

5th SEMESTER CIVIL DEPARTMENT

TEACHING SCHEME

BRANCH CODE:06 DIPLOMA PROGRAMME IN CIVIL ENGINEERING										
SEMESTER – V										
COURSE CODE	COURSE TITLE	TEACHING SCHEME/WE EK (IN HOURS)			CREDITS (L+T+P)	EXAMINATION SCHEME				
		L	T	P		THEORY MARKS		PRACTICAL MARKS		GRAND TOTAL
						ESE	PA	ESE	PA	
3350601	DESIGN OF STEEL STRUCTURE	3	0	4	7	70	30	40	60	200
3350602	CONCRETE TECHNOLOGY	3	0	2	5	70	30	20	30	150
3350603	WATER SUPPLY & SANITARY ENGG.	3	0	2	5	70	30	20	30	150
3350604	ESTIMATING , COSTING & VALUATION	3	0	4	7	70	30	40	60	200
3350605	ADVANCED CONSTRUCTION TECHNOLOGY	3	0	2	5	70	30	20	30	150
3350609	PROJECT-I	0	0	4	4	---	---	40	60	100
TOTAL					33	350	150	450	250	350

COURSE TITLE: DESIGN OF STEEL STRUCTURE

Teaching Scheme (In			Total Credits (L+T+P)	Examination Scheme				Total Marks
L	T	P		Theory Marks		Practical Marks		
			C	ESE	PA	ESE	PA	
03	00	04	07	70	30	80	20	200

UNIT – I :- LOAD CALCULATION ON ROOF TRUSS

Rolled Steel Section – ISA , I & H Section , Channel Section and its application in Steel Structure, Types of Truss , Pitch of Truss , Rise , Spacing of Truss , Purlin , Principal Rafter , Main Tie , Sag Tie , Members of Truss , Roofing material- GI and AC Sheets, Dead Load of Truss per panel point- Self Weight , Weight of

Purlin , Wind Bracing , Weight of Roofing Material, Live Load per panel point in Truss as per IS – 875 – Part II -1984 when Access is not provided, Wind Load per panel point in Truss using IS – 875 – Part III -198

UNIT – II: - BOLT AND WELDED CONNECTION

Rigid Connection , Pinned Connection , Semi Rigid Connection , Black Bolts , Turned Bolts , HSBG Bolts , Grade of Bolts, Lap and Butt Joint , Minimum and Maximum Pitch , Tack Bolting , Edge Distance , Gauge Distance , Bolt Hole, Shear Capacity of Bolt – V_{dsb} , Bearing Capacity of Bolt – V_{dpb} as per IS-800-2007 , Bolt Value , Efficiency of Joint , Numerical for Bolted Connection of Angle Section to Gusset Plate and for Efficiency of Joint having Chain Bolting, Types of Weld , Fillet Weld and its symbol , Tack Welding , Size of weld – Minimum and Maximum, Effective Throat Thickness , End Returns , Design Strength of Fillet Weld , Shop and Field Weld as per IS – 800-2007, Numerical for Welded Connection of Angle Section to Gusset Plate

UNIT – III: - TENSION MEMBER

Examples of Tension Members in Civil Engineering Structures , Design Strength of Tension Member , Design Strength due to Yielding of Gross Section , Design Strength due to Rupture of Critical Section for Angle Section , Design Strength due to Block Shear in Angle Section as per IS – 800-2007, Slenderness ratio of Tension Member as per IS – 800 – 2007, Examples of Tension Members in Civil Engineering Structures , Design Strength of Tension Member , Design Strength due to Yielding of Gross Section , Design Strength due to Rupture of Critical Section for Angle Section , Design Strength due to Block Shear in Angle Section as per IS – 800-2007, Slenderness ratio of Tension Member as per IS – 800 – 2007, Numerical for Analysis & Design type based on 1.2 for Single and Double Angle Sections on same side and either side of Gusset Plate

UNIT – IV: - COMPRESSION MEMBER STRUT & COLUMN

Strut , Maximum Slenderness Ratio , Classification of Cross – Sections and Buckling Class as per IS-800-2007, Angle Strut as per Cl. 7.5 , IS-800-2007, Design Compressive Stress – f_{cd} according to Tables of IS-800-2007, Numerical on Strut made up of Single Angle , Double Angle same and either side of G.P as per 1.2 & 1.3 Built up Column , Effective Length of Column as per Table 11 , IS-800-2007, Design Compressive Stress – f_c according to Tables of IS-800-2007 Numerical on Column made up of ISHB , ISHB with Flange Plate , Double Channels Back to Back and Toe to Toe

UNIT – V: - LACING & BATTENS

Objective of Lacing , Single Lacing , Double Lacing IS – 800-2007 requirements for Lacing System as per Cl. 7.6 Numerical on Single and Double Lacing as per , Objective of Batten , Batten , IS – 800-2007 requirements for Batten System as per Cl. 7.7, Numerical on batten as per 2.2

UNIT – VI: - LATERAL RESTRAINED BEAM & PURLIN

Main Beam , Secondary Beam , Standard I Sections , Laterally restrained and unrestrained beam, Plastic Section Modulus – Annexure –H , IS-800-2007 , Section classification as per Table 2 – IS-800-2007 , Shear buckling , Shear Strength and Bending Strength of Section as per Cl. 8.4.1 and Cl. 8.2.1.2 of IS-800-2007 , Deflection as per Table-6 of IS-800-2007 , Shear Leg Effect , Web Crippling, Numerical related to Design using Single I Section for Simply Supported Beam Subjected to UDL Load (D.L , L.L , W.L and its combination) on purlin of a roof truss, Empirical Design Method for Purlin using Angle Section - $D \geq L/45$, $B \geq L/60$,

Deflection Criteria – L/180 and Elastic Section Modulus ,Numerical based on 2.1

UNIT-VII: - SLAB BASE FOUNDATION

Slab Base, Gusseted Base, Base plate and its Thickness as per IS-800-2007, Concrete Block, SBC of Soil, Anchor Bolt, Cleat and Dummy Angle, Numerical on Slab Base Foundation under Column made up of Single H Section

TEXT BOOK: Design of Steel Structures (By Limit State Method as Per Is: 800—

2007). – BySBhavikatti

Course Title: CONCRETE TECHNOLOGY

(Code: 3350602)

Teaching Scheme (In			Total Credits (L+T+P)	Examination Scheme				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	PA	ESE	PA	150
03	00	02	05	70	30	30	20	

UNIT-I: - MATERIALS FOR CONCRETE

Importance of cement in preparation of concrete, Chemical compound of Ordinary Portland cement, Bougue's compounds and its functions, Types and Grades of cement and its uses, Physical properties- Fineness, Consistency of Cement , IST & FST , Soundness & Compressive Strength of cement and its I.S. Requirements , Its Importance & their related Test as per Indian Standards , Role of Coarse & Fine Aggregates in Concrete , Classifications of aggregate on the basis of its size, shape, texture and weight Sieve Analysis , Water Absorption Specific Gravity of Fine Aggregate & Coarse Aggregate, Coarse Aggregate Impact Value, Crushing Value & Abrasion Value, Flakiness & Elongation Index, its importance & their related Test as per Indian Standards

UNIT-II:-FRESH CONCRETE

Fresh concrete and its properties - Workability , harshness, Segregation and bleeding, Factors affecting workability, Methods of measurement of workability– Slump Test & Compaction Factor Test, Relation between workability and strength of concrete, Methods of mixing of concrete – Hand & Machine Mixing and its Transportation and Placing, Methods of compaction of concrete and its suitability, Factors affecting compaction, Curing and its importance, its methods and suitability , Effect of curing on development of strength of concrete

UNIT III: - ADMIXTURES

Admixtures and its benefits, Types of Admixtures – Accelerator and Retarder, Plasticizer and Super Plasticizer Waterproofing and Air entraining admixture, Utility of Admixture

UNIT IV: - HARDENED CONCRETE

Hardened Concrete and its Properties – Compressive Strength , Tensile Strength , Bond Strength , Flexure Strength Durability , impermeability, Factors affecting Compressive Strength, Creep of Concrete & its effect, factors affecting Creep, IS Test Procedure to find Compressive & Tensile Strength of Concrete , Acceptance Criteria, Mean Strength & Standard Deviation, Durability of Concrete & factors affecting it, Economy of Concrete & factors affecting it,

Methods of Non Destructive Test of Concrete – Rebound Hammer Test, Ultrasonic Pulse Velocity Test, Importance of NDT

UNIT –V: - CONCRETE MIX DESIGN

Factors affecting quality of concrete, Advantages of Quality control., Concrete Mix Design and Different methods of Mix Design and its suitability.,I.S .method to design a Concrete Mix As per IS 10262-2009.,Example of Mix design as per I.S. method

UNIT – VI:-SPECIAL CONCRETE & CONCRETING TECHNIQUESLight weight concrete, Plum concrete, Fiber reinforced concrete, Polymer concrete, High density concrete, No fines concrete, Ferro cement, Fly ash concrete, Pumped Concrete, Ready mix concrete

UNIT –VII: - PREVENTION&REPAIRTECHNIQUES FOR CRACKS

Deterioration of concrete and Corrosion of reinforcement, Types of deteriorations and it’s effects,Preventionofconcretedeterioration,Effectofcorrosionofreinforcement in concrete and remedial, Types, causes and remedies of concrete cracks before hardening,. Types, causes and remedies of concrete cracks after hardening, Prevention of cracks, Materials for repair of cracks Methods used for repair of cracked Concrete

UNIT-VIII:-MODERNTREND AND RESEARCH DEVLOPMENT IN CONCRETE TECHNOLOGY

Familiarize students with latest research and development in the field of concrete technology List the journals available in the library its publishers, Editors and place of publications. Name the various authorities in the field of concrete technology and their field of specialization. Prepare synopsis of at least one research paper on concrete during the course from various journals

TEXT BOOK: CONCRETE –By M.S. Shetty

COURSE TITLE: WATER SUPPLY AND SANITORY ENGINEERING

(Course Code: 3350603)

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
L	T	P		Theory Marks		Practical Marks		Total Marks
3	0	2	5	ESE	PA	ESE	PA	
				70	30	30	20	

Unit-I:-Introduction

Importance and necessity of water supply Engineering, Sources of water, Suitability of water, Choice of source

Unit-II: - Quantity and Quality of Water

Types of demand, Population forecast, Computation of quantity of water, Fluctuation in demand Factors affecting demand, Impurities in water Collection of water sample, Physical Chemical and Biological tests, Standards of quality of water

Unit-III:-Treatment of Water

Objects of water treatment, Location of water treatment plant, Layout of water treatment plant, Basic principles of working of treatment plant, Functioning of Coagulation treatment plant, Sedimentation Filtration, Disinfection, Water Softening

Unit-IV:-Conveyance of Water

Types of pipes used for conveyance, Pipe joints, Laying of Pipes, Distribution system, Types of valves, Types of Meters, Pipe fittings and fixtures

Unit-V:-Maintenance of Water Supply Mains

Necessity, Methods to prevent leaks, Measures for conservation of water

Unit-VI:-Sanitation System

Related terms, Objective of sewage disposal, Methods of sewage collection, Conservancy system Water carriage system

Unit-VII:-Drains and Sewers

Classification of Drains, Sewer section, Sewer joint, Manhole, Flushing tank, Catch basin, lying of

Appurtenances and its locations, Hydraulic testing of sewer pipe, Maintenance of sewer

Unit-VIII:-Sewage Treatment and Disposal

Characteristics of sewage, Sampling of sewage, Treatment of sewage, B.O.D. Test, C.O.D. test

Unit-IX: - House Plumbing

Related terms, Plumbing tools, Pipes and pipe fittings, Fixing and jointing pipes and accessories Traps, House drainage plant, Plumbing practice and operations, Safety and precautions, sanitary fittings

Unit-X:-Maintenance of Sewage System

Procedure for maintenance of sewerage system, Causes of trouble and odor, Sewer cleaning operations, Requirements of maintenance, Functions of each maintenance equipments and tool Selection of equipment for given maintenance job. Explosives in sewers. Safety measures for sewer-men

Unit-XI:-Recycling of Waste Water and Solid Waste

Different method with respect to quality of waste water, Utilization and management of solid waste

TEXT BOOK: Water supply & Sanitary Engineering –By Birdie G.S.

**COURSE TITLE: ESTIMATING, COSTING & VALUATION
(Code: 3350604)**

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	PA	ESE	PA	160
03	00	04	07	70	30	40	20	

Unit- I: - Introduction to estimation & mode of measurements

Define estimate, Data required for preparing an estimate, Types of estimate, Quality of good estimator, Duties of an estimator, Definitions: Overhead charges, contingencies, water charges, provisional sum, prime cost, provisional quantities, spot items, day work, etc., General rules of the measurements of different item of civil engineering works, Measurements units

Unit- II:-Specifications

Importance & purpose of specifications, Types of specifications, Principle of writing specifications, Detailed specifications of Earthwork in excavation in foundation, Detailed specification of C.C.Work, Brick masonry, R.C.C. Work, Plastering Work

Unit- III:-Rate Analysis

Task Work, Factors affecting task work, Labor required for different works, Market rates for materials, Labor rates, Purpose of rate analysis, Factors affecting rate analysis, Schedule Of Rates, Rate analysis of earthwork in excavation 3.10 Rate analysis of C.C. Work, Brick masonry Work, R.C.C. Work, Plastering Work.

Unit– IV:-Detailed Estimation

Methods of calculating quantities, Length of steel bars, Number of bars, 4.4 Estimate of residential building, Estimate of R.C.C. Slab, Estimate of R.C.C. Beam, Estimate of R.C.C. Column Footing, Estimate of R.C.C. Retaining Wall, Estimate of R.C.C. Culverts 1) Pipe Culvert 2) Slab Culvert, Methods of calculating quantities of earthwork

Unit– V: Valuation

Compare Cost, Price & Value, Types of property, Objects of valuation, Depreciation & Obsolescence, Different forms of Value, Valuation tables & their uses, Valuation methods for property and land, Types of rents, Procedure of fixing standard rents

TEXT BOOK:

1. Estimating & Costing in Civil Engg – By B.N.Dutta
2. Estimating & Costing in Civil Engg. – By S.C.Rangwal

COURSE TITLE:-ADVANCED CONSTRUCTION TECHNOLOGY

(Code: 3350605)

<i>Teaching Scheme (In Hours)</i>			<i>Total Credits (L+T+P)</i>	<i>Examination Scheme</i>				<i>Total Marks</i>
				<i>Theory Marks</i>		<i>Practical Marks</i>		
<i>L</i>	<i>T</i>	<i>P</i>	<i>C</i>	<i>ESE</i>	<i>PA</i>	<i>ESE</i>	<i>PA</i>	
3	0	2	5	70	30	30	20	150

UNIT – I: - INTRODUCTION AND MODERN MATERIALS OF CONSTRUCTION

State the advanced types of civil engineering structures like Multistoried building, Chimney, Elevated service reservoir, Dams and retaining walls, Bridges and hydraulic structures, Industrial structures, Marine and offshore structures, Tall structures., Introduction to the effect of lateral forces on building like Wind, Water and Earthquake, Admixtures with its purposes, Classification of admixtures Use of Waste products and Industrial Byproducts in Concrete.

UNIT– II PLANTS AND EQUIPMENT USED IN CONSTRUCTION

Earth moving machineries, Handling, Hoisting, Conveying, Pumping, and Compacting, Pile driving, Drilling equipments, Plants for Grouting, Guniting and Hot Mix Plant, Concrete Mix Plant, Ready Mix Plant, etc.,List factors affecting the selection of equipments depending on the various parameters., Equipments for excavation like Power Shovel, Drag line, Calm Shell,

Scoop, Trenching equipments, Wheel mounted belt loaders., Equipments for Earth moving equipments like Tractors, Boulders, Graders, Scrapers, Rippers, etc., Equipments for hauling equipments like Trucks, Wagon, Dumpers, Scrapers and rippers., Equipments for Hoisting equipments like Derrick-Pole, Gin Pole, Crane, Power driven scotch derrick crane, Hand operated crane, Locomotive crane, Gentry crane, Tower crane, Lattice Girder, Winches, Elevators, ladders., Conveying equipments like Belt conveyors, Buckets, Chutes, Pumping equipments like Water pumps and concrete pumps., Compacting equipments like Rollers (earth compaction), Smooth surface roller, sheep foot roller, pneumatic rollers, tamping roller, vibrating roller and compactors, etc., Equipments for Pile driving including types of hammer driving, drilling equipments with types of drill. Vibrators for concrete consolidation like Internal, Surface, Platform and form vibrators. Equipments used for Production of aggregate Jaw crusher, Gyratory crusher, Roll crusher, Cone crusher, Rod and ball mill, screens, Log washer. Equipment and Machineries used for Bituminous roads, Equipment and Machineries used for Large concrete works Dredging equipments

UNIT- III :-DEEP EXCAVATION

Explain the shallow and deep excavation., Differentiate between the shallow and deep excavation., Importance or necessity of timbering., Understand the members used in timbering., Explain the timbering in trenches., List and explain each precautions to be taken during timbering., Explain the dewatering including necessity and situations of dewatering., Explain in detail the dewatering methods with necessary sketch., List the suitability of different methods of dewatering.

UNIT-IV:-PILE FOUNDATIONS

List the situations demanding the use of pile foundations., Classification of piles based on their function or use., Explain the sheet piles based on materials., Classifications of piles based on materials like concrete, steel, timber, composite, sand, concrete (pre-cast, Cast –in –situ, Pre-stressed) including cased and uncased with advantages and disadvantages., List and explain the factors affecting the selection of type of piles. Explain the pile accessories. List and explain the pile driving methods. Causes of failure or settlement of piles, Explain the under reamed piles including construction of It., Explain the group action of Piles with its efficiency.

UNIT-V: - COFFER DAMS

Define the coffer dam and write the requirements of a coffer dams. State the necessity of coffer dams. State the uses of coffer dams List the selection criteria for a coffer dams, List and explain the types of coffer dams with neat sketches including construction where ever necessary. Write the design features of coffer dams; State the leakage prevention in coffer dams.

UNIT-VI: - CAISSONS

Define and short note of the caissons. Understand and state the uses of caissons. Differentiate the caissons and coffer dams. List and describe the materials used for caissons. State and explain all the types of caissons with neat sketch.. Explain the loads on caissons. Explain the Sinking of caissons, State and explain the problems in well Sinking including neat sketches.

UNIT-VII DRILLING AND BLASTING

Define drilling operation, Explain necessity of drilling , Terminology used for drilling, Factors affecting the selection of drilling method & equipment., Types of drilling , Necessity of selecting

the drilling pattern for blasting, Discuss the economy of drilling hole, Factors helping in analyzing the drilling operations, Effect of air pressure on drilling operation, Analyze factors affecting the optimum drilling pressure, Use of bentonite/mud slurry in drilling, 9 Define blasting, Terminology used for blasting, Enlist the explosives, Define terms like - Dynamite, Blasting caps, Prime line, Safety fuse, Stemming, Blast hole, Primer, Prime det, Explain explosive process, Types of blasting General precautions required for blasting

UNIT-VIII TEMPORARY STRUCTURES

Explain form work, Materials used in form work, State advantages of steel form work Advantages of timber form, 8.1.4 Requirements of a good form work, Loads on form work, Guiding points to the design of form work, Column form work, Slab & beam formwork, Slip form work, Hanging form works and trestle, Form work for domes and arches., Cantilever method of Pre-stressed concrete bridge construction

UNIT-IX ERECTION OF STEEL STRUCTURES

Problems faced in erecting different steel structure like: Roof truss Building / Industrial component Plate girder Launching a portion of bridge girder Large span lattice girder., Equipment & tackles used for erecting steel structure for Roof truss Building / Industrial component Plate girder Launching a portion of bridge girder Large span lattice girder. Erection of chimney, Erection of overhead tank.

TEXT BOOK: Building construction – By S.C. Rangwala