

Course Name: Diploma in Civil Engineering
 Course Code : DCE
 Semester : Fifth
 Subject Title : Quantity Surveying
 Subject Code : 09-CE- 514

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	100	35	25	125	50	-	-	25	10	25	10	175

Rationale:

Quantity surveying is an essential 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. So, 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:

- Decide approximate cost of civil engineering structure.
- Prepare check list of items of construction.
- Prepare estimate for civil engineering work.
- Prepare rate analysis of item of construction.
- Take measurement of completed work.

Syllabus

Part I -Theory:

Sr. No.	Content	L	M
1.	Introduction : Meaning & objectives of estimating & costing, Skills required for a good estimator. Interpretation of drawings. Mode of Measurements - Purpose, accuracy, units, Rules for deduction, Mode of measurements for content related item (as per I.S./SP-27) Preparation of measurement and abstract sheets.	04	06
2.	Taking out quantities : General Principles, Methods – Centre line and Long wall and short wall methods by solving examples on small buildings. Abstracting bills of quantities, schedule items, lump sum provisional items, prime cost, provision for electrification, drainage & water supply.	08	10
3.	Detailed Estimate : Unit quantity method, Total quantity method, Data required	12	24

	for detailed estimate. Factors to be considered during preparation of detailed estimate. Types of detailed estimate - Revised estimate, Supplementary estimate, Supplementary and Revised estimate, Annual repair or maintenance estimate Preparing detailed estimate for - (i) Compound wall (ii) Single storey (small residential building with One room, Two room, Kitchen, Bath &W.C., Verandah) (iii) Two- storied residential building (iv) RCC work for weather-shed with lintel, slab, beam, and column with footings and staircase. (v) R.C.C. Retaining wall.		
	Approximate Estimates : Definition, Purpose , Methods – Plinth area rate method, Cubic content method, Service unit method, bay method, Approximate quantities with bill method, Cost comparison method	06	15
	Rate Analysis: Meaning of term rate analysis, Factors affecting rate analysis, Task work, Quantity of materials required for different item of works, Standard schedule of rates. Analysis of rates for common items of civil engineering works.	06	20
	Specification: Definition, Purpose and Legal aspect, General and Technical specifications for various items of construction.	06	15
	Valuation: Definition, Importance and Purpose, Depreciation, sinking fund, Salvage & Scrape value, Gross & Net yield, Fixation of rent, Different methods of valuation.	06	10
	Total	48	100

Part II- Tutorials:

- 1 Prepare check list of items for following Civil engineering works.
 - i) Load bearing structure
 - ii) Framed structure
 - iii) Road work
- 2 Prepare Market rates survey report for different construction materials and items.
- 3 Taking out quantities of various items of work for load bearing structure
- 4 Taking out quantities of various items of work for R.C.C Framed structure.
- 5 Prepare a detailed estimate for Load bearing structure (G+ 1)
- 6 Prepare a detailed estimate for R.C.C Framed structure (G+ 2)

- 7 Prepare estimate by using approximate estimate method.\
- 8 Taking out quantities of earthwork for a road profile.
- 9 Prepare rate analysis for at least six items of work- RCC in beams & slabs, Columns, Brick masonry, Stone masonry, Plastering & Pointing, Flooring ,Painting, waterproofing, Plumbing.
- 10 Draft a detailed specification for at least six items of construction.
- 11 Solve any five problems on Valuation.

Term Work:

Term work shall consist of record of all tutorials.

Learning Resources:

Text Books:

1. Estimating & Costing in Civil Engineering by B.N.Dutta Publisher UBS Publishers & Distributors Pvt. Ltd. New Delhi, 25th Edition,2002
2. Estimating & Costing, Specification and Valuation in Civil Engineering by M.Chakraborti Publisher: M.Chakraborti, Kolkatta Edition-2006.

Reference Books:

1. Estimating & Costing by G.S.Birdie Publisher Dhanpat Rai and sons Delhi Edition 6th reprint 2009.
2. Professional Practice (Estimation & Valuation) by Roshan H. Namavati, Published by Lakhani Book Depot, Mumbai-400013, 4th edition, 1984

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Fourth
 Subject Title : Transportation Engineering
 Subject Code : 09-CE- 515

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	
4	-	-	3	100	35	25	125	50	-	-	-	-	25	10	150

Rationale: Transportation 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, bridges and airports. Each component of transportation is a specialized branch of engineering. This subject aims at basic knowledge about railways, bridges and airports in respect of their various 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 airports.
- Understand methods of survey for railway, airports and its geometric design.
- Understand, supervise and coordinate the construction activities related to railways, airports, docks and Harbour.
- Know Harbour layout, port facilities.

Syllabus

Part I -Theory:

Sr. No.	Content	L	M
1	Modes of Transportation system Overview of Transportation Engineering : Modes of transportation system- roads, railway, airways, Waterways, importance of each mode.	02	05
2	Railway Engineering : 2.1 Alignment and gauges Classification and zones of Indian Railway. Alignment- Factors governing rail alignment. Rail gauges types, Rail track cross sections- standard cross section of BG & M.G. single & double line in cutting & embankment. 2.2 Permanent ways	25	40

	<p>Various components & their functions, various materials used.</p> <p>Rails- Types, creep of rails, causes & prevention of creep.</p> <p>Sleepers- Types- wooden, metal, concrete, their comparison.</p> <p>Ballast-Types,properties,merits & demerits</p> <p>Rail fixtures & fastenings- fish plate, bearing plates, spikes, bolts, keys, anchors & anticreepers.</p> <p>2.3 Railway Track Geometrics</p> <p>Coning of wheels, tilting of rails, gradient & types,</p> <p>Super elevation, limits of super elevation, cant & cant deficiency</p> <p>2.4 Points and crossings</p> <p>Definition & types of points of crossing, crossovers, Diamond crossing.</p> <p>Signals- Types, interlocking, control of train movements.</p> <p>2.5 Station and Yards</p> <p>Types of stations- way side, crossing, junction, terminal.</p> <p>Yards- types, passenger yards, goods yard, and locomotive yard, requirement of locomotive yard, Marshalling yard, types & layout of marshalling yard.</p> <p>2.6 Track Maintenance</p> <p>Necessity, types, tools required, organization flow chart with duties gang mate, key man.</p>		
3	<p>Airport Engineering :</p> <p>3.1 Introduction</p> <p>Component parts of an aero plane, definitions of aircraft, aerodrome, airport, airfield, landing area, terminal area, runway, gate, taxiway, apron.</p> <p>3.2 Aircraft characteristics- aircraft weight, turning radius, wheel load & configuration.</p> <p>3.3 Airport planning - site selection.</p> <p>3.4 Airport layout- Runway orientation & configuration.</p> <p>Taxiway geometric standards, wind rose diagram, terminal buildings, Terminal area, planning of terminal building, Apron: size of the gate position, number of gate position, aircraft parking system; Hanger: general planning considerations.</p> <p>Air traffic control: Air traffic control aids, Enroute aids, landing aids.</p> <p>3.5 Airport lighting-Rotating beacon, runway lighting, taxiway lighting, lighting of wind direction indicator.</p> <p>3.6 Airport marking- runway marking, taxiway marking, apron marking, wind direction</p>	25	30

	indicator, landing direction indicator. 3.7 Airport Drainage: requirement of airport drainage, design data, surface drainage design, subsurface drainage design.		
4	Docks and Harbour: 4.1 Definition of Docks & Harbour. 4.2 Selection of site, Harbors maintenance. 4.3 Harbour layout- Break waters, Jetties, Wharfs, Piers. Dolphin. Navigational aids like buoys, Lighthouses. 4.4 Ship characteristics and their influence on port management and operations. 4.5 Port facilities- Docks, Transit sheds, Warehouses, General layout, Container and container yards, Handling equipment.	12	25
	Total	64	100

Term work:

The term work shall comprise of 10 assignments based on above syllabus.

Learning Resources:

Text Books :

1. Railway Engineering by S.C. Saxena & S.P.Arora publisher Dhanpat Rai & sons edition, 5th Reprint 2005
2. Principles and practice of bridge Engineering by S.P. Bindra publisher Dhanpat Rai & sons Edition year 2009
3. A text book of Transportation Engineering by S.P. Chandola publisher S. Chand & Co. Ltd.- 1st Edition 2001.

Reference Books :

1. Harbour dock and tunnel engineering by R Shrinivasan publisher Charotar Publishing house, Anand, 388001. 2006
2. Airport Planning and Design by Khanna & Arora publisher Nemchand Bros, Roorkee Edition year 2008.
3. Airport Engineering by G. Venkatappa Rao publisher Tata McGraw-Hill Publishing Co. Ltd. Edition 1992.

IS / International Codes. : IS 4880, IS 5878, Part-I to X

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Fifth
 Subject Title : Elements of RCC Design
 Subject Code : 09-SE- 504

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	2	3	100	35	25	125	50	-	-	25	10	25	10	175

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

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

Syllabus

Part I-Theory:

Sr. No.	Content	L	M
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)	06	09
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	15
3.	Slabs: Design of simply supported rectangular slabs spanning in one direction, cantilever slabs, slabs with overhangs. Design of one-way continuous slab using I.S. Code coefficient.	08	15
4.	Beams: Design of singly reinforced beams, Tee and Ell beams and width of the flange, neutral axis, Moment of resistance.	08	13

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.	03	10
6.	Doubly Reinforced Beams: Analysis and Design, Steel Beam theory.	03	07
7.	Axially loaded columns: Short and Sender Columns, stress reduction factor, Circular columns.	05	16
8.	Isolated Column Footings: Design of Square and Rectangular footing.	07	15
	Total	48	100

Term Work:

Project in design and drawing of a building covering slabs, beams, columns and footing including bar bending schedule. Minimum of two half imperial drawing sheets.

Part II-Tutorials:

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

Learning Resources:

Text Books

Design of reinforced concrete structures by S Ramamrutham and N. Narayanan publication Dhanpat Rai & Co edition 2006.

Reference Books

1. Design of reinforced concrete structures by H.J. Shah publication Charotar 8th Edition, 2009,
2. Analysis, Design and detailing of structure Vol. 3 by Vazirani and Ratwani Khanna Publishers edition 2003
3. I.S. 456-2000 Code for practice for plain and Reinforced Concrete
4. 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 : 09-SE- 505

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	100	35	25	125	50	-	-	-	-	25	10	150

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

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

Syllabus

Part I -Theory:

Sr. No	Content	L	M
1.	Soil, soil formation & profiles	03	07
2.	Weight –Volume relationship for soils- Specific Gravity and Moisture content tests.	03	07
3.	Soil identification and Description: Types of soil classification systems, preliminary field-tests for soil identifications.	05	12
4.	Permeability: Darcy's law, Constants head and falling head permeability test	05	12
5.	Compaction: Standard and Modified Proctor tests, Field dry density, determination by core cutter method and sand replacement methods.	05	12
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	12
7.	Consolidation: Spring analogy, time lags and consolidation test.	06	12
8.	Bearing capacity of soils:	06	10

	Shallow foundation types, net load and gross load, Field plate test. Limitations effect of water table and size of foundation.		
9.	Pile foundation: Types of piles, field pile load test, chemical actions of soil and water on piles	06	09
10.	Sub-surface exploration: Preliminary and detailed explorations, undisturbed soil sampling, Standard penetration test, field vane shear test, and dynamic cone penetration test.	03	07
	Total	48	100

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

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

Learning Resources:

Text books

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

Reference Books

1. Modern Geotechnical Engg. by Dr. Alam Singh, Cbs Publishers & Distributors 3rd Edition, 2006
2. Soil Mechanics and foundation Engg by Dr. B.C. Punmia Laxmi publishers, edition 2005

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Fifth
 Subject Title : Engineering Geology
 Subject Code : 09-CE- 516

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Practical		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	Max
3	-	2	----	---	---	--	--	--	25	10	-	-	50	20	75

Rationale: Art of engineering and the science of geology meet over a wide field and the civil engineers in his handling of rocks and soils during most kinds of construction come into contact with problems which are essentially of geological nature. If he has some knowledge of geology, he is in a position to carry out the simpler and more routine geological investigations encountered in his daily work and, when condition are less straightforward, he is able to decide when to call in expert geological advice. To enable the student to understand those aspect of the behaviour and properties of rock and soil that are relevant to the design of building structure, engineering geology provide sufficient knowledge of physical identification of minerals and rock, materials which are making up the earth.

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

- Acquire the necessary grounding in the fundamentals of subject and helps him to appreciate something of the nature of the materials with which he will be concerned in practice.
- Identify various rock forming minerals.
- Identify and classify the different types of rock.
- Consideration of common rocks as building stones.

Syllabus

Part I-Theory

Sr. No.	Contents	L
1	Introduction : 1.1 Concept and subdivision of geology 1.2 Scope of engineering geology in construction job, water resource development, Town and Regional Planning	4
2	Mineralogy : 2.1 Definition of minerals and crystals 2.2 Different modes of classification of minerals 2.3 Fundamental subdivision of minerals kingdom on the basis of chemical composition 2.4 Systematic classification of study of minerals 2.5 Detailed study of physical properties of minerals 2.6 Chemical composition of different groups of rock forming minerals and their occurrence in different rocks. Perfect crystal,	6

	crystalline, amorphous 2.7 Identification of common rock forming minerals as per list in practical work.	
3	Igneous Petrology : 3.1 Definition of rocks, igneous rock, magma and lava. 3.2 Major subgroups of igneous rocks 3.3 Composition, textures, types of textures , structures 3.4 Definition of concordant bodies and discordant bodies. 3.5 Classification on the basis of chemical, mineralogical, textural characteristics of rocks 3.6 Important acidic igneous rocks (granite, pumice), basic igneous rocks(dolerite, gabbro, basalt)	7
4	Sedimentary Petrology : 4.1 Definition of sediments, sedimentary rocks 4.2 Different mode of formation, details of mechanically formed rocks. Examples of rock formed in each group. 4.3 Composition, textures, mechanical structures 4.4 Classification of rocks 4.5 Important sedimentary rocks as per list in practical work	7
5	Metamorphic Petrology : 5.1 Definition of metamorphism, metamorphic rock. 5.2 Factors affecting metamorphism, Different kind of metamorphism 5.3 Composition, textures, structures 5.4 Important distinguishing features of rock, Rock cleavage, Schistosity and Foliation. 5.5 Important metamorphic rock as per list in practical work.	7
6	Structural Geology : 6.1 Unconformable beds and Conformable beds 6.2 Concept of Dip and Strike, Types of Dip and their significance, Outcrop pattern, outliers and inliers 6.3 Fault: Formation, Different terminology involved, types of fault and its significance 6.4 Fold: Formation , Different component ,types and its significance 6.5 Joints: Definition, joints in igneous rocks, Types of joints and its significance.	8
7	Ground water : 7.1 Sources of ground water, Perched water table. Cone of depression. Artificial ground water recharge	3
8	Application of geology : 8.1 Importance of geological condition while selecting the type of dam and tunnels 8.2 Ideal geological conditions i.e position and nature of GWT and nature and structure of rock for dams and reservoir site and tunnel site 8.3 Consideration of common rocks as building stones	6
	Total	48

Part II Practicals

1. Study of physical properties of minerals.
2. Identification of minerals
 - a. Silica group: Quartz, Amethyst, Opal
 - b. Feldspar group: Orthoclase, Plagioclase
 - c. Cryptocrystalline group: Jasper
 - d. Carbonate group: Calcite
 - e. Element group: Graphite
 - f. Pyroxene group: Talc
 - g. Mica group: Muscovite
 - h. Amphibole group: Asbestos, Olivine, Hornblende, Magnetite, Hematite, Corundum, Kyanite, Garnet, Galena, Gypsum
3. Identification of rocks(Igneous Petrology)
 - a. Acidic Igneous rock: Granite and its varieties, Syenite, Rhyolite, Pumice, Obsidian, Scoria, Pegmatite, Volcanic Tuff.
 - b. Basic rock: Gabbro, Dolerite, Basalt and its varieties, Trachyte.
4. Identification of rocks(Sedimentary Petrology): Conglomerate, Breccia, Sandstone and its varieties , Laterite, Limestone and its varieties, Shales and its varieties
5. Identification of rocks(Metamorphic Petrology) : Marble, slate, Gneiss and its varieties, Schist and its varieties, Quartzite, Phyllite

Termwork: Students shall submit journals and at least three geological maps for above Practical work.

Learning Resources:

Text Books:

1. Text Book of Engineering Geology by Dr. R.B. Gupte, Publisher Pune Vidyarthi Griha 3rd Ed. 2001
2. A Test Book of Engineering and General Geology by Parbin Singh, Publisher S.K.Kataria & Sons 7th Ed. 2004.

Course Name: Diploma in Civil Engineering
 Course Code: DCE
 Semester : Fifth
 Subject Title: Building Services
 Subject Code: 09-CE- 517

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	100	35	25	125	50	-	-	-	-	25	10	150

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 and maintenance of building environment by designed ventilation
- Know necessity of eco friendly services

Syllabus

Part I- Theory

Sr. No.	Contents	L	M
1	Introduction – 1.1 Comfort standards and Types of various installation services,	2	4
2	Water Supply & Distribution – 2.1 Plumbing engineering – Principles of plumbing, General properties of water, Per capita supply, 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	15	25

	pressure reducer valve system, multiple storage system, break pressure tanks, hydro pneumatic systems), Pumping system.		
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 and hybrid), design and capacity of pipes (primary & secondary braches), Anti siphon & vent piping installation of pipes,	8	20
4	Rain water harvesting system – 4.1 Introduction, Collection of runoff, pipe system, design consideration, Road surface runoff (open drain and closed drain), Disposal of rain water (surface and under ground rain harvesting)	5	10
5	Elevators- 5.1 Construction aspects of Lift, types of lifts, 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.	6	12
6	Fire Fighting Installations- 6.1 Requirement and storage of water 6.2 Systems of fire fighting – External (pillar and flush hydrants), Internal (residential and industrial), training to personnel for service & maintenance and safety measures. 6.3 Maharashtra fire Prevention and Life Safety Measures Act, 2006	6	15
7	Building Environment - 7.1 Necessity of HVAC, comfort standers, System of ventilation (natural and artificial ventilation), lighting, noise (recommendations to minimize noise) & acoustics, Introduction to eco friendly building services and concept of Green building.	6	14
	Total	48	100

Part II – Tutorial

**Sr.
No.**

List of Exercises

- Study of types of pipes used for plumbing and sanitary services, pipe fittings, valves and tools required for fittings
- Study of types of pipes used for plumbing and sanitary services, pipe fittings, various traps used for sanitary fixtures and tools required for fittings
- Study of existing scheme involving all types of services with sketches.
- Design of water supply, sanitation & storm water system for G+1 storey building with sketch.
- 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, 2009-10

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Fifth
 Subject Title : Project
 Subject Code : 09-CE- 518

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	-	-	-	-	-	-	-	-	50#	20	50\$	20	100

\$- Project Report

#- Presentation / Seminar

Rationale: The students passing this course should have concept from design, drawing and estimation to 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 also to develop the attitude to seek a solution.
- Apply principles, theorems & bye-laws in the project planning & design.
- Interpret & analyze the data.
- Develop professional abilities.
- 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, perform related experiments or design the required system and submit a detailed report at the end of the each semester. Students may have separate topics for sem V & sem VI or same topic for sem V & sem VI project. Scope of project shall be defined accordingly.

Term Work: Shall consist of detailed project report, presented in a professional manner.

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Fifth
 Subject Title : Entrepreneurship Development
 Subject Code : 09-HM- 504

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	-	-	-	-	-	-	-	-	-	-	-	-	-	25	10	25

Rationale:

Engineers can play very important role in economic development of the nation and wealth creation by innovation and entrepreneurship. This course aims to develop among the engineering students awareness and abilities to be entrepreneurs.

Objective:

1. To prepare a ground where the students view entrepreneurship as a desirable and feasible career option.
2. To build the necessary competencies and motivation for a career in entrepreneurship.

Syllabus

Theory

Sr.No	Content	L
1	Introduction - Concept, characteristics, functions, entrepreneurial competencies.	2
2	Entrepreneurial challenges - Live examples of challenges faced by entrepreneurs	2
3	Business idea/opportunity recognition and selection - Idea generation, Project identification, selection, formulation and appraisal	4
4	People: Making a team- Selection and training.	2
5	Evaluating markets and customers- Market evaluation and marketing strategies	4
6	Business plan- Writing a business plan	8
7	Financing the business- Sources of finance, venture capitalist, Institutional finance.	4
8	Incorporating a company- Private limited and public limited company	4
9	Evaluating the value of enterprise- Valuation of the business	2
	Total	32

Assignments: Individual and group assignments on

- 1 Idea generation
- 2 Business plan
- 3 Project appraisal

- 4 Marketing
- 5 Venture capitalist
- 6 Women entrepreneurs

Learning Resources

Text book:

Entrepreneurial Development: Khanka S.S. S.Chand, 1999 edition, 2006 reprint

Reference book:

The successful Entrepreneur's Guidebook: Colin Barrow, Robert Brown and Liz Clarke, Kogan Page India.

Course Name: Diploma in Civil Engineering
 Course Code: DCE
 Semester : Sixth
 Subject Title: Construction Site Management
 Subject Code: 09-CE- 619

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	100	35	25	125	50	-	-	-	-	25	10	150

Rationale: Major Job opportunities in Civil Engineering are for site engineers. These engineers are expected to know various aspects about work place management besides technical knowledge of civil engineering. These management issues include site management, equipment & materials management, safety and other issues related to human resource management.

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

- Know how to manage the site.
- Know materials and safety management.
- Understand issues related to human resource management.

Syllabus

Part I- Theory

Sr. No	Contents	L	M
1	Construction Documents: Tender Documents, specifications, working drawings, shop and fabrication drawings, schedules, cash flow changes and claims, extras.	3	20
2	Site organization: Organization structure, roles, responsibilities and authority	5	10
3	Co-ordination: Relationships, behavioral aspects, meetings, negotiation, dispute resolution	6	08
4	Site productivity: Labour relations, motivation, impact of changes, weather, overtime.	6	08
5	Safety: Common causes of accidents, costs of accidents, safety campaign, personal protective equipment for construction tradesmen.	4	15
6	Quality: Quality, role of inspection, checks lists, quality manuals, site laboratory, sampling and test records.	8	12
7	Documentation: Reports: types(progress, logs, accidents etc.) and contents, correspondence, meeting minutes, job diary, progress photographs, video recordings	6	10
8	Job Layout: Considerations, elements, security, organizing.	4	07
9	Materials and Equipment: ABC analysis, storage facilities, avoiding waste and pilferage,	6	10

	selection of equipment, equipment maintenance, buying and hiring option.		
	Total	48	100

Part II- Tutorials

List of Tutorials:

- 1) Students should submit a report about construction site management of one existing construction company.
- 2) Based on data collected for above tutorial exercise, students will prepare organizational chart and job responsibilities.

Term Work

- Ten assignments on various topics.
- Reports on various site visits detailing managerial aspects in all above mentioned topics.
- Students should submit journal of above exercises.

Learning resources

Text Books:

Construction Management Practice by Raina, Publisher Mcgraw Hill education, Edition, 1988

Reference Books –

Construction Jobsite Management by Mincks and Johnston, Publisher -Thomson Learning, Inc, USA, 2nd edition, 2004.

Course Name: Diploma in Civil Engineering
 Course Code: DCE
 Semester : Sixth
 Subject Title: Construction Techniques
 Subject Code: 09-CE- 620

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Practical		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	2	-	-	-	-	-	-	-	-	-	25	10	50	20	75

Rationale: Today the infrastructure development is at its peak and many advance techniques are used for various construction activities. Being a civil engineer students suppose to know the features and utility of various equipments used in construction activities, but it is necessary to have the preliminary knowledge of simple construction techniques before studying advance techniques.

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

- Know various types techniques and equipments required for construction activities.
- Know methods of excavation in rock and earth with the advanced methods like micro tunneling.
- Use various techniques for dewatering the foundation depending upon the soil conditions.
- Understand advance methods and equipments used for concreting.
- Know the connections found in structural steel
- Decide the owing and operating cost of the equipments used on construction site.

Syllabus

Part I-Theory

Sr. No.	Contents	L
1	Excavation in Rock and Earth: 1.1Definitions- Bits, Cuttings, Drifter, Drills (Abrasion, churn, core, diamond, percussion and shot), blast hole, explosive, safety fuse and blasting cap 1.2Brief description of different types of bits (Carbide insert & button) and drills (Jack Hammers, drifters, churn drills, shot drills & diamond drill) , Selection of drilling method and equipment, 1.3Necessity of drilling holes in earth, introduction of tunneling and utility of micro tunneling 1.4Types of explosives (Dynamite, Slurry, ANFO and Primers), Handling and storing of explosives. 1.5Introduction of Equipments used for excavation (shovel, hoe, loader)	12
2	Dewatering of foundations:	04

	2.1Necessity and Techniques used – Drains, sumps, pumps, well point system (Single & multiple), various methods of timbering to trenches.	
3	Scaffolding and Shoring: 3.1Definition and utility, types of scaffolding according to use for masonry and finishing works, types of shoring (Raking, dead and flying)	04
4	Concrete: 4.1Concreting in different weather conditions (hot and cold weather), underwater concreting, polymer concreting. 4.2Formwork- Definition, requirements of good formwork, types according to material used (timber, plywood, steel, etc.), formwork for various structural members (columns, beam and slab), Causes of failure. 4.3Equipments used for concreting- batcher, mixer, batching plant, generator, compressor, concrete pump, builder's hoist, vibrator, etc.	12
5	Structural steel: 5.1Member connections (column- beams, beam- beam, gusseted base), welding methods (electric arc welding and oxy-acetylene welding), advantages of welding over riveting, joint detailing, fabrication and erection. Cranes: 5.2Classification and utility of cranes, features of major types of mobile and tower cranes, selection criteria for type of crane.	08
6	Equipment cost: 6.1Definitions- salvage value and depreciation 6.2Cost of owning and operating cost, numerical for the calculation of depreciation by straight line method and sinking fund method.	05
7	Precast concrete construction: 7.1Member fabrication, storage, transport and erection, equipments used for transport and erection, comparison of precast and cast- in-situ concrete.	03
	Total	48

Part II- Tutorial

**Sr.
No.**

List of Tutorial Exercise

- 1 10 Sketches of techniques of dewatering the foundation and the timbering methods
- 2 Submit one site visit report on major equipments used on site from two site visits.
- 3 20 sketches of types of scaffolding, shoring, formwork for various structural members, concrete pump, builder's hoist, vibrator, steel member connections,
- 4 Numerical on calculation of depreciation by straight line method and sinking fund method.
- 5 5 assignments based on the syllabus.
- 6 Power point presentation on advanced equipments used for construction activities.

Termwork: Students shall submit journal and sketch book of above exercises.

Learning Resources:

Text Books :

1. Building Construction, Planning Techniques and Method of Construction by Arora S.P. and Bindra S.P. publisher Dhanpat Rai and Sons, edition1997.

2. Construction Planning, Equipment and Methods by Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C. publisher McGraw Hill, Singapore, 5th edition 1995

Reference Books:

1. Construction Equipment and its Planning and Application by Dr. Mahesh Verma publisher Metropolitan Book Company, New Delhi, 1983
2. Construction Equipment and Management by Sharma S.C. publisher Khanna Publishers New Delhi, 1988.

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Sixth
 Subject Title : RCC & Steel Design
 Subject Code : 09-SE- 606

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	2	3	100	35	25	125	50	-	-	25	10	25	10	175

Rationale: Although the technician is not supposed to the structures independently, he/she should be able to 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 design of stair in R.C.C and simple roof trusses, beams made up of structural steel and be conversant with drawing practice.

Objective: Students will be able to

- Understand importance & use of codal provisions in the design of structures.
- Design various structural components for RCC & steel structures.
- Design a small RCC structure & an industrial shade as a steel structure.

Syllabus

Part I-Theory:

Sr. No.	Content	L	M
1.	Reinforced Concrete Design (Limit Stress Method) (IS:456-2000)	5	05
2.	Design of two way slabs-Simple theory and use of IS code coefficient	5	15
3.	Design of continuous beams	5	15
4	Design of floor systems including continuous beams and slabs (using design aids)	6	05
5.	Details of openings and embedments	2	05
6.	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	5	05
7.	Bolted and welded connection: Axially and eccentrically loaded simple connections of beam, beam to beam and beam to column.	6	15
8.	Design of Tension and Compression members of simple roof trusses, Design of simple columns (without lacing or battens)	9	20
9.	Design of simple beams of uniform section, beams with flanges and plates	5	15
	Total	48	100

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 10 design problems covering each topic.

Learning Resources:**Text Books**

Design of steel structures by L.S. Negi, publisher Tata McGraw Hill edition 2nd, 2005, paper back edition

Reference Books

Design of R.C.C. structures by Shah and Kale, Structures Publication Reprint 2007

Codal References-

I.S. 456-2000 Code for practice for plain and Reinforced Concrete

I.S. 800-1984 Code for practice for general construction in steel

I.S. 875-1987 Code for practice for structural safety of buildings, loading standards.

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Sixth
 Subject Title : Water Supply & Waste Water Disposal
 Subject Code : 09-CE- 621

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	2	3	100	35	25	125	50	-	-	25	10	25	10	175

Rationale: Water is the basic need for all living beings. Maintaining this basic necessity in adequate quantity and in desired form is of great importance which is possible by detail study of Water Supply System. Some part of used water and solid wastes become sewage whose safe disposal is essential from environmental point of view. If solid and liquid wastes are not disposed off in scientific and hygienic manner which ultimately leads to health hazards. Hence Waste Water Disposal, being an essential part of Civil engineering has been included in Civil engineering course.

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

- Know the necessity of water supply scheme.
- Estimate the total quantity of water required for a particular locality.
- Know standards of drinking water.
- Understand different steps and methods of water treatment.
- Understand the distribution system.
- Know methods of collection of solid wastes and sewage.
- Know different units of sewage treatment, their operation and maintenance.
- Know various methods of disposal of sewage effluents and dewatered sludge.

Syllabus

Part I -Theory

Sr. No	Contents	L	M
1.0	Water :	18	50
	1.1 Demand of water, objectives of public water supply, Population Forecasting, estimation of water demand, fluctuations in demand of water.	03	10
	1.2 Components of water supply scheme. Flow diagram of water treatment plant.	01	02
	1.3 Quality of water-Quality requirements of drinking wholesome and potability standards.	03	10
	1.4 Treatment of Water- sedimentation, coagulation, coagulants and coagulant aids, Jar test, choice of coagulant, filtration, types of filters- rapid sand filter, slow sand filter, pressure filter, types of under drain system, methods of cleaning, disinfections, various methods, free and combined residual	06	15

	chlorine, break point chlorination, Disinfections of wells, softening, zeolite Water Softener aeration, activated carbon treatment.		
	1.5 Transmission and Distribution – Types and materials of conduits, gravity and rising mains, fire storage, service reservoirs, pipe lines, appurtenances, pumping stations.1	05	13
2.0	Waste water :	30	50
	2.1 Sewerage system- Separate, combined and partially separate ,Sanitary and Storm water sewers, Comparison of separate and combined system, quantity fluctuations, rational method of storm sewer design, sewage pumping.	02	02
	2.2 Type of sewers- house sewer, water sewer, branch sewer, main sewer, outfall sewer.	01	02
	2.3 Shape of sewer & sewer materials, laying of sewer, Sewer appurtenances- manholes, drop manholes, lamp holes, cleanout, street inlets, catch basins, flushing tanks.	02	05
	2.4 Design of sewer-maximum and minimum velocities to be generated in sewers, self cleaning velocity, Non scouring velocity, problems on design of sewers.	05	09
	2.5 Sewage strength, BOD, COD, uses of BOD & COD.	02	03
	2.6 Sewage treatment- Objective, flow diagram. Preliminary sewage treatment- Screens, grit chamber, skimming tank.	03	04
	2.7 Primary treatment- sedimentation – principle, type of sedimentation tank, rectangular, circular, constructional details of sedimentation tank.	02	03
	2.8 Secondary or Biological treatment-by Trickling filters construction and working, merits and demerits of trickling filter.	02	04
	2.9 Secondary or Biological treatment- through activated sludge process, various operations involved and units of an activated sludge plant, bulking and foaming in an activated sludge plant, sludge recycle.	02	04
	2.10 Miscellaneous methods- Oxidation ditch and Oxidation ponds.	02	04
	2.11 Disinfection of sewage- chlorination of sewage	01	02
	2.12 Sludge disposal, digestion of sludge, dewatering of sludge, sludge drying beds.	03	04
	2.13 Septic tank, treatment and disposal of septic tank effluent. Design of septic tank.	03	04
	Total	48	100

Part II – Tutorials

1. Design of a water distribution system for a town of given population
2. Comparison of advantages and disadvantages between a surface water source and ground water source.
3. Conventional water treatment plant flow sheet

4. Design of a water distribution system for a town of given population
5. Different coagulants and their use in water treatment
6. Comparison between slow sand, rapid gravity and pressure filters
7. Merits and demerits of disinfection
8. Advantages and disadvantages of sewerage system
9. Design of storm sewer
10. Flow diagram of conventional sewage treatment plant using
 - a) Activated sludge process
 - b) Trickling filter
11. Anaerobic digestion of sludge
12. Design of septic tank with disposal of septic tank effluents

Part II- Practicals

A) Tests on Water

- 1) To determine pH of the given water sample
- 2) To determine Total solids, Dissolved solids & suspended solids of the given water sample
- 3) To determine Turbidity of the given water sample
- 4) To determine Optimum Alum Dose by Jar test for the given water sample
- 5) To determine Residual chlorine of the given water sample
- 6) To determine Chloride content of the given water sample
- 7) To determine Total hardness of the given water sample
- 8) To determine Total Alkalinity of the given water sample
- 9) To determine Dissolved Oxygen of the given water sample

B) Tests on Waste water

- 1) To determine Sludge Volume Index of the given waste water sample.
- 2) To determine BOD of the given waste water sample
- 3) To determine COD of the given waste water sample
- 4) To determine Dissolved Oxygen of the given waste water sample
- 5) To determine Total solids, Dissolved solids & Suspended solids of the given waste water sample

Term work:

Students shall submit journal containing at least 10 practicals, tutorials and 8 assignments based on syllabus.

Learning Resources:

Text Books:

1. Water Supply Engineering- Vol-I by S. K. Garg, Publisher-Khanna Publishers Edition 2004
2. Environmental Engineering- Vol-II by S. K. Garg, Publisher-Khanna Publishers Edition 2006

Reference Books:

1. Water supply Engineering by Dr. P. N. Modi, Publisher Standard Book House, New Delhi 2nd edition , 2006
2. Sewage treatment & disposal and waste water engineering, Dr. P. N. Modi, Publisher Standard Book House, New Delhi 2nd edition , 2008.

Manuals:

1. Manual on Water Supply and Treatment, constituted by Government of India
2. Manual on Sewerage and Sewage Treatment, constituted by Government of India

Website

www.iwwa.info

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Sixth
 Subject Title : Irrigation Engineering
 Subject Code: 09-CE- 622

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	100	35	25	125	50	-	-	-	-	25	10	150

Rationale: India is an agricultural country as about 70% of Indian population is directly dependent on agriculture. Agriculture produces food, fats and fabrics (essential). India is a tropical country with non uniform rainfall, so artificial application of water is enviable to get assured and increased yield. The study of crops, their water requirements, various irrigation techniques and provision of various hydraulic structures needs extensive study.

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

- Know various types irrigation systems.
- Collect the required data for the design of various irrigation projects.
- Design the canal sections and calculate the capacity of canal.
- Calculate the yield from catchments.
- Decide the type and section of Dams, Weirs and Barrages.
- Understand types of wells and the theoretical concept of their interference.

Syllabus

Part I – Theory

Sr. No	Contents	L	M
1	Introduction- 1.1 Definition – Irrigation and irrigation engineering, necessity of irrigation, advantages of irrigation, ill effects of over irrigation and types of irrigation. 1.2 Introduction to lift irrigation scheme. 1.3Irrigation department design standards and specifications.	03	04
2	Hydrology- 2.1 Definitions- rainfall, rain gauge and rain gauge station. 2.2 Types of rain gauges in detail, average annual rain fall and its calculation. 2.3 Definition of run off, factors affecting run off, calculation of run off by run of coefficient, Inglis' formula, maximum food discharge and methods of calculation. Yield and Dependable yield and methods calculation. 2.4 Hydrograph, Unit hydrograph and its uses.	05	15
3	Water Requirement Of Crops- 3.1 Principle Indian crops, Cropping seasons.	06	15

	<p>3.2 Definitions – Crop period, base period, Duty & Delta, factors affecting Duty, relation between Duty, Delta and base period.</p> <p>3.3 Definition – CCA, GCA, Intensity of irrigation, time factor, Kor Period, Kor depth, outlet factor.</p> <p>3.4 Modified Penman method and Problems on water requirement and capacity of canal.</p>		
4	<p>Dams And Spillways-</p> <p>4.1 Survey for irrigation project- Data to be collected for irrigation project: site selection for dams, reservoir and spillways.</p> <p>4.2 Types of dams – Earthen dams and Gravity dams (masonry and concrete), Comparison of earthen and gravity dams with respect to foundation, seepage, construction and maintenance.</p> <p>4.3 Earthen Dams – Components and their functions, typical cross section, seepage through embankment and foundation seepage control through embankment and foundation. Types of failure of earthen dams and remedial measures.</p> <p>4.4 Gravity Dams- Typical cross section, drainage gallery, joint in gravity dam, Concept of high dam and low dam, forces acting on dam and Numerical to calculate forces.</p> <p>4.5 Spillways- Definition, function, location and components, various types</p>	12	25
5	<p>Bandhara Irrigation and Percolation Tanks-</p> <p>5.1 Layout and component parts, Advantages and disadvantages of bandhara irrigation.</p> <p>5.2 Percolation Tanks– necessity and importance, selection of site.</p>	04	08
6	<p>Diversion Head Works-</p> <p>6.1 Weirs – components parts, functions and types, layout of diversion head works with its components and their function, canal head regulator, Purpose of silt excluders and silt ejectors.</p> <p>6.2 Barrages – components and their function. Difference between weir and barrage irrigation departments design standard and specifications.</p>	08	12
7	<p>Canals-</p> <p>7.1 Classification of canals according to alignment and position in the canal network. Design of most economical canal section. Lacey's and Kennedy's Silt theories.</p> <p>7.2 Canal lining – Definition, purpose, types of canal lining, advantages of canal lining.</p> <p>7.3 Cross Drainage works- Concept and different types of C.D. works,</p> <p>7.4 Uses of canal falls, escapes, cross regulators and canal outlets.</p>	06	15
8	<p>Ground Water Hydrology-</p> <p>8.1 Specific capacity of well, interference among well (Theoretical concept),</p> <p>8.2 Open wells, tube wells and their types.</p>	04	06
	Total	48	100

Part II- Tutorials

1. Neat labeled sketches of Earthen dam, Gravity Dams, types of Spillways and types of Open and Tube Wells on A4 size plates
2. Collection of information and prepare list of documents and drawings required for irrigation project
3. Collection of information of various dams in the state and study of various watershed management techniques adopted in farms.
4. Numerical on Calculation of Canal capacity.
5. Six assignments based on the syllabus.

Term Work- Students should submit journal of above exercises.

Learning Resources:

Text Books:

1. Irrigation Engineering (Including Hydrology) by Sharma R. K. & T.K.Sharma, Publisher S. Chand & Co. Ltd. 2nd Edition 2004

Reference Books:

1. Irrigation and hydraulic Structure by S. K. Garg, Publisher Khanna publisher, New Delhi, 1981
2. Irrigation Water Resources & Water Power Engineering by dr. P.N. Modi, Standard Book House, 7th edition, 2008
3. Irrigation Engineering by Basak N. N., Publisher Tata McGraw-Hill Publishing Co, 1st edition, October 1999
4. Irrigation & Water Power Engineering by Dr. B.C.Punmia, Dr. Pande Brijbasi Lal & others, Laxmi publications 16th edition 2009

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Sixth
 Subject Title : Project
 Subject Code : 09-CE- 623

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	-	-	-	-	-	-	-	-	50#	20	50\$	20	100

\$- Project Report

#- Presentation / Seminar

Rationale: The students passing this course should have concept from design, drawing and estimation to 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 also to develop the attitude to seek a solution.
- Apply principles, theorems & bye-laws in the project planning & design.
- Interpret & analyze the data.
- Develop professional abilities.
- 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, perform related experiments or design the required system and submit a detailed report at the end of the each semester. Students may have separate topics for sem V & sem VI or same topic for sem V & sem VI project. Scope of project shall be defined accordingly.

Term Work: Shall consist of detailed project report, presented in a professional manner.

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Sixth
 Subject Title : Theory of Structures
 Subject Code : E-SE- 607

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	100	35	25	125	50	-	-	25	10	25	10	175

Rationale: This course is in continuation of the course “Strength of Materials” in the IVth semester. The topics included here are of relatively of more advanced nature to enable the students to carry out the analysis of structures. This course is pre-requisite for the subject of steel and R.C.C. design.

Objective: Students will be able to

- Understand the difference between determinate and indeterminate structures.
- Solve the indeterminate structures with a maximum degree of indeterminacy of three by various methods.
- Understand behavior of long columns & solve problems on the same.

Syllabus

Part I -Theory:

Sr. No.	Content	L	M
1.	Struts: Euler’s theory of struts under axial loads, various end conditions, effective length, slenderness ratio, Rankin’s formula and its use.	05	10
2.	Strain Energy: Strain energy due to axial force, bending moment and shear force in beams.	05	10
3.	Static Indeterminacy of structures: Type of structures occurring in practice and their classification such as statically determinate and indeterminate structures, stable and unstable structures.	06	10
4.	Thin cylindrical and spherical shells:	03	10
5.	Analysis of indeterminate structures: Methods of consistent deformation propped cantilevers and fixed beams.	10	20
6.	Theorem of three Moments: Application to propped cantilevers and continuous beams.	06	15
7.	Slope Deflection Method: Application to continuous beams, sinking and rotation of supports.	07	10
8.	Moment Distribution Method: Stiffness of Member, carry over factor, Distribution factor, application to continuous beams.	06	15

	Total	48	100
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Term Work: Set of minimum 20 problems covering all topics.

Learning Resources:

Text Books

Theory of Structures by S. Ramamurthum publisher Dhanpat Rai and Sons Edition, 8th Reprint 2008.

Reference Books

1. Analysis of structures Vol II by V.N. Vazirani & M.M. Ratwani, Khanna Publishers edition 2003
2. Basic Structural Analysis by C.S. Reddy publication McGraw-Hill Education 2nd Edition, 16th Reprint 2007,

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Sixth
 Subject Title : Planning and Scheduling
 Subject Code : E-CE- 624

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	100	35	25	125	50	-	-	25	10	25	10	175

Rationale: For completion of any project its proper planning and proper scheduling are most important. The students are expected to know their objectives, functions and applicability. They should be conversant with the various techniques available today and should gain the confidence of completing the project with the knowledge gained.

Objective: Students will be able to know

1. Stages in planning of the project.
2. Different planning tools.
3. Scheduling.

Syllabus

Part I -Theory:

Sr. No	Content	L	M
1.0	Planning: Stages in planning, level of detail, planner's characteristics, attitudes, work breakdown structure, methods statement, activities, scope of work, productivity of resource groups, estimations of durations.	12	30
2.0	Planning tools: Bar chart time, chain age chart, critical path method, networks- activity on link and activity on node diagrams, early and late time computations, float computations, PERT methodology, time and cost trade off (compression and decompression)	12	30
3.0	Scheduling: Resource, material and equipment schedules, cash flow, resource conflict, schedules with limited resources, resource leveling and smoothing, line of balance scheduling	12	20
4.0	Progress reporting: updating of plans	6	20
	Total	48	100

Term Work: At least five assignments and ten problems covering entire syllabus.

Learning Resources:

Text Books

1. Techniques for construction Network scheduling by Stevens, edition 1990
2. Project management by B. M. Naik Publisher Vani Educational Books, edition

1984

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Sixth
 Subject Title : Building Repair and Maintenance
 Subject Code : E-CE- 625

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	100	35	25	125	50	-	-	25	10	25	10	175

Rationale: The problem of rehabilitation of structures is increasingly becoming serious. In future engineers will have to undertake these works routinely and the aim of the subject is to highlight the problems, to find solutions, to identify the materials and to carry out remedial techniques and non-destructible techniques.

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

- Know importance of repair and maintenance of structures.
- Find out solutions for rehabilitation of structures.
- Identify the materials for rehabilitation of structures.

Syllabus

Part I-Theory

Sr. No.	Content	L	M
1.	Structures and their characteristics with reference to maintenance: Buildings, High Rise Residential Buildings, High Rise Commercial Buildings, Hospitals, Five Star Hotels, Educational Institution with Hostels, Roads – Concrete Asphalt, pavement maintenance management, Bridges, Flyovers, Pipeline – Water, Sewer, Heritage Structures, Tunnels	3	5
2.	Defects in Building: Defects in RCC Members slab, beam, column, loose concrete, corrosion of reinforcement, cracks deep, floor sinking, defect in waterproofing systems, water seepage, water leakages, plumbing leakages, routine maintenance, and checklists.	6	12
3.	Non Destructive Testing of Structures Detailed inspection survey, preparation of report, N. D.T. tests on concrete, N.D.T. equipment, methods, rebound hammer, ultrasonic tester limitations.	7	15
4.	Materials for Repair and Maintenance. Chemicals used in Repairs, methods of application, costs Use of admixtures protection of reinforcement, special checks on use of repair material, tests. Special Concretes and Mortar, Concrete chemicals, Special Elements for accelerated strength gain, Expansive cement, Polymer Concrete, Sulphur Infiltrated Concrete, Ferro	7	15

	Cement, Fibre Reinforced Concrete		
5.	Techniques for Repair : Rust Eliminators and polymers coating for rebars during repair, foamed concrete, mortar and dry pack, vacuum concrete, Gunite and shotcrete, Epoxy Injection, Mortar Repairs for cracks, shoring & underpinning. Underpinning methods- purpose underpinning, pit underpinning other methods, micro piling Waterproofing of roof, Chajjas, canopies-methods Restoration techniques for structural and non structural member jacketing, strengthening	10	20
6.	Maintenance and Repair Strategies : Definitions: Maintenance, repair and rehabilitation, Facets of Maintenance, Importance of Maintenance, Preventive Measures on Various Aspects, Periodic one time, Long Span Routine, Cost Preventive Maintenance, Organization Structure, functions. inspection, Assessment Procedure for Evaluating of Damaged Structures, Causes of Deterioration, Testing Techniques	10	20
7.	Specifications: Detailing for important items of work in restoration. Investigation of structures and report on proposed restoration procedure.	5	13
	Total	48	100

Part II- Tutorials

Inspection and Rehabilitation procedure for a distress building with detailed report.

Term work: Students shall submit at least ten assignments based on above topics.

Learning Resources:

Text Books:

1. Concrete Technology -Theory and Practice by M.S. Shetty, Publisher S.Chand and Company, New Delhi - 1st Multicolor Illustrative Revised edition 2005
2. Learning from Failures – Deficiencies in Design by Mr. R.N.Raikar, Publisher Construction and Service – R & D Centre (SDCPL), Raikar Bhavan, Mumbai, 1987

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 Repair by Dennison Campbell, Allen and Harold Roper, Publisher Longman Scientific and Technical UK, 1991.
3. Journal-The Indian Concrete Journal
4. Journal- Civil Engineering & Construction Review

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Sixth
 Subject Title : Disaster Management
 Subject Code : E-CE- 626

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	100	35	25	125	50	-	-	25	10	25	10	175

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 : Definitions and terminologies-hazard, vulnerability, risk, accident, disaster, disaster management; Significance of disaster management and the role of engineers in disaster management.	08	15
2	Types of Disasters : Geological Disaster : earth quakes, landslides, tsunami, mining Hydro-meteorological disasters floods, cyclones, lightening, hail storms, cloud bursts, avalanches, draughts, cold and heat waves. Biological disasters: pest attacks, epidemics, forest fires etc. Technological disasters: chemical, industrial, radiological, nuclear. Man-made disasters : building collapse, rural & urban fire, road & rail accidents, war, terrorist attacks etc.	10	25
3	Disaster Management :	15	25

	Disaster management cycle; Pre-disaster phase-disaster risk zonation, monitoring, warning and alert system, evacuation, safe route and safe shelters ; Disaster phase – Emergency communication, transportation, rescue, temporary shelters, and restoration of basic facilities and infrastructure; Post –disaster phase- Rehabilitation, recovery and redevelopment; Use of GIS and remote sensing in disaster management		
4	National Disaster Management Framework : National policy on disaster management, Disaster management act, 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.	10	20
5	Regional Case Studies : Survey of recent regional(local, state and adjoining states) disaster, forecasts.	05	15
	Total	48	100

Term Work: At least ten 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

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Sixth
 Subject Title : Pavement Maintenance
 Subject Code : E-CE- 627

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	100	35	25	125	50	-	-	25	10	25	10	175

Rationale: Road maintenance is one of the important components of the entire road system. Maintenance operations involve the assessment of road condition, diagnosis of the problem and adopting most appropriate maintenance steps. Possible defects and causes of failures should be considered for the constant maintenance. Extent of maintenance depends upon the type of pavement.

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

- Know importance of repair and maintenance of pavement.
- Know different types of failures and maintenance methods.

Syllabus

Part I- Theory

Sr. No.	Content	L	M
1	Pavement maintenance : Necessity of maintenance of roads, agency responsible for construction and maintenance of highways in India, defects in bituminous roads, defects in cements concrete roads, equipment required for maintenance work.	04	10
2	Pavement distresses : Distresses in flexible/rigid pavements causes & remedies. Visual Surface distress survey procedures and techniques. Serviceability Indicators for roads Measurement of Serviceability Indicators using various equipments like Bump Indicator, Skid tester, Distress surveys & Benkelman Beam Functional evaluation of pavements: Serviceability Concepts, Visual Rating, Pavement Serviceability Index, Roughness Measurements, Skid Resistance, Roughness, and Safety Aspects. Inventory System	12	25
3	Maintenance operations/alternatives : Classification of maintenance operations, Routine, Periodic, Special. Common types of maintenance: Potholes, Cracked surface, Ruts & undulations, Resurfacing, Interface treatments, Bituminous Thin Surface Courses: Seal Coat, Surface Dressing, Premixed carpet, Mixed seal surfacing, Micro asphalt concrete (MAC)	15	20

	Bituminous Surface Courses: Semi-Dense Bituminous Concrete, Bituminous Concrete, and Bitumen Mastic. Road maintenance in high rainfall areas. Choice of materials. Modified bitumen & geo-fabrics. Maintenance alternatives including recycling. Maintenance of different roads- earthen roads. Gravel roads, WBM roads, bituminous roads, cement concrete roads.		
4	Pavement Management/ Maintenance Management System : Maintenance documents, Components of PMS and their Activities, Major Steps in Implementing PMS, Inputs, Design, Construction and Maintenance, Rehabilitation and Feedback Systems, Examples of HDM package, Highway Financing, Fund Generation, Evaluating Alternate Strategies and Decision Criteria.	9	20
5	Prediction Deterioration Models : Factors that affect performance, Types of prediction models, Prediction deterioration model development, Method to assess the precision and accuracy of the developed model	5	15
6	Emerging Technology in Pavement Management Systems :	3	10
	Total	48	100

Part II -Tutorials

- 1) Students should inspect road defects and suggest remedial measures and submit detailed report.
- 2) Study of various equipments like Bump Indicator, Skid tester, Distress surveys & Benkelman Beam should be done on site and submit a report.

Term work: Students shall submit at least ten assignments based on above topics.

Learning Resources:

Text Books:

1. Highway Engineering by Khanna, Justo, Publisher Khanna, 8th Edition 2001
2. A text book of Transportation Engineering by S.P. Chandola, Publisher S. Chand & Company Ltd, New Delhi-110055, 1st Edition 2001

Reference Books:

1. Traffic engineering and transport planning by L.R. Kadiyali, Publisher Khanna publishers Delhi, 1989
2. Transportation Engineering by Vazarani & Chandola, Publisher- Khanna Publication, 1981
3. Manual of Economic Evaluation of Highway Projects in India (SP30), Indian Road Congress.

IS / International Codes. : IRC36-1970, IRC 16-1965, IRC 20-1966

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Sixth
 Subject Title : Safety Management
 Subject Code : E-CE- 628

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	100	35	25	125	50	-	-	25	10	25	10	175

Rationale: Safety management is the process used by industry /organizations to ensure that all safety aspects have been adequately addressed. It includes the setting of organizational safety policies. It is a mean of measuring safety achievement and mechanism for rectification of deficiencies.

Objective: Students will be able to understand

- Safety aspects in construction industry.
- Terminology associated with Safety Management
- The hazards involved in various construction trades, precautionary measures and curative measures to overcome them.
- Safety standards for various construction activities.
- Different protective gears.
- Awareness campaign for inculcating safety habits in people.

Syllabus

Theory:

Sr. No	Contents	L	M
1	Introduction : Safety aspects in construction industry, definition of hazard, accident, safe, safety and health statistics, special problem of safety and health in construction industry, occupational diseases.	12	15
2	Construction trades & their hazards : Bricklayers, carpenters, painters, plumbers, electricians, plant operators, concreters, plasterers, glaziers, ladders, tillers, storekeepers, labourers and other general workers.	10	25
3	General precaution / safety standards : for steel erection, demolition, excavation, concreting, tunneling.	10	25
4	Personal protective clothing & equipments : protection for eyes, respiratory system, face, hand, ear, head, foot, body protection from fall.	10	20
5	Safety campaign on project site : Training, signages, awareness camps, safety audit.	06	15
	Total	48	100

Term Work: Students shall submit at least ten assignments covering entire syllabus.

Learning Resources:

Text Books:

1. Industrial Safety Management by L.M. Deshmukh, Publisher Tata McGraw Hill. Edition December 2005

2. Essentials of Safety Management by Dr. H.L. Kaila, S.V. Kamat, Dr. S. Ravishankar, Publisher Himalaya, 1st edition – Students Edition.