Course Name: Diploma in Civil Engineering
Course Code : DCE
Semester : Fifth
Subject Title : Quantity Surveying
Subject Code: 131CE51

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	2	-	3	80	32	20	100	40	-	-	-	-	50	20	150

Rationale:

Quantity surveying is core course of civil engineering programme. Civil engineer need to have some basic skills to interpret the drawing, to apply the methods of computing the quantities according to relevant I.S. In this applied technology course of Quantity surveying, efforts have been made to familiarize and to know the provision of I.S. for mode of measurement, preparation specifications, carrying out rate analysis and also the approximate methods of estimation. These basic skills can be developed in the students through this course.

Objective:

Students will be able to:
1. Decide approximate cost of civil engineering structure.
2) Prepare check list of items of construction.
3) Prepare estimate for civil engineering work.
4) Prepare rate analysis of item of construction.
5) Take measurement of completed work.

Part I : Theory

Sr.No.	Topic	L	M
	Section I		
1	Introduction : 1.1. Meaning & objectives of estimating & costing, Skills required for a good estimator. 1.2. Types of estimate - Approximate and Detailed, Approximate estimate - Plinth area rate method, Cubical Content method, Service Unit method, Typical bay method, Approximate Quantity method. Problems on Plinth area rate method & application of Service unit. Detailed estimate types- Revised estimate, Supplementary estimate, revised & supplementary estimate and Maintenance & Repair estimate.	05	12

	1.3. Mode of Measurements - Units of Measurements for different item of works as per IS 1200 & As per PWD specification Book. Rules of deductions for openings as per IS 1200 for brickwork, plastering, painting. 1.4. Preparation of measurement and abstract sheets.		
2	Taking out quantities : 1. 2. 2.1. General Principles, Methods – Centre line and Long wall and short wall methods. 2.2. Abstracting bills of quantities, schedule items, lump sum provisional items, prime cost, provision for electrification, drainage & water supply, contingencies, work charged establishment,.	07	13
3	Detailed Estimate : 3.1 Procedure for taking out quantities for various items of works as per IS 1200. Unit quantity method, Total quantity method, data required for detailed estimate. 3.2 Factors to be considered during preparation of detailed estimate – Percentage of reinforcement for various structural members, Bar bending Schedule concept. 3.3 Preparing detailed estimate for - a. Single storey Load bearing Structure (small residential building with One room, Two room, Kitchen, Bath &W.C., Verandah) by Long Wall and short wall method and Center line method. b. Two- storied residential Framed Structure building by centre line method c. RCC work for weather-shed with lintel, slab, beam, and column with footings and staircase using modern construction materials. d. Earthwork quantity for a road profile.	12	15
	Total of section I	**24**	**40**
	Section II		
4	Rate Analysis: 4.1 Meaning of term rate analysis, Factors affecting rate analysis, Task work, Quantity of materials required for different item of works, Standard schedule of rates. 4.2 Analysis of rates for items of civil engineering works - P.C.C., Brickwork, RCC works, Stone masonry, Plastering & Pointing, Flooring, Waterproofing, Plumbing, RMC, Shuttering and Cast in situ concrete,	09	18
5	Specification: 5.1 Definition, types, Purpose and Legal aspect. 5.2 General and Technical specifications for various items of construction – earthwork in excavation of foundation trenches and back filling, lime concrete and cement concrete in foundation, RCC work, Ist class brickwork, random and course rubble masonry, DPC., plastering.	09	12

6	Valuation: 6.1 Importance and Purpose of valuation. 6.2 Definitions - Depreciation, sinking fund, Salvage & Scrape value, Gross & Net yield. 6.3 Fixation of rent, Different methods of valuation.	06	10
	Total of Section II	**24**	**40**
	Total of Section I & II	**48**	**80**

Part II: Tutorial

Sr. No.	Title	Hours
1	Prepare check list of items for following Civil engineering works. i) Load bearing structure ii) Framed structure iii) Road work	02
2	Prepare Market rates survey report for modern construction materials and items.	02
3	Taking out quantities of various items of work for load bearing structure	04
4	Taking out quantities of various items of work for R.C.C Framed structure.	04
5	Prepare a detailed estimate for Load bearing structure (G+ 1)	05
6	Prepare a detailed estimate for R.C.C Framed structure (G+ 2)	05
7	Prepare estimate by using approximate estimate method.	02
8	Taking out quantities of earthwork for a road profile.	02
9	Prepare rate analysis for at least six items of work- RCC in beams & slabs, Columns, Brick masonry, Stone masonry, Plastering & Pointing, Flooring , waterproofing, Plumbing, Cut & bent, Light weight blocks, RCC with fly ash with current market rates.	02
10	Draft a detailed specification for at least six items of construction.	02
11	Solve any five problems on Valuation.	02
	Total	**32**

Term Work:
Term work shall consist record of all tutorials.

Text Books :

1. Estimating & Costing in Civil Engineering by B. N. Dutta, Edition 25th 2002, Publisher- UBS Publishers Distributors Pvt. Ltd. New Delhi.
2. Estimating & Costing , Specification and Valuation in Civil Engineering by M. Chakraborti, edition-21st 2008, publisher- M. Chakraborti, 21 B, Bhabananda Road, Kolkatta-700026.

Reference Books :

1. Estimation & coting by G.S. Birdie, Edition 6th reprint, Publisher-Dhanpat rai and sons, Delhi.
2. Estimating & Costing by S.C. Rangwala, Edition 2002, Publisher- Charotar Publication Anand.

Course Name : Diploma in Civil Engineering
Course Code : DCE
Semester : Fifth
Subject Title : Contracts & Accounts
Subject Code : 131CE52

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
2	2	-	-	-	-	-	-	-	-	-	25	10	50	20	75

Oral Examination will be assessed by internal & external examiner.

Rationale:

This is a core subject which will enable the students to learn facts, concepts, principles and procedure followed in the preparation of tender documents, contracts and maintaining the accounts before start of any new project. Students will also use the core knowledge of this subject area for assessment of expenses for repairs and maintenance of civil engineering works.

Students will get acquainted with procedures and different forms used by PWD as well as private construction firms and will therefore be able to prepare bills and pay contractor for the work as well as penalize for defective work

Objectives:
The students shall be able to

- Differentiate between types of contract.
- Prepare tender documents.
- Draft tender notice for various types of construction.
- Prepare bills and pay contractor for the work.

Content : Theory

Sr.No.	Topic	L
01	Contract – 1.1 Definition of contract, Objects of contract, requirements of valid contract, Types of engineering contract with advantages and disadvantages- Lump sum contract, item rate contract, percentage rate contract, cost plus percentage, cost plus fixed fee, cost plus variable percentage and cost plus variable fee contract, labour contract, demolition contract , target contract, negotiated contract. Class of contractor, Registration of contractor.	10

	1.2 BOT Project: objectives, scope, advantages, disadvantages, examples.	
02	Tender & Tender Documents – 2.1 Definition of tender, necessity of tender, types-local and global. 2.2 Tender notice, points to be included while drafting tender notice, drafting of tender notice. 2.3 Meaning of terms: earnest money, security deposit, validity period, right to reject one or all tenders, corrigendum to tender notice and its necessity. 2.4 Tender documents – list, schedule a, schedule b, schedule C. 2.5 Terms related to tender documents – contract conditions: time limit, time extension, penalty, defective material and workmanship, termination of contract, suspension of work, subletting of contract, extra items ,escalation ,arbitration, price variation clause, defect liability period, liquidated and Unliquidated damages. Bank guaranty. 2.6 Procedure of submitting filled in tender document , procedure of opening tender , comparative statement ,scrutiny of tenders, award of contract, acceptance letter and work order. 2.7 Introduction to e - tendering process. 2.8 Unbalanced tender, ring formation.	12
03	Accounts in P.W.D.- Various account forms and their uses –Measurement Books, Nominal Muster Roll, Indent, Invoice, Bills, Vouchers, Cash Book, and Temporary Advance.	05
04	Payment to Contractors- Mode of payment to the contractor- Interim Payment And Its Necessity, Advance Payment, Secured Advance, On Account Payment, Final Payment, First And Final Payment, Retention Money, Reduced Rate Payment, Petty Advance, Mobilization Advance.	05
	Total	**32**

Tutorial –

Sr. No.	Tutorial Exercise	Hours
1.	Collecting old set of tender document and writing a report on it	03
2.	Collection of tender notices published in newspapers for various items of civil engineering works. (At least 5) Write salient features of them.	03
3.	Drafting a tender notices for construction of a civil engineering Work (W. B. M. Road, Residential Building)	06
4.	Preparation of Tender Document for the Building. (Detailed Estimate prepared for R.C.C. Building in Estimating and Costing shall be used)	10

5.	Collection of various account forms from PWD & writing report on it	02
6.	Writing a report on store procedure and account procedure of PWD.	08
	Total	**32**

Term Work- Students should submit journal of above exercises.

Text Books:

1. Estimating & Costing in Civil Engineering by B. N. Dutta, Edition 25th 2002, Publisher- UBS Publishers Distributors Pvt. Ltd. New Delhi.
2. Estimating & Costing , Specification and Valuation in Civil Engineering by M. Chakraborti, edition-21st 2008, publisher- M. Chakraborti, 21 B, Bhabananda Road, Kolkatta-700026.

Reference Books:

1. Estimation & coting by G.S. Birdie, Edition 6th reprint, Publisher-Dhanpat rai and sons, Delhi.
2. Estimating & Costing by S.C. Rangwala, Edition 2002, Publisher- Charotar Publication Anand.
3. Valuation of Real Properties by S.C. Rangwala, Publisher- Charotar Publication, Anand.
4. Civil Engineering Contracts And Accounts Vol I , II by B.S. Patil, Publisher- Orient Longman.

Course Name: Diploma in Civil Engineering
Course Code: DCE
Semester : Fifth
Subject Title: Building Services
Subject Code: 131CE53

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	2	-	3	80	32	20	100	40	-	-	-	-	25	10	125

Rationale: Building services like water supply, sanitary services, rain water harvesting, elevators and fire protection systems form an essential part of every residential and commercial building. No building can be put into effective use without these services. Also now days the eco friendly design of these systems are on demand. It is necessary for the students to understand the basic principles of building services.

Objective: At the end of this course students will be able to

- Know various types of building services required
- Plan and design the various building services like water supply, Building drainage, rain water harvesting etc.
- Know various types of tools and accessories required to design plumbing and sanitary services
- Know various installation services like fire fighting extinguisher, elevators etc.
- Know about green builgings.

Syllabus

Part I- Theory

Sr. No.	Contents	L	M
	Section-I		
1	Introduction – 1.1 Comfort standards and Types of various installation services,	2	2
2	Water Supply & Distribution – 2.1 Plumbing engineering – Principles of plumbing, General properties of water, Per capita supply,	12	18

	Service connections from municipal main, Storage of water (underground & overhead), water meter (Sizes and its fixing). 2.2 Hydraulics of Plumbing - Loss of heads in pipes & fittings (Major and Minor Losses) and its effects, flow formulae, Causes and prevention of air lock & cavitations. 2.3 Plumbing of high rise buildings – Types of various water supply systems (down take pressure reducer valve system, multiple storage system, break pressure tanks, hydro pneumatic systems), Pumping system. 2.4 Standard sizes of pipes availble for plumbing.		
3	Sanitary Services 3.1 Sanitary appurtenances - Classification of fixtures (ablution fixtures and Soil fixtures), bathroom accessories & fittings. 3.2 Building Drainage- General principles governing building drainage, Nature of drainage phenomenon, Various plumbing systems (one pipe, two pipe, single stack single stack partially ventilated andhybrid),Capacity and sizing of pipes (primary & secondary braches), Siphonic action & vent piping, Traps for appliances-Bottle trap,Nahani trap, Gulley trap, Air admittance valve, installation of pipes,	7	15
4	Recycling of water & waste water 4.1 Recycling of water- need , uses & types-storm water, Residential, Industrial & commecial, Grey water. 4.2 Environmental Benefits of recycled water , future of water recycling. 4.3 Recycling of waste water- need & uses. 4.4 ZLD – Concept of Zero Liquid Discharge for industrial plant.	3	5
	Total for Section I	**24**	**40**
	Section-II		
5	Rain water harvesting system – 5.1 Introduction, Collection of runoff, pipe system, design consideration, Road surface runoff (open drain and closed drain). 5.2 Disposal of rain water (surface and under ground rain harvesting)	5	08
6	Elevators- 6.1 Construction aspects of Lift, types of lifts, 6.2 Essential features of a Lift (machine room equipment, lift well, lift pit, lift landing door, lift car), Electrical requirements, Preventive maintenance & legal formalities of elevators.	5	09
7	Fire Fighting Installations- 7.1 Requirement and storage of water 7.2 Systems of fire fighting – External (pillar and flush hydrants), Internal (residential and industrial), training to personnel for service & maintenance and safety measures. 7.3 Maharashtra fire Prevention and Life Safety Measures Act(Latest). 7.4 Fire Audit	8	14
8	Acoustics and Noise, lightinging and Illumination - 8.1. Recommendations to minimise noise, special treatments-	6	09

	ceiling,wall, floor, sound insulation. 8.2 Recommended value of illumination, factors affecting illumination- sources of day lighting, siting of buildings,design & planning. 8.3 Green Building- Concept, advantages & comparison of green building with normal building.		
	Total for Section II	**24**	**40**
	Total of Section I & II	**48**	**80**

Part II – Tutorial

Sr. No.	**List of Exercises**
1.	Study of types of pipes used for plumbing and sanitary services, pipe fittings, valves and tools required for fittings
2.	Study of various traps used for plumbing & sanitary fixtures.
3.	Study of existing municipal water supply scheme to VJTI campus.
4.	Study of ferrule.
5.	5 assignments based on the syllabus.

Term Work- Students should submit journal of above exercises.

Learning Resources:

Text books:

1. Plumbing Engineering (Theory, design & practice) by S.M. Patil, Publisher Seema publications, Mumbai 2nd Edition 2007
2. Building Services by S.M. Patil, Publisher Seema publications, Mumbai 1st revised edition 2008

Reference Books:

1. Plumbing Design and practice by S. Deolalikar, Publisher Tata McGraw. Hill publishing company, 1st edition 2008
2. Design & Practical Handbook on Plumbing by C. R Mohan, Standard Publishers Distributors, New Delhi, 1st edition , 2009
3. A to Z of practical building construction & its management by Sandeep Mantri, Publisher Mantri Institute of Development & Research, 9th edition, 2009.

Visits

1. Visit to any building to learn plumbing systems. Students shall submit visit report.
2. Visit to plumbing exhibition.

Course Name : Diploma in Civil Engineering
Course Code : DCE
Semester : Fifth
Subject Title : Elements of RCC Design
Subject Code : 131SE54

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	-	2	3	80	32	20	100	40	-	-	25	10	25	10	150

Rationale:

Civil engineering essentially means dealing with structures in various ways, either as designer or contractor in maintenance field. Reinforced Cement Concrete is one of the most widely used materials of construction and this syllabus deals with basic properties of concrete and principles on which various components of the structure are designed. The student will be going out for one year on industrial training after this semester. Therefore this syllabus is designed to give some basic information of the most extensively used material to students.

Objective:

Students will be able to

1. Understand philosophy of designing a safe & serviceable structure.
2. Understand importance & use of codal provisions in the design of RCC structures.
3. Design various structural components for RCC structures.
4. Design various small RCC structures.

Syllabus

Sr.No.	Contents	L	M
	Section I		
1	Materials: Properties of cement, aggregates, grades and strength requirements of concrete, reinforcing material, mild steel, deformed bars. Permissible stresses as per IS: 456-2000 (working stress method)	03	06
2	Elastic theory: Basic assumption in Elastic Theory, Equivalent transformed concrete area, Neutral axis, Balanced, Under-reinforced and Over-reinforced sections, Moment of resistance of singly reinforced sections.	08	12
3	Slabs: Design of simply supported rectangular slabs spanning in one direction, cantilever slabs, slabs with overhangs.	08	12

	Design of one-way continuous slab using I.S. Code coefficient.		
4	Beams: Design of singly reinforced beams, Tee and EII beams and width of the flange, neutral axis, Moment of resistance.	05	10
	Total of Section I	**24**	**40**
	Section II		
5	Shear and Bond: Shear stresses in R.C. beam section, Diagonal tension, shear reinforcement: vertical stirrups, incline and diagonal reinforcement, Bond stresses, End anchorage, Development length, Curtailment of reinforcement.	07	10
6	Doubly Reinforced Beams: Analysis and Design, Steel Beam theory.	03	05
7	Axially loaded columns: Short and Sender Columns, stress reduction factor, Circular columns.	07	15
8	Isolated Column Footings: Design of Square and Rectangular footing.	07	10
	Total of section II	**24**	**40**
	Total of Section I & II	**48**	**80**

Term Work:

1. Project in design and drawing of a building covering slabs, beams, columns and footing including bar bending schedule.
   Students shall submit minimum of two half imperial drawing sheets for the above work.
2. Site visit to a construction site to understand reinforcement detailing.
3. Introduction to software like STAAD, ETaab for analysis and design of simple structures.

Tutorials:

A set of minimum of 20 problems, covering analysis and design of beams, slabs, columns and footings.

Text Books:

Design of reinforced concrete structures by S Ramamrutham and N. Narayanan, Edition-2006, Publisher- Dhanpat Rai & Co.

Reference Books:

1. Design of reinforced concrete structures by H.J. Shah., Edition 8th, 2009, Publisher-
   Charotar publication.
2. Analysis, Design and detailing of structure Vol. 3 by Vazirani and Ratwani.Edition-2003, Publisher- Khanna Publishers.
3. Design of reinforced concrete structures by Shah & Kale, Edition- Reprint 2007 Publisher- Structures publication.

Codes-

1. I.S. 456-2000 Code for practice for plain and Reinforced Concrete.
2. I.S. 875-1987 Code for practice for structural safety of buildings, loading standards.

Course Name : Diploma in Civil Engineering
Course Code : DCE
Semester : Fifth
Subject Title : Soil Mechanics
Subject Code : 131SE55

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	-	2	3	80	32	20	100	40	-	-	-	-	25	10	125

Rationale:

Foundation is a very important part of the structure & one has also to take into account the nature of the sub strata, along with the loads coming on the foundations, while designing the same. This subject is detailed in such a way that after studying this subject, student will get some information about soils & their different varieties as well as their properties, in terms of permeability, consolidation etc. safe bearing capacity of soils, an important aspect in the design of foundation is also included. All the above-mentioned topics will be substantiated by intensive laboratory experiments.

Objective:

Students will be able to

1. Understand & determine physical properties of the soil.
2. Solve problems to determine properties of soil required for foundation design.
3. Design simple foundations.

Syllabus

Sr. No.	Contents	L	M
	Section I		
1	Soil, soil formation & profiles	04	05
2	Weight –Volume relationship for soils- Specific Gravity and Moisture content tests.	04	05
3	Soil identification and Description: Types of soil classification systems, preliminary field-tests for soil identifications.	06	10
4	Permeability: Darcy's law, Constants head and falling head permeability test	04	10
5	Compaction: Standard and Modified Proctor tests, Field dry density, determination by core cutter method and sand	06	10

	replacement methods.		
	Total of Section I	**24**	**40**
	Section II		
6	Shear strength of soil: Coulomb's law of shear strength, Mohr's stress circle, undrained direct shear test, unconfined compression test and vane shear test.	06	8
7	Consolidation: Spring analogy, time lags and consolidation test.	05	8
8	Bearing capacity of soils: Shallow foundation types, net load and gross load, Field plate test. Limitations effect of water table and size of foundation.	05	8
9	Pile foundation: Types of piles, field pile load test, chemical actions of soil and water on piles.	03	4
10	Sub-surface exploration: Preliminary and detailed explorations, undisturbed soil sampling, Standard penetration test, field vane shear test, and dynamic cone penetration test.	03	8
11	Geotextiles: Introduction to geotextiles, its types & application in Civil Engineering.	02	4
	Total of Section II	**24**	**40**
	Total of section I & II	**48**	**80**

Term Work:

The term work will comprise of laboratory work of minimum eight experiments based on the above syllabus inclusive of CBR test. Term work will also include assignments containing 20 problems and questions.

List of Experiments:

Sr. No.	Name of Experiments
1.	Field Dry density and moisture content determinations by a) Core cutter method b) Sand replacement method
2	Specific gravity of soils
3	Sieve analysis

4	Atterberg's limits a) Liquid limit b) Plastic limit c) Shrinkage limit
5	U. U. direct shear test
6	C.B.R. Test
7	Compaction test a) Standard Proctor Compaction test
8	Falling head permeability test
9	Vane shear test
10	U.C.C. test

Text Books:

Soil Mechanics and foundation Engg by Dr. V.N. Murthy, edition 2009, Publishers- UBS Publishers Distributors Ltd

Reference Books:

1. Modern Geotechnical Engg by Dr. Alam Singh, Edition -3rd edition,2006, Publisher- CbS Publishers & Distributors.

2. Soil Mechanics and foundation Engg by Dr. B.C. Punamia, Edition- 2005, Publisher-Laxmi publishers.

Course Name : Diploma in Civil Engineering
Course Code : DCE
Semester : Fifth
Subject Title : Railway Engineering, Docks & Harbour
Subject Code : 131CE56E1

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	1	-	3	80	32	20	100	40	-	-	25	10	25	10	150

Oral Examination will be assessed by internal & external examiner.

Rationale

Railway engineering has become the most important part of developing societies. This subject caters to the need of technician engaged in the investigation, planning, construction and maintenance of Railways and Docks & Harbour. This subject aims at basic knowledge about Railways and Waterways with respect to their types, materials used, functions of component parts, methods of construction, planning principles & aspects of supervision and maintenance.

Objective

At the end of this course students will be able to

- Know the basic concepts in Transportation Engineering System.
- Know component parts of railways and Docks & Harbour.
- Understand methods of survey for railway and its geometric design.
- Understand, supervise and coordinate the construction activities related to railways, docks and Harbour.
- Know Harbour layout, port facilities.

Syllabus

Part I Theory

Sr. No.	Contents	L	M
	Section I		
1	Modes of Transportation system 1.1 Overview of Transportation Engineering. 1.2 Modes of transportation system-roads, railway, airways, Waterways, importance of each mode.	2	05
2	Railway Engineering	22	35
2.1	Introduction to Railway Engineering 2	6	12

2.2	2.1.1 Alignment and gauges Classification and zones of Indian Railway. Alignment-Factors governing rail alignment. Rail gauges types. 2.1.2 Permanent ways Various components & their functions, various materials used. Rails- Types, creep of rails, causes & prevention of creep. Sleepers types- wooden, metal and concrete, their comparison. Ballast Types- properties, merits & demerits. Rail fixtures & fastenings-fish plate, bearing plates, spikes, bolts, keys, anchors & anti creepers, applications Geometric Design : 2.2.1 Railway Track Geometrics Coning of wheels, tilting of rails, gradient & types, Super elevation, limits of super elevation, cant & cant deficiency, numerical based on above topic 2.2.2 Points and crossings Definition & types of points, crossing, Track Junctions, Turnouts, Crossovers, Diamond crossing.	8	14
2.3	2.2.3 Signals-Types, Interlocking, various control systems of train movements. Station and Yards 2.3.1 Types of stations-way side, crossing, junction, terminal. Yards-types, passenger yards, goods yard and locomotive yard, requirement of locomotive yard, Marshalling yard, types & layout of marshalling yard. 2.3.2 Track Maintenance Necessity, types, tools required, organization flow chart with duties gang mate, key man. 2.3.3 Track Drainage – significance, requirements , types	8	09
Total of Section I		**24**	**40**
	Section II		
		24	40
3	Docks and Harbour		
	3.1 Inland Water Transportation Introduction, Importance, Definition of Docks & Harbour	2	4
	3.2 Harbours & Port Early period Harbours, Classification of Ports & Harbours Requirement of Port,	3	5
	3.3 Harbour layout Selection of site, Break waters, Jetties, Wharves, Piers. Dolphin,	4	5
	Quays	4	5
	3.4 Docks Types of Docks, Features ,Shape of Docks & Basins, Dock Entrances	4	6
	3.5 Harbors maintenance. Maintenance Dredging, Dredging Devices	3	5
	3.6 Navigational aids 3.7 Ship characteristics and their influence	1	4

	3.8 Port facilities Transit sheds Warehouses, General layout, Container and container yards, Cargo Handling.	3	6
Total of Section II		**24**	**40**
Total of Section I & II		**48**	**80**

Part II Term Work

The term work shall comprise of-

I) Drawings of following on Quarter Imperial sheets

a) Railway track cross-sections
b) Permanent way.
c) Coning of wheels.
d) Types of switches.
e) Rail fixtures & fastenings.
f) Turnouts, Crossovers.
g) Level crossing, Diamond crossing.

II) 5-6 assignments based on above syllabus.

III) Site Visit to Yard/crossings/port.

Learning Resources

Text Books:

1. Railway Engineering by S.C. Saxena & S.P. Arora publisher Dhanpat Rai & sons, 2005
2. Harbour, dock and tunnel engineering by R. Shrinivasan publisher Charotar Publishing house, Anand. 2006

Reference Books:

1. A text book of Transportation Engineering by S.P. Chandola publisher S. Chand & Co. Ltd.,2001

Course Name : Diploma in Civil Engineering
Course Code : DCE
Semester :Fifth
Subject Title : Building Repairs and Maintenance
Subject Code : 131CE56E2

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Practical		Oral		Term work		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	1	-	3	80	32	20	100	40	-	-	25	10	25	10	150

Oral Examination will be assessed by internal & external examiner.

Rationale:
Structures are distressed at an early stage and in some cases collapsed due to various causes. Hence the main aim of this subject is to highlight the problems, to find the solutions, to identify the materials and to carry out remedial techniques to avoid such defective, distorted and total collapse of structure
Civil Engineering students need to acquire the repair, maintenance & rehabilitation skill when performing their job in construction industries. This course enables the students to get the idea of failure pattern, evaluation of strength of structures, decides the remedial techniques of repairs, maintenance & rehabilitation of Civil Engineering structure.

Objective: At the end of this course students will be able to

- Understand various types of defects in structures.
- Know the structural audit and different Non-destructive test
- Know the repairs and maintenance procedures of structures.
- Know the materials used for repairs of defects/ damages
- Be entrepreneur by having the skill of -
    1. Repairs of any Civil Engineering Structure.
    2. Maintenance of any Civil Engineering Structure
    3. Rehabilitation of any Civil Engineering structure
    4. Assessment of procedure / planning for the repairs & maintenance of various members of structures.

Part I : Theory

Sr.No.	Content	L	M
	Section I		

01	1.1 Meaning of Operation, Maintenance ,Repair , Restoration and Rehabilitation of structure 1.2 Need of Repair, Maintenance and Rehabilitation of Civil Engineering Structure	02	04
02	Defects in Building: 2.1 Different factors affecting structural deterioration /defects 2.2 Principal causes and broad classification of cracks 2.3 Defects in RCC member slab, beam, column 2.4 Defects in Waterproofing system, Common sources of leakages in bathroom, kitchen and balcony floor. 2.5 Causes of Corrosion of reinforcement.	05	12
03	Condition Survey & Non Destructive Testing: 3.1 Detailed Inspection Survey, Structural Audit, Internal and External Observation Report, Difficulties encountered during Structural Audit. Different Government bodies dealing with Structural Audit. 3.2 Structural Audit Report Format 3.3 N.D.T. methods. Principles and method of application of Ultrasonic Pulse method, Rebound Hammer test as per IS recommendation.	07	10
03	Materials for Repairs**:** 3.1 Characteristic features of Injection Grout, Bonding Coat, Bond coat, Plasticizer, Self-Flow Micro Concrete Polymer / Epoxies in Repair mortar, Quick Setting Compound, Retarder, Waterproofing compound. 3.2 Rebar, Characteristics of different types of rebar. 3.3 Function of Admixture in concrete as per ACI 212-3R Air-Entraining Admixtures and Water-Reducing Admixtures in concrete. 3.4 Crack sealant 3.5 SBR Polymer, Fibre glass fabric	10	14
	Total of Section I	**24**	**40**
	Section II		
04	Techniques for Repairs: 4.1 Rust Eliminators and polymer coating for rebar during repair, 4.2 Repair of defective concrete or Concrete spalling 4.3 Repair of cracks in plaster and on RCC surface 4.4 Rules of application and injection of admixture 4.5 Meaning of Aerated and Foamed concrete, dry pack mortar, vacuum concrete, Gunite and shotcrete, 4.6 Jacketing Technique for Restoration of structure: Definition, Purpose, types of method. 4.7 Meaning and different types of Underpinning	09	16

05	Water Proofing Technology: 5.1 Correct method of fixing pipe fitting inside toilet and bathrooms 5.2 Detailed procedure of Waterproofing system in Toilet and Bathroom 5.3 Detailed procedure of Waterproofing system in Sunk area of Water closet block 5.4 Detailed procedure of Waterproofing of chajjas and terrace	09	12
06	Maintenance of Building: 6.1 Concept of decay, defects and damage of structure 6.2 Definition and aim of Maintenance 6.3 Classification of Maintenance- Routine, Preventive and Remedial methods. 6.3 Order of Deteriorations Observation of RC building 6.4.Planned Maintenance Report	04	08
07	Specifications: 7.1 Typical Specifications and Performance Specification with respect to repairs 7.2 Different items that follows in Typical Specifications.	02	04
	Total of Section II	**24**	**40**
	Total of Section I & II	**48**	**80**

Part II : Tutorials / Site Visits

1. Students shall visit any site undergoing waterproofing of the structure.
2. Students shall study different structural distress.
   Students shall submit the detailed report of the above.

Termwork:

Students shall submit at least 6 assignments based on the above topics.

Learning Resources:

Text Books:

1. Concrete Technology-Theory and Practice by M.S.Shetty, Edition-Revised edition 2005, Publisher S.Chand and Company New Delhi.
2. Water Proofing technology Theory and Practice by M.K.Lakhani, 1st Edition Nov 2003, Publisher Lakhani Enterprise.
3. Maintenance Engineering for Civil Engineers by B. S. Nayak, Khanna Publisher
4. Building Construction by Sushil Kumar, Standard Publisher
5. Maintenance and Repairs of Buildings by P. K. Guha, New Central Book Agency
6. Building Maintenance by Ivor H.Seeley Volume 2, 1976 Publisher The MacMillan Press Ltd London

Reference Books:

1. Estate Management –Metal Lecture Notes of Workshop on “Repairs and Rehabilitation of Structures” by Lakshmipathy 29-30 October 1999.Publisher Anna Institute of Management. N. Palaniappan, Chennai 1992.

2. Concrete Structures-Materials, Maintenance and Repairs by Dennison Campbell, Allen
And Harold Roper, Publisher Longman Scientific and Technical U.K,1991.
3 Journals-The Indian Concrete Journal
4 Journal-Civil Engineering & Construction Review.
5. Learning from Failures –Deficiencies in Design by Mr R.N.Raikar Publisher Construction and Service R & D Centre (SDCPL) Raikar Bhavan, Mumbai, 1987
6. Structural Failure in Residential Building by Shild, Oswald Volume 2, 1979 Publisher Granada Publishing, New York.

Course Name : Diploma in Civil Engineering
Course Code : DCE
Semester : Fifth
Subject Title : Disaster Management
Subject Code : 131CE56E3

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Pract		Oral		Term work		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	1	-	3	80	32	20	100	40	-	-	25	10	25	10	150

Oral Examination will be assessed by internal & external examiner.

Rationale:

The subject of Disaster Management is assuming great importance of late. A few natural disasters like Tsunami, earthquake, Mumbai floods have occurred heaping untold miseries on a large population. Man-made disasters, like terrorist attacks for example, the World Trade Centre Towers in New York and in Kashmir, accidents on road, sea, rail and air or release of toxic gas like the Bhopal gas tragedy have highlighted the need for national policy on disaster management and mitigation policy.

Objective:

1. It spells out the need for better disaster management which may help to bring relief immediately to the victims of the tragedy.
2. Students will understand and appreciate the nature of disaster management, in its pre-disaster, during disaster and post disaster phases.

Syllabus

Theory:

Sr. No	Content	L	M
1	Introduction : 1.1. Definitions and terminologies-hazard, vulnerability, risk, accident, disaster, disaster management. 1.2. Significance of disaster management and the role of engineers in disaster management.	03	06
2	Types of Disasters : 2.1 Water and Climate- floods, cyclones, tornadoes and hurricanes, hailstorms, cloudburst, heat wave and cold wave, snow avalanches, droughts, sea erosion, thunder lightning. 2.2 Geological – Landslides and mudflows, earthquakes, large fire, dam failures and dam bursts.	05	12

	2.3 Biological – Epidemics, pest attacks, cattle epidemics, food poisoning. 2.4 Chemical, Industrial and Nuclear-Chemical, Industrial and Nuclear. 2.5 Accidental- Forest fires, urban fires, mine flooding, oil spill, major bulding collapse, serial bomb blasts, festival related disasters, electrical disasters anf fires, air, road and rail accidents, ship capsizing, village fire.		
3	Disaster Management : 3.1 High Powered Committee (HPC), aspects for HPC consideration, subgroups set up by HPC, action points of HPC, four levels of planning. 3.2 Disaster management cycle - Pre-disaster phase- disaster risk zonation, monitoring, warning and alert system, evacuation, safe route and safe shelters ,	08	12
4	Disater management preparedness procedure – 4.1 personnel training, drills and exercises, types of drills- orientation, table top, functional drill, full scale exercise, provisions for drills, supplies and equipment, protection of records, mutual aid. 4.2 Risk- risk, hazard, risk probability acceptable levels of risk, 4.3 Risk determination- three componenets. 4.4 Risk presentation- by F/N curves & by risk mapping.	08	10
	Total of Section I	**24**	**40**
	Section-II		
5	Disaster phase – 5.1 Emergency communication, transportation, rescue, temporary shelters, and restoration of basic facilities and infrastructure; 5.2 Post-disaster phase- Rehabilitation, Response & recovery and redevelopment- longest phase. 5.3 Response procedures- detection alert & warning devices. 5.4 EOC- Emergency Operations Center & its requirements. 5.5 Recovery procedures. 5.6 HAZOP- study, guide words. 5.7 Use of GIS and remote sensing in disaster management	07	12
6	National Disaster Management Framework : 6.1 National policy on disaster management, Disaster Management Act 2005. 6.2 Role of participants-Government (local, state, and national), non-government and multilateral agencies in disaster management, disaster management plan of local authority.Monitoring, development and up-gradation of disaster management practices.	12	15
7	Regional Case Studies : Survey of recent regional (local, state and adjoining states) disaster, forecasts.	05	13
	Total of Section II	**24**	**40**
	Total of Section I & II	**48**	**80**

Term Work: At least eight assignments covering entire syllabus.

Learning Resources:

Text Books:

Disaster Management – Text and Case Studies by N. Murth D.B., Publisher Deep & Deep Publications, edition 2007

Reference Books:

1. Disaster Management Act-2005 by M. C. Gupta

2. Manual on Natural Disaster Management in India

Visit:

Students shall visit any Government Organization/Office to study disaster management

provision and submit report of the visit.

Course Name : Diploma in Civil Engineering
Course Code : DCE
Semester : Fifth
Subject Title : Design of R.C.C. & Steel Structures.
Subject Code : 131SE56E4.

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Pract		Oral		Term work		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	1	-	3	80	32	20	100	40	-	-	25	10	25	10	150

Oral Examination will be assessed by internal & external examiner.

Rationale:
Although the technician is not supposed to design the structures independently, he/she should be able to understand the design process and be able to provide assistance to engineer. After studying the course, students should be able to design floor system including continuous slabs and beams in R.C.C and simple roof trusses, beams made up of structural steel and be conversant with drawing practices.

Objective:
Students will be able to:
1. Understand importance & use of codal provisions in the design of structures.
2. Design various structural components for RCC & steel structures.
3. Design a two way RCC slab panel & an industrial shade as a steel structure.

Syllabus

Sr. No.	Contents	L	M
	Section I		
1	Reinforced Concrete Design (Limit Stress Method) (IS:456-2000)	05	10
2	Design of two way slabs-Simple theory and use of IS code coefficient	05	10
3	Design of continuous beams	05	10
4	Design of floor systems including continuous beams and slabs (using design aids)	06	05
5	Concept of various loads coming on structures, D.L., L.L., W.L., including earthquake loads and ductility, I.S. code provisions for load combinations	05	05

Section II			
7	Bolted and welded connection: Axially and eccentrically loaded simple connections of beam, beam to beam and beam to column.	06	10
8	Design of Tension and Compression members of simple roof trusses, Design of simple columns (without lacing or battens)	09	15
9	Design of simple beams of uniform section, beams with flanges and plates	07	15
	Total of section I & II	**48**	**80**

Term Work:

Two projects in design and drawing (one each in R.C.C. and Steel design) with minimum three half imperial size drawing sheets showing beams, slabs, details of opening in R C slabs, embedment, columns and beam junctions, continuous beam over supports, bar bending schedules, bolted and welded joints.

Tutorials:

A set of 12 design problems covering each topic

Text Books:

1. Design of steel structures by L.S. Negi, Edition-2nd, 2005,paper back. Publisher-Tata McGraw Hill.
2. Design of R.C.C. structures by Shah and Kale, Edition- Reprint 2007, Publisher-Structures Publication.

Reference Codes:

1. I.S. 456-2000 Code for practice for plain and Reinforced Concrete.
2. I.S. 800-1984 Code for practice for general construction in steel.
3. I.S. 875-1987 Code for practice for structural safety of buildings, loading standards.

Course Name : Diploma in Civil Engineering
Course Code : DCE
Semester : Fifth
Subject Title : Project
Subject Code : 131CE57

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Practical		Oral		Term work		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
-	-	2	-	-	-	-	-	-	-	-	-	-	25	10	25

Rationale

The students passing this course should have concept from design, drawing and estimation for completion of Civil Engineering projects. Accordingly suitable projects will be taken by the students to study the complete aspects of a project.

Objective

At the end of this course students will be able

- To identify various problems and to develop the attitude to seek a solution.
- To decide about project topic.
- To decide the strategy about the project in VIth semester.
- To develop professional abilities.
- To enhance creative thinking.

Course content

A topic related to Civil Engineering will be allotted to a group of 5-6 students. These students will study, collect data and perform related experiments if required or design the required system and submit a detailed report at the end of VIth semester. In Vth semester student will identify topic, collect literature related to topic and decide methodology of project.

Term Work

1. Each group should prepare a power point presentation describing project topic and strategy about project, which will be assessed by project guide of that group and one internal faculty from diploma.

2. Students shall submit hard copy of work completed (Introduction, Literature review, Methodology) in report of this semester.

Course Name : Diploma in Civil Engineering
Course Code : -
Semester : sem I to VI
Subject Title : Student Center Activity/Test

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Pratical		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-

Rationale:

A fresh student needs lot of help about institute and its working. During the subsequent years there is a need of general development of personality, in addition to educational progress. During later part of course, a student needs to prepare for future career. Due to globalization and competition in the industrial and service sectors; the selection for the job is based on campus interviews or competitive tests. While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and attitude, in addition to basic technological concepts.

The purpose of introducing 'Student Centered Activity (SCA)' is to provide opportunity to students to undergo activities which will enable them to develop confidence on various fronts as stated above.
Following activities can be planned in the form of lectures, notes, presentations and group visits etc:

1. Introduction to institute and related activities –
    a. Introduction to institute infrastructure and facilities
    b. General conduct and discipline
    c. Anti-ragging act
    d. functions of student counseling cell
    e. medical help center
    f. library procedures
    g. NCC activity
    h. Gymkhana activities
    i. cultural events
    j. scholarship issues
    k. hostel and mess functions
    l. railway concession
    m. academic calendar
    n. registration process
    o. examination rules
    p. malpractices in exams and punishments
2. Expert lectures on
    a. Introduction to E-learning sources

b. Use of E-library
c. Use of internet for career and personality development
d. Preparations for seminars on technical topics
e. Group discussion techniques
f. General mannerisms and personality development
g. Interview techniques
h. Career guidance and related counseling.
i. Health, yoga and mediation

These activities are planned in different semester so that there will be increased participation of students in learning process.
SCA will exist till the start of Monday Tests ie till first 8 weeks.

Objectives:

The Student will be able to:

1. Acquire information from different sources
2. Prepare notes for given topic
3. Present given topic in a seminar
4. Interact with peers to share thoughts
5. Take the advantages of E-learning sources

Procedure:

Students will be taken in groups to various places with instructors. Will be attending expert lectures as and when planned. View slide shows, get information through handout and notes, refer notices etc