

ENTREPRENEURSHIP DEVELOPMENT

L T P
3 0 0

Total Contact Hrs.:45 Total Marks: 150

Theory: 45

Practical: 0

Prerequisite: Nil

Credit: 3

Curri. Ref. No.: G304

Theory:

End Exam :70

P.A.: 30

Practical: 0

End Exam.:0

P.A. :0

RATIONALE / AIM :-

The course intends to provide the fundamental aspects of entrepreneurship as a means for self employment and culminating in economic development of the country. It deals with basic issues like entrepreneurial characteristics and quality, governmental policy support and overall scenario along with opportunities and the facilities available for entrepreneurship development.

COURSE OUTCOME :-

Module

/Unit After completion of the course, the students will be able to:

1. Identify different functions and scopes of entrepreneurship.
2. Distinguish different types of company with registration procedure
3. Define scope & functions of small scale & ancillary industries.
4. Identify different characteristic and functions of sales organization.
5. Identify basic guidelines of pricing of product
6. Collect basic quarries and information's from different business organizations.
7. Write preliminary report incorporating feasibility study finance, time etc.
8. Define different environmental legislation acts and guidelines.

COURSE CONTENTS (THEORY):

UNIT	TOPIC/SUB-TOPIC	Total hrs.
1	INTRODUCTION:	10
	1.1 Definition and functions of Entrepreneur, entrepreneurship quality, entrepreneurial spirit, need for entrepreneurship.	
	1.2 Individual and social aspects of business – achievement motivation theory	
	1.3 Social responsibilities of Entrepreneurs	
2	FORMS OF BUSINESS ORGANISATION	4
	2.1 Types of company	
	2.2 Merits and demerits of different types	
	2.3 Registration of small scale industries	
	2.4 Conglomeration.	
3	SMALL SCALE AND ANCILLARY INDUSTRIES	8
	3.1 Definition – scope with special reference to self employment.	
	3.2 Procedure to start small scale and Ancillary industries	
	3.3 Pattern on which the Scheme/Project may be prepared	
	3.4 Sources of finance - Bank, Govt., and other financial institutions.	
	3.5 Selection of site for factory	
	3.6 Factors of selection	
	3.7 N.O.C. from different authorities, e.g., Pollution Control Board, Factories Directorate etc.	
	3.8 Trade License	
4	SYSTEM OF DISTRIBUTION	1
	4.1 Wholesale Trade	
	4.2 Retail trade	
5	SALES ORGANISATION	3
	5.1 Market survey, marketing trends, knowledge of competitors, product selection & its basis .	

5.2	Sales promotion	
5.3	Advertisement	
5.4	Public relations and selling skills	
6	PRICING THE PRODUCT	1
6.1	Basic guidelines.	
7	INTRODUCTION TO IMPORT AND EXPORT	6
7.1	Procedures for export	
7.2	Procedures for import	
7.3	Technical collaboration – international trade	
7.4	Business insurance	
7.5	Rail and road transport	
7.6	Forwarding formalities, FOR, FOB, CIF, etc.	
8	BUSINESS ENQUIRIES	4
8.1	Enquiries: From SISI, DIC, SFC Dept. of Industrial Development Banks.	
8.2	Offers and Quotations	
8.3	Orders	
9	PROJECT REPORT	6
9.1	Project Report on feasibility studies for small scale industries, proposal for finances from bank and other financial institutions for establishing new industries and its extension, obtaining License enlistment as suppliers, different vetting organizations for Techno Economic feasibility report.	
9.2	Breakeven analysis, Breakeven point.	
10		2
10.1	Air Pollution Act	
10.2	Water Pollution Act	
10.3	Smoke Nuisance Control Act	
10.4	ISO: 14000, OSHA	

TOTAL: 45

TEXT /REFERENCE BOOKS:

Sl No.	Book Title	Author	Publisher
1	Entrepreneurship Development	CTSC Manila	Tata McGraw Hill Publishing Co. Ltd
2	Small Enterprise Management		ISTE, Mysore
3	Motivation		ISTE, Mysore
4	Entrepreneurship Development	Jose Pauletal	Himalaya Publishing House, 1996
5	A Handbook of Entrepreneurship	Rathore, B.S. and J.S. Saini (Ed)	Panchkula : Aapga, 1997
6	Entrepreneurship Development	Khanka, S.S	S. Chand and Co. New delhi. 2001

WATER SUPPLY & SANITARY ENGINEERING

L T P
3 0 2

Total Contact Hrs.:45 **Total Marks:** 150

Theory: 45

Practical: 30

Prerequisite: CE406

Credit: 4

Curri. Ref. No.: CE509

Theory:

End Exam :70

(35 from each half)

P.A.: 30

Practical: 50

End Exam.:25

P.A. :25

RATIONALE/AIM:

Providing potable water, one of the basic necessities of life, to a community is an important activity of a civil engineer. Knowledge and skill in the field of water supply engineering and waste water disposal is essential for maintaining the health and sanitation of a community.

AIM:

The course content of Water Supply & Sanitary Engineering has been designed to provide adequate information to develop competency in a learner to-

1. Estimate the water requirements of a community
2. Select suitable source for a water supply project
3. Analyze the quality of water to determine its suitability for drinking
4. Identify the appropriate treatment processes required for making the water potable
5. Construct, operate and maintain the various units of water treatment plants
6. Lay out the necessary arrangement of pipe systems and structures for conveying water from the source to the treatment plant and for supply of treated water from the treatment plant to the consumer inside the building.
7. Estimate the volume of various types of sewage from a community

8. Layout the necessary sewerage system along with the appurtenances for collection and disposal of sewage
9. Analyze the sewage characteristics to determine the degree of treatment required for disposal according to government standards
10. Identify the appropriate treatment processes required to make the sewage fit for disposal
11. Construct, operate and maintain the various units of waste water treatment plants
12. Implement rural water supply and sanitation projects

COURSE CONTENTS:

THEORY:

UNIT	TOPIC/SUB-TOPIC	Total hrs.
<u>WATER SUPPLY</u>		
1.0	INTRODUCTION:	1
	1.1 Necessity of protected water supply	
	1.2 Historical development	
	1.3 Brief description of water supply system	
2.0	QUANTITY OF WATER	3
	2.1 Water requirements and different uses of water	
	2.2 Per capita demand, variation in demand and factors affecting demand	
	2.3 Methods of forecasting population, Numerical problems using different methods	
3.0	SOURCE OF WATER	5
	3.1 Surface sources- Lake, stream, river and impounded reservoir	
	3.2 Underground sources- aquifer type & occurrence- Infiltration gallery, infiltration well, springs, well- types, suitability	
	3.3 Yield from well- methods of determination, Numerical problems using yield formulae (deduction excluded)	
	3.4 Sinking of wells, Well components, Well development.	
	3.5 Sanitary protection of wells and maintenance of well	
	3.6 Well Pumps - type, selection, installation	

4.0 CONVEYANCE OF WATER:	3	
4.1 Intakes- types, description of river intake, reservoir intake, canal intake		
4.2 Pumps for conveyance & distribution- types, selection, installation, most economic diameter of pumping main		
4.3 Pipe materials-types, suitability, merits & demerits of each type, selection of pipe material		
4.4 Pipe joints-necessity, types of joints, suitability, methods Of jointing		
[Note: Detailed study covered under practical, hence students may be asked to prepare detailed sketches as home assignment]		
4.5 Laying of pipes- method, testing		
4.6 Pipe corrosion- cause and remedies		
5.0 QUALITY OF WATER:	2	
5.1 Impurities in water- organic and inorganic, classification		
5.2 Harmful effects of impurities		
5.3 Analysis of water- sampling and tests for physical, chemical and bacteriological quality ,significance of tests (detailed methods of tests will be discussed in laboratory class)		
5.4 Water quality standards for different uses		
6.0 TREATMENT OF WATER:	8	
[Note: 1. Design of treatment units excluded.		
2. Students may be asked to prepare detailed sketches of units, preferably from working drawing, as home assignment		
3. Field visit to treatment plant, under practical should be arranged after covering this unit]		
6.1 Flow diagram of conventional water treatment system		
6.2 Treatment process/units:		
6.2.1 Aeration: Necessity, types of aerators, essential features		
6.2.2 Plain Sedimentation: Necessity, working principles, sedimentation tanks - types, essential features, operation & maintenance.		
6.2.3 Sedimentation with coagulation: Necessity, principles of coagulation, types of coagulants, determination of coagulant dose (procedure of Jar test to be covered under practical)		
		<ul style="list-style-type: none"> • Flash Mixer - types, essential features, operation • Flocculators - types, essential features, operation & maintenance • Clarifier - types, essential features, operation & maintenance
		6.2.4 Filtration: Necessity, principles, types of filters
		<ul style="list-style-type: none"> • Slow Sand Filter- essential features, operation, clearing & maintenance. • Rapid Sand Filter- essential features, operation, cleaning & maintenance, comparison with slow sand filter, description & working of operating accessories - rate controller, head-loss gauge etc., Filter operational troubles & remedies. • Pressure Filter - essential features, operation & maintenance, suitability of use.
		6.2.5 Disinfection: Necessity, methods of disinfection, types of chemical disinfectants criterion for ideal disinfectant.
		<ul style="list-style-type: none"> • Chlorination - free and combined chlorine demand, available chlorine, residual chlorine, pre-chlorination, break-point chlorination, super-chlorination, determination of chlorine dose (testing procedure to be covered under practical), chlorinators- types, feeding.
		6.2.6 Miscelleneous treatment methods:
		<ul style="list-style-type: none"> • Removal of iron & manganese - Necessity, working principles. • Softening of water - Necessity, Methods of softening - Lime soda process, Ion exchange method, working principles. • Removal of arsenic & fluoride - Necessity, working principles.
		6.3 Chemicals required in various treatment units, their uses and feeding devices.
		6.4 Determination of dosage of chemical requirement for coagulation, chlorination, (Jar test, Residual chlorine test to be discussed in laboratory) softening,numerical problems on dosage calculation.

7.0 DISTRIBUTION SYSTEM:	5
7.1 General requirements, types of distribution system-gravity, direct and combined	
7.2 Methods of supply- intermittent and continuous	
7.3 Maintenance of required pressure in distribution system head loss in system, calculation of size of pipes -application of Hazen-William's formula, numerical problems on determination of size of pipe	
7.4 Storage- necessity, types- underground, ground level, overhead reservoirs, suitability, accessories	
7.5 Distribution system layout - types, comparison, suitability	
7.6 Loss and wastage-causes, detection, remedial measures	
8.0 APPURTENANCES IN DISTRIBUTION SYSTEM:	1
8.1 Valves-types, features, uses, purpose-slucice valves, check valves, air valves, scour valves	
8.2 Fire hydrants	
8.3 Water meters- types, uses, fixing	
<i>[Note: detailed study covered under practical. Students may be asked to prepare sketches as home assignment]</i>	

SANITARY ENGINEERING

9.0 INTRODUCTION:	1
9.1 Aims and objectives of sanitary engineering	
9.2 Definition of terms related to sanitary engineering	
9.3 Systems of collection of wastes- Conservancy and Water Carriage System - features, comparison, suitability.	
10 QUANTITY OF SEWAGE:	2
10.1 Quantity of sanitary sewage- domestic & industrial Sewage, variations in sewage flow, numerical problem on computation quantity of sanitary sewage, Storm water flow-rational method of computation of flow.	
10.2 Computation of size of sewer, application of Chazy's formula, Limiting velocities of flow- self-cleaning and scouring.	

11.0 SEWARAGE SYSTEM:	3
11.1 Types of system,-separate, combined, partially separate, Features, comparison between the types, suitability.	
11.2 Shapes of sewer- rectangular, circular, ovoid-features, suitability	
11.3 Sewer materials-features, suitability, handling & maintenance-stoneware, cast iron, cement concrete, asbestos cement, pre-cast & cast in situ sewer.	
11.4 Laying of sewer-setting out sewer alignment, excavation, and supporting, checking the gradient, preparation of bedding, handling , lowering, laying and jointing, testing of sewer, backfilling, ventilation of sewer, cleaning.	
12.0 SEWER APPURTENANCES:	3
12.1 Manholes and Lamp holes- types, features, location, function, construction.	
12.2 Inlets, Grease & oil trap- features, location, function construction.	
12.3 Storm regulator, inverted syphon-feature, location, function, construction.	
12.4 Sewage Pumping- necessity, ejectors, location, component of pumping station, types of pumps and selection.	
13.0 SEWAGE CHARACTERISTICS:	2
13.1 General importance, strength of sewage, Characteristics of sewage-physical, chemical & biological.	
13.2 Analysis of sewage-sampling , tests for- solids, pH, dissolved oxygen, BOD, COD, Nitrogen (Detailed methods of test to be discussed in laboratory)	
13.3 Significance of parameters.	
13.4 Bacteriology of sewage-decomposition cycles of sewage-aerobic & anaerobic -C, N, S cycle.	
14.0 SEWAGE DISPOSAL:	2
14.1 Disposal on land-sewage farming, sewage application and dosing, sewage sickness-causes & remedies.	
14.2 Disposal by dilution-standards for disposal in different types Of water bodies, self purification of stream.	

15.0 SEWAGE TREATMENT: 8

[Note: 1. Design of treatment units excluded.

2. Students may be asked to prepare detailed sketches of units, referable from working drawing as home assignment.

3. The field visit to treatment plant under practical should be arranged after covering this unit.]

- 15.1 Principles of treatment, Flow diagram of conventional treatment
- 15.2 Primary treatment - necessity, principles, essential features, functions, operation and maintenance of different units- Screens and racks, Grit chamber, primary sedimentation tank
- 15.3 Secondary treatment - necessity, principles, essential features, functions, operation and maintenance of different units-contact bed, trickling filter, activated sludge process, aerated lagoon, oxidation ditch, rotating biological disc.
- 15.4 Sludge disposal-sludge digestion - necessity, principles, features, Operation, construction of sludge digesters, disposal of digested sludge.
- 15.5 Isolated treatment units-features, principles, operation, construction, maintenance of septic tank and soak pit/soak trench, design of septic tank according to I.S. code; oxidation pond - principles & essential features.

16.0 SANITARY PLUMBING FOR BUILDING: 5

- 16.1 Method of connection from water mains to building supply.
- 16.2 Plumbing arrangement of single storied & multi-storied building as per I.S. code of practice.
- 16.3 Requirements of building drainage, layout of lavatory blocks in residential buildings, layout of building drainage.
- 16.4 Sanitary fixtures-features, function, and maintenance and fixing of the fixtures- water closets, flushing cisterns, urinals, inspection chambers, traps, anti-syphonage pipe.
- 16.5 Inspection, testing and maintenance of sanitary fixtures.

17 RURAL WATER SUPPLY & SANITATION: 3

- 17.1 Spring water source- development, sanitary protection, Maintenance.
- 17.2 Roof top rain water harvesting - techniques, elementary Treatment, storage, maintenance.
- 17.3 Single pit & two pit latrine-features, construction, Maintenance, disposal of sludge

CLASS TEST: 3
TOTAL HRS: 60

TEXT / REFERENCE BOOKS:

- 1. Text book on Water Supply and Sanitary Engineering - by G.S.Birdie
- 2. Public Health Engineering - by Hussain
- 3. Water supply & Sanitary Engineering - by Rrangawala
- 4. Environmental Engineering - by Duggal
- 5. Water Supply & Sewage - by Steel
- 6. Environmental Engineering - by A.K.Chatterjee
- 7. CPHEEO Manual-Water Supply - by Ministry of Urban; Development, Govt. of India
- 8. CPHEEO Manual-Sewage & Ministry of Urban Sewage Treatment – by Development, Govt. of India

WATER SUPPLY & SANITARY ENGINEERING

Practical :

RATIONALE:

Laboratory practice is an essential component for study of the subject water supply & sanitary engineering. Data obtained tests conducted in the laboratory are the basis of decision-making process adopted in the field. The course work includes the tests for determination of essential parameters for assessing the quality of water and characteristics of waste water.

AIM:

The course content of water supply & sanitary engineering practical has been designed to provide adequate hands-on-experience to develop the competency in a learner to –

1. Assess the suitability of a water sample for drinking water use.
2. Determine the chemical dosage requirements in various stages of water treatment process.
3. Assess the characteristics of a waste water sample.

COURSE CONTENT:

The students will perform the following tests/exercises to determine different parameters of given samples of water and waste water.

UNIT	TOPIC / SUB-TOPIC	Hrs.
1	Determination of Turbidity of a water sample using Turbidimeter/ Nephelometer/ Jackson's Candle turbidimeter.	2
2	Determination of PH of a water sample using (a) PH-meter (b) colour comparator	2
3	Determination of conductivity of a water sample using conductivity meter	
4	Determination of Acidity/ Alkalinity of a water sample using method of Titration	2

5	Determination of Iron content of a water sample calorimetric method using Nessler's Tubes	2
6	Determination of chloride content of a water sample using method of titration	2
7	Determination of Bacteriological quality of a water sample by Coliform Test	2
8	Determination of Coagulant (Alum) close requirement for a turbid water sample by method of Jar Test	2
9	Determination of Dissolved Oxygen of a water sample, collected from the field, using Winkler's method	2
10	Determination of total solids, suspended solids and dissolved solids of a waste water sample by Gravimetric method	2
11	Determination of Bio-chemical Oxygen Demand (BOD) of a waste water sample	2
12	Study of different types of pipe joints, valves, water meters	2
13	Study of plumbing fixtures and fitting for water supply & sanitary arrangement	
14	Field visits to study	
14.1	Water supply and Sewerage System of the Polytechnic campus, including a building	2
14.2	A water Treatment Plant	2
14.3	A Waste water Treatment Plant	2

Total: 30

ESTIMATING – II

L T P
2 0 4

Total Contact Hrs.: **Total Marks: 125**

Theory: 30

Practical: 60

Prerequisite: CE504

Credit: 4

Curri. Ref. No.: CE505

Theory:

End Term Exam :70

P.A.: 30

Practical: 25

P.A.:25

RATIONALE:

The subject of estimating is very important, as the students are required to know the various aspects of rate analysis, types of estimates, details of specifications for arriving at a correct estimate of a construction unit.

AIM:

The aim of the subject is to acquaint the students with the methods of estimating and to explain the reason behind.

COURSE CONTENTS:

THEORY:

UNIT	TOPIC/SUB-TOPIC	Total hrs.
1.0	Rate Analysis	4
	1.1 Analysis of rates of brick work, plain cement concrete work, RCC work, doors, windows, plastering, cement concrete floor, white washing centering and shuttering, damp proof course coverage, carriage of materials, earth work for foundation and for cutting and filling of trenches.	
2.0	Types of Estimates	4
	2.1 Plinth area estimate, carpet area estimate, cube rate estimate, revised estimate, supplementary estimate, repair estimate	
	2.2 Bill of quantities, building cost index, annual repair estimate	
3.0	General and detailed specification	4
	3.1 Specification of earth work in excavation, first class brick and brick work, wood work in doors and windows, CGI sheet and	

AC sheet roofing, rolling and consolidation of road metals, construction of cement concrete floor, RCC slab/box culvert, plastering, white washing, plain concrete, cement mortar, mosaic floor, lime concrete in terracing centering and shuttering

4 Valuation **4**

4.1 Describe the different forms of Valuation

4.2 Describe the method of valuing the real estate properties both for free hold and lease hold. State the method of presentation of the valued properties in a tabular form

PRACTICAL:

5 EXERCISE **56**

5.1 To prepare a detailed estimate of an irrigation canal partly cutting and partly banking.

5.2 To prepare a detailed estimate of a double storied RCC framed building with verandah, latrines, septic tank, fencing wall with decorative finish (including plumbing, sanitary, steel and timber works).

5.3 To prepare a detailed estimate of finishing items such as plastering, painting, varnishing etc.

5.4 To prepare a supplementary estimate of a RC building for addition, alteration or deviation from the original plan of the building after part execution.

5.5 To prepare an estimate for annual repair of a RC building.

5.6 To prepare an estimate for RC box culvert.

Class Test: 3
TOTAL 75

Note: These exercises should be preferably run in parallel with the theoretical instruction.

REFERENCE BOOKS:

1. Estimating and costing - by B.N. Dutta & R.C. Rangwala
2. A Text Book of Estimating Costing and Accounts - by D.D. Kohli & R.C. Kar
3. Estimating, Costing and Specification - by M. Chakraborty
4. Estimating & Costing - by S. Ramamrutham

DESIGN AND DETAILING -I

L T P
3 0 2

Curri. Ref. No.: CE501

Total Contact Hrs.: Total Marks: 150

Theory: 45

Practical: 30

Prerequisite: CE405

Credit: 4

Theory:

End Term Exam :70

P.A.: 30

Practical: 50

P.A.:50

RATIONALE:

Safety and durability of a structure depend on appropriate design, proper detailing and construction as per detailed drawing and specification. For this reason, 'Design and Detailing' is an important subject for Civil Engineering Diploma holders. They are most often asked to act as a supervisor in construction projects. In addition to this they may also require to work as a draftsmen responsible for preparing detailed drawing for construction sites. Diploma holders are also called upon to assist designers, suggest modifications for repair and renovation works and also to design simple structural elements. The subject attempts to cover the above aspects of civil engineering profession.

AIM:

The subject aims to expose the civil engineering diploma students to design of simple R.C. structural elements and also to drawing structural details for construction.

COURSE CONTENTS:

THEORY:

UNIT	TOPIC/SUB-TOPIC	Total hrs.
1.0	Introduction to design & detailing	6
	1.1 State & explain the objectives of design & detailing	
	1.2 Explain the advantages of Reinforced Concrete	
	1.3 State the different methods of design	
	1.4 Explain briefly the general concept, assumptions of old Working Stress Method (WSM) of design	

2.0 Limit State Method (LSM) of Design

5

- 2.1 Define Limit States
- 2.2 State & explain limit states of collapse, serviceability and durability
- 2.3 State & explain the factors responsible for (i) durability of a structure, (ii) serviceability of a structure; and how they are taken into account in design.
- 2.4 Define & explain characteristic strengths of materials, such as steel & concrete (IS:456-2000)
- 2.5 Define & explain briefly different characteristic loads for structures
- 2.6 Explain the partial safety factors for loads and material strengths under different load combinations of different limit states
- 2.7 Draw and explain the assumed actual and design stress-strain diagrams of Mild Steel, HYSD bars and concrete as per IS 456

3.0 Limit State of Collapse of Singly Reinforced Members in Bending

12

- 3.1 Explain Ultimate Strength of R.C. beams (Limit State of Collapse by flexure), balanced, under reinforced sections, why over reinforced sections are not used, compression stress block in concrete
- 3.2 Evaluate the depth of neutral axis of a given beam, solve problems
- 3.3 Calculate moment of resistance, solve problems
- 3.4 Design singly reinforced rectangular beams, one-way & cantilever slabs as per IS456
- 3.5 Use SP-16 for design of beams & slabs
- 3.6 Explain basic considerations, behaviour of doubly reinforced beams
- 3.7 Design of doubly reinforced beams, solve problems.

4.0 Limit State of Collapse in Shear (Design for Shear by LSM)

7

- 4.1 Explain shear cracks and shear failures with or without shear reinforcement
- 4.2 Explain contribution of concrete in resisting design shear, types of shear reinforcement, design of stirrups, minimum shear reinforcement, step-by-step procedure for design of stirrups

4.3	Design rectangular beams for shear and bending, solve problems, concept of 'T' and 'L' beams	
5	Bond, Anchorage, Development lengths & Splicing (LSM)	6
5.1	Development length of bars	
5.2	Explain & calculate development length for HYSD bars for M20 & M25 grade concrete	
5.3	Check the development length at critical sections.	
5.4	Explain the equivalent development length of bonds, IS code provision for anchorage, splicing of bars, laps, and importance of laps and anchorage length	
6	Two-way slabs (LSM)	5
6.1	Explain the action of two-way slabs, detailed arrangement of reinforcements, torsional reinforcements at corners.	
6.2	Perform design of rectangular two-way slabs as per IS 456 bending moment co-efficient, solve problems	
7	Axially loaded short columns (LSM)	4
7.1	Explain short columns, braced and unbraced columns, effective length of columns, design formula for short columns, minimum accidental eccentricity, minimum longitudinal reinforcement and transverse reinforcement, detailing at junctions with beams and footing	
7.2	Perform design of axially loaded short columns using IS 456 & SP-16	

SESSIONAL ASSIGNMENTS

8	Draw the following with necessary details & schedule of bars from supplied hand sketches or given references such as SP 34	27
	(a) Slab, beam and lintel with chajja as in a simple building (Help from Sections 8 & 9 of SP 34 may be taken) Plate 1.	
	(b) Columns, column-beam connections with & without splicing, isolated footing, staircase (Help from Sections 6, 7, 10 of SP 34 may be taken) - Plate 2.	
	(c) Cantilever and a Counterfort retaining walls: Deflected shapes of sections at different locations, and details of reinforcement (Help from Section 11 and Sheet 20 of SP34 may be taken) - Plate 3.	

Class Test: **3**

Total: 75

REFERENCE BOOKS:

1. Limit State Design of Reinforced Concrete - by P.C. Varghese
2. Reinforced Concrete - by H.J. Shah
3. Reinforced Concrete : Limit State Design - by A.K. Jain
3. Design Aids for Reinforced Concrete to IS: 456-1978, BIS, SP-16
4. Handbook on Concrete Reinforcement & detailing, BIS, SP-34

GEO-TECHNICAL ENGINEERING - I

L T P
3 0 2

Total Contact Hrs.: **Total Marks: 150**

Theory: 45

Practical: 30

Prerequisite: CE401

Credit: 4

Curri. Ref. No.: CE506

Theory:

End Term Exam :70

P.A.: 30

Practical: 25

P.A.:25

RATIONALE:

The knowledge and skills of Geo-Technical Engineering provided is as important as any other subject of Civil Engineering. Practical works in Geo-Technical Engineering are equally important. The theory together with practices of this subject will definitely help the Practicing Civil Engineers in Civil Engineering Construction Works, especially in the design and construction of building foundation.

AIM:

To develop knowledge and skills of (a) Classification of soils and soil structure (b) Soil mass and fundamental concepts and principles (c) Permeability, seepage, compaction, consolidation, stability of slopes and shear strength of soils (d) bearing capacity of shallow and deep foundations of soils (e) Settlement of foundations (f) Estimation of thickness of pavement by CBR method (g) Stabilisation of soils.

COURSE CONTENT:

THEORY:

UNIT	TOPIC/SUB-TOPIC	Total hrs.
1.0	INTRODUCTION	2
	1.1 Definition of soil, formation of soil, residual and transported soil.	
2.0	INDEX PROPERTIES	7
	2.1 Preliminary definition of water content, density, specific gravity, void ratio, degree of saturation, density index, numerical problems.	
	2.2 Determination of water content, specific gravity and particle size distribution of coarse and fine grained soil. Numerical problems	
	2.3 Consistency limits of soil: Definition, relation and determination of liquid limit, plastic and shrinkage limit, Application of consistency limit. Numerical problems	
3.0	CLASSIFICATION OF SOIL	6
	3.1 Identification and description of coarse and fine grained soils	
	3.2 Particle size classification, textural classification, HRB classification, unified soil classification, IS classification	
4.0	SOIL STRUCTURE	2
	4.1 Particle arrangement in coarse grained, clay and composite soil	
5.0	PERMEABILITY	4
	5.1 Definition of head, gradient	
	5.2 Darcy's law, Validity of Darcy's law	
	5.3 Laboratory and field determination of permeability	
	5.4 Factors effecting permeability	
6.0	SEEPAGE ANALYSIS	4
	6.1 Definition and concept of seepage flow and flow net	
7.0	COMPACTION	5
	7.1 Definition, maximum dry density, optimum moisture content	
	7.2 Factors effecting compaction	
	7.3 Light and heavy compaction test as per IS specification	
	7.4 Field compaction methods	

8.0 CONSOLIDATION	4
8.1 Brief concept of compressibility and consolidation	
8.2 One dimensional consolidation test	
9.0 SHEAR STRENGTH	8
9.1 Definition of shear and shear parameters	
9.2 Mohr circle, unconfined compression test, direct shear test, UU test, numerical problems	
9.3 Introduction to Triaxial tests	
CLASS TEST	3
TOTAL:	45

N.B.: Geotechnical Engineering subject can best be learned through lecture - demonstrations using examples of the functions of coarse and fine grained soils in the lecture room environment. The graphical representation of concepts and principles of Soil Mechanics and Foundation Engineering, can easily be taught using appropriate teaching Aids. If the majority of the lecture periods are covered using demonstration models and other related teaching aids learners will be amply benefited by the presence of teachers teaching this subject. While teaching this subject it is desirable that teachers are devoting their whole-hearted time and energy using maximum number of related examples during the period of interactions with the learners acquiring the knowledge and skills of different concepts and principles of Soil Mechanics.

REFERENCE BOOKS:

BOOK TITLE	AUTHOR	PUBLISHER
Principles of Geotechnical Engineering	B.M.Das	Thompson
Basic and Applied Soil Mechanics	Gopal, Ranjan	New Age International (P) Ltd.
Soil Mechanics & Foundations, 2ed, w/CD	Budhu	Wiley, India
Soil Mechanics SI version	Lambe	Wiley India
Soil Mechanics & Foundation Engineering	Raj	Pearson
Soil Mechanics & Foundations	B.C Punmia, Ashok Jain & Arun Jain	Laxmi Publication
Basic Soil Mechanics & Foundation	Alam Singh	CBS Publishers
Soil Mechanics & Foundation Engineering	VNS Murthy	CBS Publishers

List of Experiments / Tests

30 Hrs.

1. To determine the water content and specific gravity of a given soil sample.
2. To determine the field density of a soil using core-cutter and sand replacement method.
3. To determine the grain size distribution of a cohesionless soil sample by Mechanical Analysis.
4. To determine the grain size distribution of a fine grain soil sample by Hydrometer analysis.
5. To determine of the consistency limits of a given soil sample by using Casagrande's liquid limit device, cone penetrometer.
6. To determine the coefficient of permeability: Constant head and variable head method.
7. To determine the maximum dry density and optimum moisture content by light and heavy compaction.
8. Unconfined compression test, direct shear test
9. Demonstration Test in the Laboratory — One dimensional consolidation test Triaxial test.

HIGHWAY ENGINEERING

L T P
3 0 2

Total Contact Hrs.: Total Marks: 150

Theory: 45

Practical: 30

Prerequisite: Nil

Credit: 4

Curri. Ref. No.: CE510

Theory:

End Term Exam :70

P.A.: 30

Practical: 25

P.A.:25

RATIONALE:

The subject of highway engineering is very important as it deals essentially with road transportation. It is essential for the students to get a through input into the different components of road constructions, maintenance, drainage and related traffic engineering.

AIM:

To develop a thorough knowledge & skill in highway development, highway plans and administration, highway economics and financing, traffic engineering, bituminous materials, bituminous surface treatment, carpet coat, road-mix and intermediate type bituminous plant mix surfaces, high type bituminous pavement and their design Portland cement concrete pavement and their base courses, verified brick and block pavement, pavement design both flexible and rigid, highway maintenance.

COURSE CONTENT:

THEORY:

UNIT	TOPIC/SUB-TOPIC	Lecture hrs.
1.0	Highway development	4
	1.1 To state the importance of highway transport both in the urban, semi-urban and rural area	
	1.2 To state the concept of a road	

1.3 To know the rate of growth of road transport in India

1.4 To distinguish between a kutch road, a bituminous road and a rigid road

2.0 Highway plans & administration 4

2.1 To classify the roads as per IRC

2.2 To define National highway, state highway, district roads and village roads

2.3 To define road mileage

2.4 To state the formula for calculation of mileage of national and state highways and major district roads

2.5 To state the meanings of symbols used in the formulae

2.6 To calculate the road mileage with the appropriate formulae

2.7 To define the terms central and state administration of roads

3.0 Highway economics and financing 3

3.1 To state the meaning of road users services

3.2 To define the term road users benefits

3.3 To define annual cost, capital cost, maintenance cost operating cost pertaining to highway

3.4 To know and calculate the annual cost of highway for a specific facility, projector road system and explain all the meaning of symbols used in the formula or formulae

4.0 Road Geometrics 4

4.1 To state the concept of road geometrics

4.2 To define camber

4.3 To define super elevation

4.4 To state where camber on road surfaces are provided

4.5 To state how camber is provided on road surface

4.6 To state where the super elevation is provided on the road surfaces

4.7 To calculate the degree of super elevation camber to be provided on road surfaces as per IRC

5.0 Highway survey 4

5.1 To state the method of carrying out survey for locations of the highway track line

5.2 To state whether the track line is the real road alignment

5.3 To map the road alignment

6.0 Road construction	4
6.1 To prepare the sub-grade for road construction	
6.2 To list the steps of road construction	
6.3 To state the special design considerations of Hill roads.	
7.0 Road drainage	4
7.1 To state the necessity of road drainage	
7.2 To state the method of laying the road drainage system	
7.3 To state the usefulness of kerbstones	
8.0 Road maintenance	4
8.1 To state when maintenance of road surface is necessary	
8.2 To describe how the maintenance work is carried out	
8.3 To state the steps of periodic maintenance of roads	
8.4 To state the steps for annual maintenance of roads	
9.0 Traffic studies	1
9.1 To state the basic concept of traffic studies	
10.0 Traffic signals	4
10.1 To classify the traffic signal	
10.2 To identify the important features of a traffic control signal and their importance	
10.3 To explain the advantage and disadvantage traffic control signal	
10.4 To list the steps for timings of signals	
11.0 Traffic segregation	3
11.1 To list the different types of traffic segregation	
11.2 To state the advantages of traffic segregation	
12.0 Highway street lighting	3
12.1 To define illumination and brightness	
12.2 To define lumen	
12.3 To state the factors affecting street lighting	
12.4 To state the advantage of street lighting	
12.5 To define mounting height	
12.6 To list the importance of mounting height	
Class Test	3
TOTAL:	45

13.0 PRACTICAL	30 Hours
13.1 Determination of size and shape of road aggregates	
13.2 Determination of crushing value of road aggregates	
13.3 Determination of impact value of road aggregates	
13.4 Determination of Los Angeles Abrasion value of coarse road aggregates	
13.5 Determination of C.B.R. value of subgrade soil	
13.6 Determination of penetration value of bitumen	
13.7 Determination of softening point of bituminous material	
13.8 Determination of ductility of bitumen	
13.9 Determination of Marshall stability value of bituminous mixture	
CLASS TEST	3
TOTAL:	45

REFERENCE BOOKS:

1. Principles and Practices of Highway Engineering - by R.C. Sharma & K.K. Sharma; Wiley Eastern
2. Highway Engineering - by Dr. N.K. Vaswani; Roorkee
3. Highway Bridges in West Bengal - by West Bengal PWD
4. Highway Engineering - by Leo J. Ritter & Radnorj Paquette; John Willey Publishers
5. Highway Engineering - by Robert Ashworth; Hienemann Educational Books
6. Highway - by Laurence I. House and Clurkson H. Oglesby; Asia Publishing Co.
7. Highway Material Tests - by S.K. Khanna & C.E.J. Justo; Nemchand & Bros.

PROFESSIONAL PRACTICE – IV

L T P
0 0 2

Curri. Ref. No.: CE515

Total Contact Hrs.: Total Marks: 50

Practical:

Practical: 30

P.A.: 50

Pre-requisite: Nil

Credit :1

COURSE CONTENTS

UNIT	TOPIC / SUB-TOPIC
1	<p>Structured industrial visits shall be arranged and report of the same should be submitted by the individual student, to form a part of the term work. Following are the suggested type of Industries/ Field visits (Any one) :-</p> <ul style="list-style-type: none">• Irrigation project for observing components of dam.• Steel structure for study of its details.• Residential apartment /public building to study plumbing & sanitary system.• Water treatment plant
2	<p>The Guest Lecture/s from field/industry experts, professionals to be arranged (2 Hrs duration), minimum 2 nos. from the following or alike topics. The brief report to be submitted on the guest lecture by each student as a part of term work.</p> <ul style="list-style-type: none">• Construction of highway, material of construction, machinery used and manpower requirement.
3	<p>The students should discuss in group of six to eight students and write a brief report on the same as a part of term work. The topic of group discussions may be selected by the faculty members. Some of the suggested topics are –</p> <ul style="list-style-type: none">• Recent trends in civil engineering as a service industry.• Waterproofing and leakage prevention.• Troubleshooting in plumbing system.• Causes of failure of road.

Sample path for Term V in Civil Engineering.

S l. N o	Code	Course	Study Scheme			Evaluation Scheme								Total Marks	Credit
			Pre-requisite	Contact Hours / Week			Theory			Practical					
				L	T	P	End Exam	Progressive Assessment			End Exam	Progressive Assessment			
								Class Test	Assign ment	Attend ance		Sessi onal	Viva voce		
1	G304	Soft Core-II (Entrepreneurship development)		3	0	0	70	15	10	5	0	0	0	100	3
2	CE509	Water Supply & Sanitary Engineering	CE406	3	0	2	70	15	10	5	25	25	0	150	4
3	CE505	Estimating - II	CE504	2	0	4	70	15	10	5	0	25	0	125	4
4	CE501	Design & Detailing – I	CE405	3	0	2	70	15	10	5	25	25	0	150	4
5	CE506	Geo-Technical Engineering -I	CE401	3	0	2	70	15	10	5	25	25	0	150	4
6	CE510	Highway Engg.		3	0	2	70	15	10	5	25	25	0	150	4
7	CE515	Professional Practice-IV		0	0	2	0	0	0	0	0	50	0	50	1
TOTAL				17	0	14	420	90	60	30	75	200	0	875	24