus of section, plastic hinge, Collapse Mechanisms, Upper Bound and Lower Bound Theorems, Applications to beams and single bay single storey portal frames.

Unit 2. Displacement Method of Structural Analysis:

Kinematic Indeterminacy, degrees of freedom, Concept of stiffness, Slope-deflection Method- applications to beam, plane truss and plane frame, Matrix approach

Unit 3. Iterative methods of structural analysis:

Moment Distribution Method and Kani's Method of analysis of statically indeterminate structures- applications to continuous beams and plane frames

Unit 4. Analysis of Indeterminate Arches:

Applications of Energy Theorems: Analysis of Two Hinged Arches, Fixed Symmetrical Arches -Elastic Centre Method

Rib shortening, Temperature Stresses

Unit 5. Force Method of Structural Analysis:

Review of energy principles, Static Indeterminacy, Force method- concept of flexibility, Matrix approach, application to beam, plane truss and plane frame

Reference Books:

1. Timoshenko S.P. and Young D.H., Theory of Structures, Tata McGraw Hill, New Delhi
2. C.H. Norris, J.B. Wilbur and S.Utku, Elementary Structural Analysis, Tata McGraw Hill, New Delhi
3. S.J. Kinney, Indeterminate Structural Analysis, Oxford and IBH
4. C.K. Wang, Indeterminate Structural Analysis, Tata McGraw Hill, New Delhi
5. Russell C. Hibbeler, Structural Analysis, Pearson Education, India
6. Devdas Menon, Structural Analysis, Narosa Publications, New Delhi
7. C.S. Reddy, Basic Structural Analysis, Tata McGraw Hill, New Delhi
8. S. Ramamrutham and N. Narayan, Theory of Structures, Dhanpat Rai, New Delhi
9. N.C. Sinha and P.K. Gayen, Advanced Theory of Structures, Dhanpat Rai, New Delhi

AM-342 Design of Steel Structures

Teaching Scheme		**Evaluation Scheme**	
Lectures	3 Hrs/Week	Test	20 Marks
Tutorials	1 Hrs/Week	Teacher Assessment	20 Marks
Total Credits	4	End-Semester Examination	60 Marks

Prerequisites:

The students should have learnt about Properties, behavior of various materials and basic principles of strength of materials.

Course Educational Objectives:

1) To introduce the concept of structural design using steel sections.
2) To expose the students to the basic principles of design philosophies used in steel design.
3) To make the students aware of the code provisions for deign using steel members.
4) To make the students understand the design procedures of various structural members

Course Outcomes Expected:

1. Students will be able to demonstrate an understanding of the design concepts.
2. Students will be able to use and interpret the recent Indian code for analyzing the behavior of steel structural element
3. Students will be able to design economical various structural members using steel sections.

UNIT-1 Types of structural steel, permissible stresses. Various Indian standard sections and their properties. Relevant IS specifications, Philosophy of limit state design for strength and serviceability, partial safety factor for load and resistance, various design load combinations, classification of cross section such as plastic, compact, semi-compact and slender. Design of bolted and welded joint, structural connection, framed connection, and design of joints.

UNIT-2 Tension and Compression members: (a) Types of tension member. Factors affecting strength of member, Limit strength due to yielding, rupture and block shear. Design of tension member. Design of lug angle.

(b) Design of compression member, Buckling classification as per geometry of cross section, buckling curves, design of struts in trusses using single and double angle section, connections of members with gusset plate by bolts and welds. Roof truss: Assessment of dead load, live load and wind load, design of Tension and compression members of a truss, detailing of typical joints and supports.

UNIT-3 **Columns and column bases:** Design of axially loaded column. Design of built-up column, lacing and battening, connection of lacing/battening with main components by bolts and welds. Column base under axial load: design of slab base, gusseted base. Column base for axial load and uniaxial and biaxial bending.

UNIT-4 Flexural member- Plastic design, Laterally supported and unsupported beams, strength in flexure, low and high shear, check for deflection. Secondary and main beam arrangement for floor of a building, design of beam to beam and beam to column connections using bolt / weld, design of purlins.

UNIT-5 Introduction to plate girder and design concept .Design of plate girder: design of cross section, curtailment of flange plates, stiffeners and connections. Introduction of gantry girder

TEXT AND REFERENCE BOOKS

1. Design of Steel Structure by N Subramanian, Oxford University Press, New Delhi.
2. Design of steel structure by Limit State Method as per IS: 800- 2007 by Bhavikatti S S,I K International Publishing House, New Delhi.
3. Design of Steel Structure By K.S. Sai Ram, Pearson Education India Pvt Ltd, New Delhi 2010
4. Limit state design of Steel Structure by V L Shah & Gore, Structures Publication, Pune.
5. Teaching Resource Material by INSDAG.
6. IS 456-2000: Code of practice for plain and R. C. BIS, New Delhi.
7. I.S.800:2007,"Code for general construction in steel structures," Bureau of Indian Standards,Manak Bhavan,9,Bhadur Shah Zafar Marg, New Delhi.
8. I.S.875 (part I to part V)," Code Of Practice For. Design Loads," Bureau of Indian Standards,Manak Bhavan,9,Bhadur Shah Zafar Marg, New Delhi.
9. I.S.226," Steel for general structural purposes," Bureau of Indian Standards,Manak Bhavan,9,Bhadur Shah Zafar Marg, New Delhi.
10. I.S.808:1989,"Code for Classification of Hot Rolled Steel ," Bureau of Indian Standards,Manak Bhavan,9,Bhadur Shah Zafar Marg, New Delhi.
11. I.S.226," Steel for general structural purposes," Bureau of Indian Standards,Manak Bhavan,9,Bhadur Shah Zafar Marg, New Delhi.
12. I.S.808:1989,"Code for Classification of Hot Rolled Steel ," Bureau of Indian Standards,Manak Bhavan,9,Bhadur Shah Zafar Marg, New Delhi.
13. I.S.816:1969," Code of practice for use of metal arc welding for general construction in mild steel," Bureau of Indian Standards,Manak Bhavan,9,Bhadur Shah Zafar Marg, New Delhi.

AM-343 Concrete Technology

Teaching Scheme		**Evaluation Scheme**	
Lectures	3 Hrs/Week	Test	20 Marks
Tutorials	0 Hrs/Week	Teacher Assessment	20 Marks
Total Credits	3	End-Semester Examination	60 Marks

Prerequisites:

The students should have learned about meaning of concrete, concrete making materials and use of concrete at First year Engineering

Course Educational Objectives:

1) To make the students understand characterization of various materials used for making concrete and their interaction.
2) To make the students understand the process of selection of ingredients and production of concrete
3) To make the students understand the methods of assessment of properties of concrete in the fresh and hardened state.

Course Outcomes Expected:

1) The student will be able to assess the properties of ingredients, their influence on properties of concrete
2) The student will be able to determine the proportions of ingredients of concrete based on desired properties

UNIT-1 **Cement:** Production, chemical composition, types of cement and their properties,, hydration process, physical and chemical tests and standards

Chemical and Mineral Admixtures: Water reducers, Air entraining agents set controllers- Their properties and effects on concrete properties. Introduction to supplementary cementing materials. Their production, properties and effects on concrete properties.

UNIT-2 **Fine Aggregate:** Natural and manufactured sand, particle size distribution, fineness modulus, grading curves, specific gravity ,moisture content, bulking of sand, water absorption, bulk density and standard specifications,

Coarse Aggregate: Types, particle size distribution, fineness modulus, grading curves moisture content, specific gravity, absorption, bulk density, flakiness index, elongation index, crushing value, impact value, abrasion and attrition and standard specifications

UNIT-3 Concrete production: batching, mixing, transporting, placing, compaction, curing

Fresh concrete: workability and its measurement, cohesiveness, segregation, bleeding, setting and its measurement, Functioning of Ready Mix Concrete Plants

UNIT-4 Compressive strength, tensile strength, modulus of elasticity and Poisson's ratio and their measurement, Destructive and Non Destructive Testing of strength of concrete

Permeability, Creep, and Shrinkage: measurement and parameters affecting them.

Introduction to durability of concrete and factors affecting it.

UNIT-5 Fundamentals of Concrete mix proportioning: Characteristic strength of concrete, Quality control, Methods of concrete mix proportioning: IS, ACI and DOE methods. Introduction to High Strength Concrete.

TEXT AND REFERENCE BOOKS

1. A M Neville, Properties of Concrete, 4th edition, 2006, ELBS with Longman, UK
2. M L Gambhir, Concrete Technology, 3rd edition, 2006, Tata McGraw Hill, New Delhi
3. M S Shetty, Concrete Technology, 2008, S. Chand & Co., New Delhi

CE-344: TOWN PLANNING & BUILDING PLANNING AND DESIGN

Teaching Scheme		**Evaluation Scheme**	
Lectures	3 Hrs/Week	Test	20 Marks
Tutorials	0Hrs/Week	Teacher Assessment	20 Marks
Total Credits	03	End-Semester Examination	60 Marks

Prerequisites:

Basic knowledge about various building components, building byelaws and principles of planning.

Course Educational Objectives:

1. To introduce basic concepts of Town planning.
2. To study the planning of building, considering various principles of planning including furniture arrangement.
3. To study principles of architecture and various byelaws of local bodies for the preparation of building drawing.
4. To study the History of architecture.

Course Outcomes Expected:

1. Students will be able to understand basic concepts of town planning
2. Students will be able to understand basic concepts of Building planning and by learning the principles of planning, principles of architecture and byelaws, they will be able to design the buildings and draw the various building drawings.

UNIT-1 **Town Planning:-** Objects and necessity of town planning, principles of town planning, growth pattern, development of towns, levels of town planning process, town planning act, town planning survey, data collection and analysis, master plan, development plan, zoning, town planning in ancient India and modern India.

UNIT-2 Functions of CIDCO, HUDCO, MHADA, PWD in town planning and development, TDR, Aspects of Public building , Prefabricated constructions, SEZ, CRZ, Gunthewari and similar schemes of Maharashtra State

UNIT-3 **Housing: -** Formal housing – plotted and flatted housing, group housing, mass housing projects, and informal housing, functions of various Govt. and other agencies for housing. Slums, slum clearance, slum rehabilitation, slum development and urban development projects. Industrial development with respect to town planning, physical infrastructure – water supply, sewerage, roads and pathways, electricity, telephone services. Social infrastructure – Education, health and recreation facilities, development control rules and standard norms for town planning

UNIT-4 **History of Architecture:-** Tabulated and arched style, Egyptian architecture, Greek architecture, Roman architecture, Indus valley civilization, Indian Tribute style, Hindu temples, Buddhist style, Indo – Islamic style.

Principles of Architecture:- Composition, unity, contrast, proportion, scale, balance, rhythm, character of building, aspects and prospects, roominess, orientation, sunlight and ventilation, privacy, elegance, concept of architectural beauty, concept of green building

UNIT-5 **Building Byelaws and design Principles of Buildings: -** Functions of local authority, terminology and definition, site selection and its criteria, classification of buildings, area and height limitations, setback, floor area ratio, floor space index with the standard norms, parts of buildings, habitable room, kitchen, bathrooms and water closets, mezzanine floor, stair cases, drawing submission and approval procedure of building plans, general requirements of residential buildings, Hospital, Primary school, High school, college building and commonly observed industrial buildings.

TEXT AND REFERENCE BOOKS

1. S.C. Rangwala, “Town Planning” Charotar Publishing House, Court Road, Anand, Edition, 1998
2. Y.S.Sane, “Planning and Designing Buildings”, Engineering Book Publishing Co., Pune – 16, Edition 1996
3. M.G. Shah, C.M.Kale, S.Y. Patki, “Building Drawing with an Integrated Approach to Built Environment”, Tata McGraw Hill Education Private Limited, New Delhi, Third Reprint 2012.
4. National Building Code of India, S.P. 7 ISI

CE 345: Transportation Engineering –I

Teaching Scheme:
Lectures: 3 Hrs/ Week
Total Credits - 03

Examination Scheme:
Test: 20 Marks
Assignment 20 Marks
ESE: 60 Marks

Prerequisite:
Students should have Elementary Knowledge of Civil Engg. Materials & Construction Techniques. Course Educational Objectives:
1. To introduce basic concepts of bridge and railway Engineering
2. To study the basic construction aspects of bridges and railway track
3. To study basic concepts of Airport and Dock and Harbours
Course outcomes expected:
1. Students will be able to understand basic concepts of bridge, railway engineering
2. Students will be able to understand basic concepts of Airport and dock and Harbours
UNIT I:
Types of bridges, Classification, Hydrology, Alignment Finalization, Investigations, selection of bridge site, subsurface investigation, flood discharge, water way calculations. Afflux, scour, River training works Types of foundations-shallow, piles, Raft Foundations, coffer dams
UNIT II:
Approaches of bridges, Types of constructions, slab culvert, box pipe, causeways and submersible bridges, IRC Loading, piers, abutment, wing wall and its stability, Hydraulic design of C.D. works.
UNIT III:
Railway Terminology, Permanent way, Gauges, Ballast, Sleepers, Rails, Rail Joints, Creep of Rails, Rail Fixture and Fastenings, Points and crossings, Geometric Design of Track. Stations and Yards, Signaling and its types, interlocking and their principles, objects, modern trends in railway, Mono Rail, Metro Rail, Maintenance of Track, Sky walks
UNIT IV:
Concept and uses of Harbours, Dry docks and slipways, Transition sheds and warehouses, Quays, Jetties and Wharves, Dry docks, Maintenance of Dredging, Maintenance of Ports and Harbours, Navigational Aids
UNIT V
Introduction to Airport, Civil aviation Agencies, layout, site selection, Types of pavements,
Runway, Terminals and taxiways, Air traffic control, Windrose diagrams and their uses, Airport maintenance.

Reference books:

1. S.P. Bindra 'Bridge Engineering' Published by O.P.Kapur for Dhanpat Rai & Sons
2. Saxena and Bindra 'Principals of Railway Engineering' Published by Ish Kapur for Dhanpat Rai & Sons
3. S.P. Bindra 'Dock and Harbour Engineering' Published by Dhanpat Rai & Sons
4. Subhash C. Saxena "Tunnel Engineering Published by Dhanpat Rai & Sons
5. 'Tunnel, Bridge and Railway Engineering Published by Dhanpat Rai & Sons
6. S.P.Bindra, Arora, 'Airport Engineering', Chartor Publishing House Pvt Ltd

AM-346 Lab-Structural Design and Drawing-I

Teaching Scheme		**Evaluation Scheme**	
Practicals	4 Hrs/Week	Term-Work	25 Marks
		Practical Viva-voce	50 Marks
Total Credits	2	Total Marks	75

Prerequisites:
Knowledge of strength of materials, theory of structures, design of steel structures, building design and drawing, computer programming language, AutoCAD

Course Educational Objectives:
1. To expose the students to analysis and design of roof truss.
2. To expose the students to analysis and design of plate girder/gantry girder
3. To expose the students to prepare computer programme to design of steel structural members.
4. To expose the students to prepare steel structural detailing using AutoCAD

Course Outcomes Expected:
1. Student will able to analyze, design steel structures.
2. The students will able to design steel structural members using computer programming

1) Design and drawing of factory shed consisting of roof truss, column, beams, connections and column bases using drafting software

2) Analysis, design and drawing of gantry girder/plate girder using drafting software

3) Design of steel structural elements tension members, compression members, beam member using computer programming

NOTE: Minimum two drawing sheets shall be drawn manually and other drawing sheets shall be drawn by using any drafting software.

TEXT AND REFERENCE BOOKS

1. Design of Steel Structure by N Subramanian, Oxford University Press, New Delhi.
2. Design of steel structure by Limit State Method as per IS: 800- 2007 by Bhavikatti S S,I K International Publishing House, New Delhi.
3. Design of Steel Structure By K.S. Sai Ram, Pearson Education India Pvt Ltd, New Delhi 2010
4. Limit state design of Steel Structure by V L Shah & Gore, Structures Publication, Pune.
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7. I.S.800:2007,"Code for general construction in steel structures," Bureau of Indian Standards,Manak Bhavan,9,Bhadur Shah Zafar Marg, New Delhi.
8. I.S.875 (part I to part V)," Code Of Practice For. Design Loads," Bureau of Indian Standards,Manak Bhavan,9,Bhadur Shah Zafar Marg, New Delhi.
9. I.S.226," Steel for general structural purposes," Bureau of Indian Standards,Manak Bhavan,9,Bhadur Shah Zafar Marg, New Delhi.
10. I.S.808:1989,"Code for Classification of Hot Rolled Steel ," Bureau of Indian Standards,Manak Bhavan,9,Bhadur Shah Zafar Marg, New Delhi.
11. I.S.226," Steel for general structural purposes," Bureau of Indian Standards,Manak Bhavan,9,Bhadur Shah Zafar Marg, New Delhi.
12. I.S.808:1989,"Code for Classification of Hot Rolled Steel ," Bureau of Indian Standards,Manak Bhavan,9,Bhadur Shah Zafar Marg, New Delhi.
13. I.S.816:1969," Code of practice for use of metal arc welding for general construction in mild steel," Bureau of Indian Standards,Manak Bhavan,9,Bhadur Shah Zafar Marg, New Delhi.

AM 347: Lab-Concrete Technology

Teaching Scheme		**Evaluation Scheme**	
Practical	2 Hrs/Week	Term-Work	25 Marks
		Viva-voce	25 Marks
Total Credits	01	Total	50 Marks

Course Educational Objectives:

3) To make the students understand the importance of testing of ingredients of concrete and concrete produced there from.
4) To make the students understand standard procedure of testing of various properties of ingredients of concrete and concrete produced there from
5) To make the students aware of the production of concrete at the site

Course Outcomes Expected:

1. Student will able to determine the properties of various materials in concrete through tests as per relevant standards.
2. The students will able to design a concrete mix for given materials and requirements.

Term Work:

It shall consist of record of 12 experiments performed in the laboratory. The list of experiments is given below. A report of visit to a construction site shall also be included.

A) Cement (minimum 4)

1. Fineness by Air permeability Test
2. Standard consistency,
3. Initial and Final Setting time
4. Soundness
5. Specific gravity
6. Compressive strength

B) Fine aggregate (minimum 2)

1. Sieve analysis to determine Fineness modulus and grading curve
2. Water absorption, moisture content and specific gravity
3. Bulking of sand

C) Coarse Aggregate (minimum 2)

1. Sieve analysis to determine Fineness modulus and grading curve
2. Water absorption, moisture content and specific gravity
3. Flakiness and Elongation Index of aggregates

D) Tests on Fresh Concrete (minimum 2)

1. Workability of concrete by slump test
2. Workability of concrete by compaction factor test
3. Workability of concrete by Vee Bee consistometer test
4. Workability of concrete by flow test

E) Tests on Hardened Concrete (minimum 2)

1. Compressive strength of concrete
2. Rebound hammer test
3. Ultrasonic pulse velocity test

F) Concrete mix proportioning using natural and manufactured sand as per IS 10262-2009

G) Visit to construction site.

CE 348: Lab Work - TOWN PLANNING & BUILDING PLANNING AND DESIGN

Teaching Scheme		**Evaluation Scheme**	
Practical	4 Hrs/Week	Term Work	25 Marks
Tutorials	0Hrs/Week	Practical/Viva voce	25 Marks
Total Credits	02		

Prerequisites:

Basic knowledge about various building components.

Course Educational Objectives:

1. To introduce basic concepts of Building Drawing.
2. To plan and design the building, considering various principles of planning.
3. To prepare various drawings taking in to consideration various byelaws of local bodies.

Course Outcomes Expected:

Students will be able to understand basic concepts of Building Drawing and Design and by learning the principles of planning and building byelaws, they will be able to draw the various building drawings.

Laboratory Work

1) Planning and Design of Residential Building (Drawing)

Drawing of RCC residential building using Conventional or drafting software.

Any one category of residential buildings may be considered for drawing purpose.

1. Three room kitchen house.
2. Bungalow of at least 150 sq. m. built up area (G+1)
3. Residential complex consisted of at least eight dwelling units, with all requisite services and facilities.
4. Semidetached house (or twin bungalow)

2) Planning and Design of Public Building (Drawing)

Drawing of two public buildings, using conventional or drafting software-
Any two categories of public buildings may be considered for drawing purpose.

1. High school/ Engineering College / Arts, commerce, Science College
2. Hospital of at least 100 beds
3. Any medium scale manufacturing industry
4. Commercial complex/ multiplex theaters/ shopping mall

3) Study report of Development plan of any one city of Maharashtra State.

CE 349 : Lab work- Transportation Engineering –I

Teaching scheme:

Practical	- 2 Hrs/Week	Term Work	- 25 Marks
Total Credits	- 02	Pract/ Viva voce	- 25 Marks

Prerequisites:
Basic Knowledge about various bridge, airport, dock and harbour component

Course Educational objectives;
1. To introduce basic concepts of bridge, airport, dock and harbour components
2. To introduce construction techniques of bridge, airport, dock and harbour

Course outcomes expected:
1. Students will be able to understand the concepts of structures related with bridges, railways, airports and docks and Harbours

Laboratory work;

Part -I
1. Drawing of any eight sketches with regards to Bridge Engineering/ Cross Drainage works
2. Drawing of any eight sketches with regards to Railway Engineering
3. Drawing of any eight sketches with regards to Airport/Dock and Harbour

Part –II
Hydraulic Design of causeway or box cell or Pipe vented C.D.work

Part –III
Site visit to Bridge structure which is in progress/ Railway Engineering site/ Airport site/ Dock and Harbour. Student has to submit a site visit report .

CE 350: Seminar

Teaching Scheme: **Exam Scheme:**

Practical: 2hrs/week **Term Work: 25 Marks**

Viva: 25 Marks

Prerequisites: Student should have exposure to field problems in civil engineering, fundamental knowledge of civil engineering subject taught.

Course educational objectives:

1. To make student understand process of reading journals.
2. To make student able to write technical report i.e. summary of literature and methodology etc.
3. To expose student for presenting their work on the Dias before the audience.

Expected outcomes:

1. Students will be exposed to journals for carrying out literature search for a specific problem.
2. Students will be able to write literature review.
3. Students will be able to present summary of literature and methodology for solution for a specific civil engineering problem.

Student must select topic related to field/research problem, recent technology and its applications in Civil Engineering. The student shall carry out literature review and methodology from standard sources e.g. reference books, journals etc., and shall compile the information. The seminar shall consist of submission of technical report and presentation on the seminar topic. The evaluation of term work shall be done by the guide. The candidate shall be asked to present his work before the audience and two internal examiners, one of whom will be the guide and the other appointed by the Head of the Department. The performance of the candidate in viva-voce shall be assessed on the basis of the contents of seminar report and presentation and the responses of the candidate to the questions asked by the examiners and the audience.

SEMESTER-II

AM-351: Design of Reinforced Concrete Structures-I

Teaching Scheme		**Evaluation Scheme**	
Lectures	3 Hrs/Week	Test	20 Marks
Tutorials	1 Hrs/Week	Teacher Assessment	20 Marks
Total Credits	4	End-Semester Examination	60 Marks

Prerequisites:

The undergraduate courses Concrete Technology, Solid Mechanics, and Theory of Structures should have been studied earlier.

Course Educational Objectives:

Students would learn the fundamental topics in reinforced concrete design based on philosophy of limit states design.

Course Outcomes Expected:

The students would be able to apply the theory of limit states design for designing RCC structural members using first principles using relevant Indian standards.

UNIT-1

Various RCC structural systems in use, Behavior of structural concrete under compression, tension, and combined stresses, Behavior of reinforcing steel under tension, Importance of design codes and handbooks, Design considerations, Design philosophies: Working Stress Method, Ultimate Load Method, Limit States Method

UNIT-2

Analysis and design of singly reinforced, doubly reinforced, rectangular and flanged concrete beams by limit state method.

UNIT-3

Design for Shear, Torsion and Bond, serviceability limit states

UNIT-4

Design of one-way slab and continuous slabs and beams, two-way slabs and stair cases

UNIT-5

RCC columns, Limit state design of short/long columns under axial compression, uniaxial and biaxial bending, Design of isolated footing for columns

Note: *10 Hrs of tutorials will be suitably distributed for the above five units for hands on experience of solving numerical problems.*

TEXT AND REFERENCE BOOKS

1. S U Pillai and Devdas Menon, Reinforced Concrete Design, Tata-McGraw-Hill Publishing Company Limited, New Delhi.
2. B C Punmia, A K Jain and A K Jain, Comprehensive Design of RCC Structures, Laxmi Publications (P) Ltd, New Delhi
3. S Ramamrutham, Design of Reinforced Concrete Structures, Dhanpat Rai Publishing Company, New delhi,
4. V L Shah and S R Karve, Limit State Theory and design of reinforced Concrete, Structures Publications, Pune, 2011
5. Park R and Paulay T, Reinforced Concrete Structures, John Wiley & Sons, Inc., New York, 1975
6. IS 456: 2000 Plain and Reinforced Concrete- Code of Practice, Bureau of Indian Standards, New Delhi
7. N. Subramanian, Design of reinforced concrete structures, Oxford publication
8. Handbook on Concrete Reinforcement and detailing, Special Publication SP 34, Bureau of Indian Standards, New Delhi, 1987

CE 352: Engineering Geology

Teaching scheme:
Lectures: 3Hrs. /Week

Examination scheme:
ESE: 60 marks
Test: 20 marks
Teacher Assessment: 20 marks

Prerequisite: Knowledge of surveying, geography and transportation is necessary.

Course Educational Objectives:

- To provide the students with the basic and advance knowledge of engineering Geology.
- To have a knowledge of the different rocks its formation & to know its suitability for different construction purposes

Course Outcomes Expected:

- As a student in the Bachelor of Engineering (Civil Engineering) will undertake advance courses in Geology such as Rock Mechanics, Geoinformatics to study the geology and select the suitability of site for different construction, development works

UNIT I:
Geology definition, scope, important in Civil Engineering important rock forming minerals their groups identification in hard specimens ores igneous rock cooling of magma, textures classification and mineral composition, important igneous rocks secondarily rocks, formation, classification, sedimentary rocks classification consolidation, textures, characteristics residual , chemical and organic deposits, important secondary rocks, Metamorphism, agents, and types of metamorphism structures, important metamorphic rocks.

UNIT II:
Strike, dip, parts And important types of folds, faults, fractures and joints unconformity, discontent and concordant igneous intrusions, river youth mature and old stages, geological work, features associated with eras ion and deposition, river rejuvenation, river capture earthquake, seismic waver, seismograph, location of epicentre, effects, Zones volcano products fissure, and cone and crater type. Mountain building activity and Introduction to Plate tectonics

UNIT III:
Geological investigations of Civil Engineering sites, significance of stratification strike dip fold faults joints fractures dykes in this study, surface and subsurface surveys, use of pits trenches, exploratory drilling in subsurface exploration, preparation of geological maps and sections limitations of ach method. Sub surface water types, water table porosity permeability Zones, perched water table occurrence of subsurface water, geological conditions favourable for natural springs and seepages, depression and contact springs, hot springs and geysers, wells and drill holes, fluctuations in water table levels by geo physical electrical resistivity method

UNIT IV:
Building stones, requirement of good building stones and their dependability on geological characters of rocks, common building stones, Building stones of India, Land slider, angle of repose, causes, stability of hill slopes, relation of dip, amount of slope with stability of hill slopes, preventive measures for landslides. Remote sensing and geographical information system, application of remote sensing and geographical information system in Geology

UNIT V:
Dams, requirements of good dam and reservoir site, Influence of Geological conditions on types and design of a dam. Dams on sedimentary rocks, folded strata dykes fractures zones, fault zones and on carbonate rocks. Tunnels types, seepage of subsurface water, over break, support during tunneling, lining after tunnelling, rate of tunnelling, tunnels in soft rocks, in hard rocks in sedimentary rocks, in jointed rocks in folded strata. Tunnels across fracture zones and fault zones, Bridges, types, requirements of good site

Reference Books:
1. Gupte R.B. : A Text Book of Engineering Geology, Pune Vidyarthi Griha Prakashan, Pune
2. Garg S. K. Physical and Engineering Geology, Khanna Publishers, Delhi

3. Venkat Reddy : Engineering Geology for Civil Engineers, Oxford & IBH publishing co. Ltd.
New Delhi
4. Mukarjee P.K. A text book of Geology The world press pvt Ltd. Kolkata
5. Parbin Singh: A Text Book of Engineering and General Geology: S.K. Kataria & Sons New Delhi.
6. Text Book of Remote Sensing and Geographical Information Systems by M. Anji Reddy- 2nd Edition B S Publication.

CE 353 : Environmental Engineering-I

Teaching Scheme:

Lectures: 3 Hrs/ Week

Examination Scheme:

Test: 20 marks T.A.: 20marks

ESE: 60 marks

Prerequisite:

Student should have basic knowledge of water properties and chemistry

Objective:

1. **Students will able to learn about water quality, quantity and Supply system**
2. **Students will be able to identify suitable method of treatment to be used for removal of impurities**
3. **Students will able to design conventional water treatment plant**
4. **Students will able to analyse water distribution system**

Outcome:

1. **Students will learn about water quality, quantity and Supply system**
2. **Students will identify suitable method of treatment to be used for removal of impurities**
3. **Students will design conventional water treatment plant**
4. **Students will analyse water distribution system**

UNIT I:

Characteristics of water, physical, chemical and biological standards. Water quality standards as per IS10500: 1991, U.S.EPA and WHO Quantity of water, rate of water consumption for various purposes, factors affecting, fire demand, Sources of water and their yield, population forecast, Design period; Intakes, pumping and Transportation of water; Analysis of water – alkalinity, hardness and its determination (EDTA method only). Water for domestic use

UNIT II:

Principles of water treatment processes, Theory operation and design of aeration system, Solids separation: coagulation and flocculation theory, zeta potential and its significance, mean velocity gradient, "G" and power consumption, common coagulants, coagulant aids, principle of sedimentation, efficiency of ideal settling basin, reduction inefficiency by current and other factors, types of settling and related theory, Design of settling tanks and clariflocculator, tube settlers.

UNIT III:

Filtration: theory, Mechanism of filtration, slow and rapid gravity filter, under Drainage system, operation troubles, Back washing of filters, Design of filters, filter materials, multimedia filters. Disinfection, factors affecting disinfection, type of disinfectants, Theory and application of chlorine, break point chlorination, bleaching powder estimation, Ozone and ultra violate rays, Disinfection by products. Disposal of sludge and back wash waters of water treatment plant.

UNIT IV:

Softening, Chemical precipitation, ion exchange process, Regeneration process, Design aspects, Reverse Osmosis process, Electro dialysis, Ultra filtration Taste and odour Removal. Demineralization, Desalination of Water, Removal of fluorides, color, taste and odors, dissolved metals, Dissolved gases CO2, O2, Cl2, etc. Removal of iron and manganese.

UNIT V:

Pipe materials, corrosion, lying of pipes, distribution system planning of water supply projects. Water distribution systems and analysis; Appurtenances of water transport and distribution systems. O & M of water treatment, plants, industrial water treatment, Survey of water treatment works, water Supply system, Data collection and feasibility of project. Design of water supply scheme project for a medium sized township (above 1 lakh population)

Reference Books:

1. G.M. Fair, J.C. Geyer, D.A. Okan, Elements of Water Supply and Wastewater Disposal, John Wiley and Sons Inc., 1971.

2. M.J. Hammer, Water and Waste Water Technology, John Wiley and Sons, New York, 1986.

3. CPHEEO: Manual on water supply and treatment, Ministry of Urban Development, 1991.

4. B. C. Punmia, Ashok Jain, Arun Jain, "Water Supply Engg.", LP

5. Dr.A.G.Bhole, Design of Water Treatment Plants, Indian Water Works Association

6. S.K.Garg, Water Supply Engineering, Khanna Publishers

CE 354 : Geotechnical Engineering

Teaching Scheme:
Lectures: 3 Hrs/ Week

Examination Scheme
ESE: 60 marks
Test: 20 marks
Teacher Assessment: 20 marks

Prerequisite: Knowledge of Mathematics, Surveying, Engineering Mechanics and Fluid Mechanics

Course Educational Objectives:

- To provide the knowledge of different properties of soil and its significance
- To give the knowledge of improvement in soil properties fro different civil engineering structures

Expected Outcomes:

- Student can apply the knowledge of geotechnical engineering in the design of foundations, computer modeling
- Student can classify the type of soil and can suggest its use
- Student will be able to suggest soil improvement technique for different types of civil engineering structures

UNIT I:

Properties and Classification of soils :

Introduction to soil Mechanics, Major soil deposits of India such as marine deposits black cotton soils, lateritic soils, alluvial deposits and desert soils, Soil problems in civil engineering. Three phase soil system, Particle size and shape, Soil minerals, Soil structures, Weight volume relationship, Index properties of soil Methods of determination and its significance, .I.S. classification of soil, plasticity chart, Field identification of soils.

UNIT II:

Permeability and Seepage :

Introduction, Darcy's law, Validity of Darcy's Law, Discharge and seepage velocity, factors affecting permeability, Laboratory methods for determination of coefficient of permeability, Determination of average permeability of stratified soil mass, critical hydraulic gradient , Seepage pressure and quick sand condition, Introduction to necessity and various techniques of soil exploration and investigations.

UNIT III:

Shear Strength Parameters of soil and Stress Distribution in soils

Mohr's envelops for different types of soils, Pore pressure, total and effective stress, Mohr-Coulomb law, Factors affecting shear strength, Laboratory measurement of shear strength by direct, unconfined, tri-axial and vane shear test, Sensitivity and thixotrophy of cohesive soils, Stress at a point, Geostatic stresses, Elastic properties of soil, Boussinesq theory-point load, line load strip load, Pressure bulb and contact pressure.

UNIT IV:

Compaction, Consolidation, Earth pressure

Soil compaction phenomena, Factors affecting compaction, Dry density and moisture content relationship, Zero air voids line, Effect of compaction on soil structure, Standard proctor test and modified proctor test, Field compaction methods, Consolidation test, Introduction, consolidation indices, relation between pressure and void ratio, Laboratory consolidation test. Terzaghi's one-dimensional consolidation theory, square root of time fitting method and logarithm of time fitting method, secondary consolidation,, Earth pressure at rest, active and passive condition, Rankine's and Coulomb's theories.

UNIT V:

Stability of slopes, Stabilization and Geosynthetics :

Classification and failure of slopes, Finite slope stability by Swedish circle method with slip circle and method of slices, Definition of stabilization, its necessity and various methods stabilization such as lime, flyash, cement, chemical. Types and functions of geosynthetics, Role of geotechnical engineering in environmental protection

Reference Books:

1. V.N.S.Murthy, "Soil mechanics and foundation engineering"Vol.1, Saikrupa Technical Consultants, Bangalore,1991.

2. Punmia B. C. "Soil mechanics and foundation engineering"Laxmi Publications Pvt. Ltd., New Delhi.

3. Kasmalkar B. J. " Geotechnical Engineering", Pune Vidyarthi Griha Prakashana,Sadashiv Peth Pune-30

4. Shashi K. Gulhati and Manoj Datta, "Geotechnical Engineering"Tata McGraw Hill Publication

5. Modern Geotechnical Engineering by Alam Singh.

6 Geotechnical Engineering by P. Purshothamaraj

7. Soil mechanics and foundation Engg. by Arora.

8. Relevant Indian Standard Specification & Codes.

9. Soil Mechanics by Craig R. F. Chapman and Hall

10 Theoretical Soil Mechnics by Terzaghi.

11. Soil Mechnics by Lambe T. W. & Whitman R. V.

CE 355: Water Resources Engineering –I

Teaching scheme:
Lectures: 3Hrs. /Week

Examination scheme:
ESE: 60 marks
Test: 20 marks
Teacher Assessment: 20 marks

Pre-requisite: Student must have studied two courses of Fluid Mechanics.

Course Objectives: Students will be able to:

1. Know the different terminologies related with hydrology.
2. Analyze hydrological parameters required for water resource management.
3. Assess ground water potential.
4. Identify suitable method of irrigation and drainage of waterlogged area.

Expected Outcomes:

1. Student will know the different terminologies related with hydrology.
2. Student will analyze hydrological parameters required for water resource management.
3. Student will assess ground water potential.
4. Student will identify suitable method of irrigation and drainage of waterlogged area.

UNIT I: Precipitation

Hydrology: Introduction, application in engineering, hydrologic data, Precipitation: Forms of precipitation, losses from precipitation, weather systems for precipitation, characteristics of precipitation in India, measurement of precipitation, raingauge network, presentation of precipitation data, presentation of rainfall data, mean precipitation over an area, depth area distribution curves and frequency of rainfall, probable maximum precipitation, Intensity-Duration-Frequency Relationship

UNIT II: Evapo-transpiration, Infiltration and Runoff

Evaporation and evapo-transpiration: Evaporation process, Evaporimetres, reduction in evaporation measurement of evapotranspiration, Penman's equation, Infiltration: Infiltration process, Infiltration capacity, Measurement of infiltration, Infiltration Indices, Runoff: Different routes of runoff, rainfall runoff correlation, strange's tables, factors effecting runoff, flow distribution curve, flow mass curve and uses.

UNIT III: Hydrographs and Floods

Introduction, Factors affecting Flood Hydrograph, Components of a hydrograph, Base flow separation, Effective rainfall, Unit Hydrograph, Use and Limitations of unit hydrograph, Derivation of unit hydrograph, Synthetic Unit Hydrograph, Instantaneous Unit Hydrograph, Flood Studies: Design Flood and method of its estimation, empirical formula, frequency analysis, Gumbels and Log Pearson type III distribution, Muskingum methods

UNIT IV : Groundwater hydrology and Watershed management

Groundwater hydrology: Definition, occurrence of ground water, aquifer and their types, aquifer parameters, specific yield of well, Thiem and Dupuit's theory for wells in confined and unconfined aquifers, interference among wells and boundary, well losses, specific capacity, Watershed management, Recharge of ground water, various methods and their suitability.

UNIT V: Water Requirements of Crops, Stream Flow and River Training Works

Factors affecting crop water requirement, irrigation water standards, wilting point, crop period and base period, optimum utilization of irrigation water, irrigation efficiencies, delta, duty, determination of duty, important crops in India, their seasons, cropping pattern, crop rotation, design and frequency of irrigation, various methods of applying water to crops and their comparison, Stream flow and river training works: site selection for stream gauging, river training for flood control, various methods.

Reference books:

1. K. Subramanya, "Engineering Hydrology" Tata Mc Graw Hill, New Delhi
2. Vijay P. Sing, "Elementary Hydrology" Prentice Hall of India, New Delhi
3. S.K.Garg "Hydrology and Water Resources Engineering"
4. V. T.Chow, D. R. Maidment, L.W. Mays "Applied Hydrology" McGraw-Hill International Editions, New York
5. B.C.Punmia and Pande "Irrigation and Water Power Engineering" Laxmi Publications Pvt. Ltd., New Delhi

AM-356 Lab-Structural Design and Drawing-II

Teaching Scheme		**Evaluation Scheme**	
Practicals	4 Hrs/Week	Term-Work	50 Marks
		Practical Viva-voce	25 Marks
Total Credits	2	Total Marks	75

Prerequisites:
Knowledge of strength of materials, theory of structures, design of RCC structures, building design and drawing, computer programming language, drafting software

Course Educational Objectives:
1. To expose the students to analysis and design of three storeys RCC structures.
2. To expose the students to prepare computer programme to design of RCC structural members.
3. To expose the students to prepare RCC structural detailing using AutoCAD and recent is codes.

Course Outcomes Expected:
1. Student will able to analyze, design RCC structures.
2. The students will able to design RCC structural members using computer programming

Design and drawing of residential/commercial/public RCC building using IS codes and drafting software

Design and detailing of RCC structural elements using computer programming singly reinforced beam, doubly reinforced beam, and column

NOTE: Minimum two drawing sheets must be prepared by manual drawing and other drawing sheets using any drafting software.

TEXT AND REFERENCE BOOKS

1. S U Pillai and Devdas Menon, Reinforced Concrete Design, Tata-McGraw-Hill Publishing Company Limited, New Delhi.
2. B C Punmia, A K Jain and A K Jain, Comprehensive Design of RCC Structures, Laxmi Publications (P) Ltd, New Delhi
3. S Ramamrutham, Design of Reinforced Concrete Structures, Dhanpat Rai Publishing Company, New delhi,
4. V L Shah and S R Karve, Limit State Theory and design of reinforced Concrete, Structures Publications, Pune, 2011
5. Park R and Paulay T, Reinforced Concrete Structures, John Wiley & Sons, Inc., New York, 1975
6. IS 456: 2000 Plain and Reinforced Concrete- Code of Practice, Bureau of Indian Standards, New Delhi
7. Handbook on Concrete Reinforcement and detailing, Special Publication SP 34, Bureau of Indian Standards, New Delhi, 1987

CE 357:Lab-Engineering Geology

Teaching Scheme: **Examination Scheme:**

Practical- 2 Hrs/Week Term Work: 25 marks

Course Educational Objectives:

- To provide the students the knowledge of mineralogy of different types of rocks
- To have a knowledge of the different types of geological maps and uses of it in civil engineering

Course Outcomes Expected:

- Student will identify the rock and can brief about mineralogy of rock
- Student can use geological maps for civil engineering structutres

Term work shall be based on syllabus and following assignments

1. Identification and classification of important rock forming minerals and rocks
2. Geological map reading, construction of section of geological maps consisting of horizontal, and inclined beds, unconformity, faults, folds, dykes etc.
3. Study of solutions to engineering geological problems with the help of these maps.
4. Geophysical exploration by electrical resistivity method
5. One site visit to study geology and its engineering applications

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Reference Books:

1. R. B. Gupte “Text book of Engineering Geology”
2. S. K. Garg “Physical and Engineering Geology”
3. D.Venkat Reddy.”Engineering Geology for Civil Engineers”
4. P. K. Mukerjee “Principles of Geology”
5. Parbin Singh “Engineering Geology

CE 358 : Lab-Environmental Engineering-I

Teaching scheme:
Practical: 2 Hrs/ Week

Examination Scheme:
Term work: 25 marks
Viva voce: 25 marks

Prerequisite:

They should have basic knowledge of water properties and chemistry

Objective:

1. **Students will able to learn about water quality, quantity and Supply system**
2. **Students will able to design conventional water treatment plant**

Outcome:

1. **Students will learn about water quality, quantity and Supply system**
2. **Students will design conventional water treatment plant**

1. The term work shall consist of a record of laboratory experiments as mentioned below and detail Design report of water supply scheme project for a medium sized township (above 1 lakh population).
2. Experiments on following (any six)
    1. Determination of Hardness
    2. Determination of Chlorides
    3. Determination of pH, TDS, conductivity , salt concentration
    4. Determination of sulphates
    5. Determination of fluorides
    6. Determination of Chlorine demand and residual chlorine
    7. Determination of MPN
    8. Determination of heavy metals
3. Visit to water treatment plant and visit report

CE 359 : Lab-Geotechnical Engineering

Teaching Scheme:
Practical : 02 Hrs/ Week

Examination Scheme
Term work: 25 marks
Viva : 25 marks

Course Educational Objectives :

- To identify the different properties of given sample of soil
- To classify the sample of soil by conducting different experiments in the laboratory

Course Outcomes Expected

- Student will be able to decide the different properties of soil in the laboratory
- Student will be able to suggest the use of soil

I**) Experiments to be conducted are as given below:-**

1. Specific gravity determination by density bottle method / pycnometer
2. Sieve analysis, Particles size determination & IS classification.
3. Determination of consistency limits& use in IS classifications.
4. Field density by core cutter method, sand replacement method cold method.
5. Determination of coefficient of permeability by constant head & variable method.
6. Direct shear method test.
7. Unconfined compression method.
8. Vane shear test.
9. Standard proctor test/modified proctor test.
10. Differential free swell test

In addition to these 10 experiments it is desirable to demonstrate the following Experiments,
1. Tri-axial test. 2. Swelling pressure test 3. Hydrometer/pipette method

II) Assignments:-
Minimum 1 number of assignments from part A and part B should be completed

Part A

Computer program for any of the following problems:-
1. Lateral earth pressure. 2. Pressure bulb. 3. Stress distribution by Boussinesq's theory.
4. Slip circle method 5. Direct shear test.

Part B

1. Earth pressure by Rehbann's method. 2. Determination of coefficient of permeability
3. Method of slices.

Visit - Visit to any construction site for soil investigation purpose and writing visit report.

Practical Examination

The practical examination shall consist of term work assessment and viva- voce based on syllabus.

Reference Books:

1. J. E.Bowles, "Physical and Geotechnical Properties of soils" McGraw Hill International Editions, 1990.
2. T. W. Lambe, "Soil Testing for Engineers" Wiley, 1960.

CE 360: Lab-Water Resources Engineering –I

Teaching scheme: **Examination scheme:**

Practicals: 2 Hrs /Week Term Work: 25 marks

Viva voce: 25 marks

Pre-requisite: Basic knowledge of hydrology, ground water hydrology, water requirements of crops and river training.

Course Educational Objectives:

1. Student will able to know the different terminologies related with water resources engineering.
2. Student will be able to plot flow distribution curve, mass curve and unit hydrograph from given data.
3. Student will be able to estimate aquifer parameters and water requirements of crops.
4. Student will be able to decide suitable method for irrigation and drainage of waterlogged area

Expected Outcomes:

1. Student will know the different terminologies related with water resources engineering.
2. Student will plot flow distribution curve, mass curve and derive unit hydrograph from given data.
3. Student will estimate aquifer parameters and water requirements of crops.
4. Student will decide suitable method for irrigation and drainage of waterlogged area

Term work shall be based on syllabus and following assignments (any eight)

1. Writing brief report on laws related with equitable distribution of water and water availability in different basins
2. Marking of watershed, canal alignment on toposheet
3. Study of Maharashtra ground water act
4. Plotting of flow distribution curve, mass curve from given data
5. Derivation of Unit Hydrograph from given data
6. Estimation of aquifer parameters
7. Drawing of sketches of various methods of drainage of waterlogged areas
8. Cropping pattern and estimation of crop water requirement
9. Drawing of sketches of various river training works
10. Drawing sketch of Layout showing dam site indicating catchment area, dam alignment, waste weir/spillway, tail channel etc.
11. Visit to observatory to study various instrument with their functions.e.g. Raingauge station, weather recording system, etc.

Viva Voce Examination

The viva voce examination is based on the term work

CE 361 PROFESSIONAL TRAINING

Teaching Scheme		**Evaluation Scheme**	
Practical	2 Hrs/Week	Term Work	25 Marks
Total Credits	01	Oral Examination	25 Marks

Prerequisites: The student should be familiar with construction technology and building materials.

Course Educational Objectives: Students will be able to:

1. Understand the actual field practice.

2. Able to apply knowledge gained in SE and TE to solve real problems.

Course Outcomes Expected: Students will be able to handle the site independently.

List of exercise is given below

In the first term of third year, student will identify the suitable site in consultation with guide for onsite training after end of first term. Student shall undergo training for about 30 days. During training period student shall maintain daily technical activity diary. After the training, the student will submit the report under the guidance of guide. Based on onsite training and report, oral examination will be conducted.