

Department of University Polytechnic
Integral University, Lucknow
Study & Evaluation Scheme

Diploma in Civil Engg (Construction Management & Safety)

Year 3rd

S.No	Course Code	Name of Course	Periods			Evaluation Scheme				Sub Total
			L	T	P	Sessional (CA)			Exam	
						CT	TA	Total	ESE	
Semester V										
1.	DCE – 501	Design of Reinforced Concrete Structure-I	03	01	00	30	20	50	100	150
2.	DCMS – 502	Transportation Engg.	03	01	00	30	20	50	100	150
3.	DCMS – 503	Construction Equipment & Maintenance	03	01	00	30	20	50	100	150
4.	DCE – 504	Irrigation Engg.	03	01	00	30	20	50	100	150
5.	DCE – 505	Surveying – II	03	01	00	30	20	50	100	150
6.	DCMS - 506	Project Management in Construction	03	01	00	30	20	50	100	150
7.	DCE - 554	Civil Engg. Drawing – II	00	00	03	--	--	20	30	50
8.	DCE - 555	Surveying Lab – II	00	00	03	--	--	20	30	50
9.	DCE - 557	Field exposure	00	00	00	--	--	20	30	50
10.	GP - 551	General Proficiency	--	--	--	--	--	50	--	50
		Total	18	06	06	--	--	--		1100
Semester VI										
1.	DCE – 601	Design of Reinforced Concrete Structure – II	03	01	00	30	20	50	100	150
2.	DCMS – 602	Field Practices in Construction	03	01	00	30	20	50	100	150
3.	DCE – 603	Estimating , Costing & Valuation	03	01	00	30	20	50	100	150
4.	DCE – 604	Design of Steel & Masonry Structures.	03	01	00	30	20	50	100	150
5.	DCMS – 605	Quality and Safety Management in Construction	03	01	00	30	20	50	100	150
6.	DCMS - 606	Contract Management	03	01	00	30	20	50	100	150
7.	DCE - 651	Reinforced Cement Concrete & Highway Lab	00	00	02	--	--	20	30	50
8.	DCE - 657	Project.	02	00	02	50	20	70	100	170
9.	GP- 651	General Proficiency						50	--	50
		Total	20	06	04	--	--	--	--	1170

DCE -501	DESIGN OF REINFORCED CONCRETE STRUCTURE – I				
Pre- requisite NONE	Co- Requisite NONE	L 03	T 01	P 00	C -
Objective	Students should be able to: 1. Analyze the section by Working Stress Method 2. Select Proper materials and calculate the design values for the materials. 3. Design singly reinforced & doubly reinforced beams, Design of Lintel, Cantilever Beam and Slab by Working Stress Method				
UNIT I	INTRODUCTION & FUNDAMENTAL OF WORKING STRESS METHOD				10
Introduction: Concept of reinforced concrete structures, advantages and disadvantages. Different materials used in RCC with their properties. Load and loading standard as per IS: 875. Concept of design of reinforced concrete based on working stresses method and limit state method and their difference. Design based on Working Stress Method: Assumptions in the theory of simple bending for RCC beams. Flexural strength of a singly reinforced RCC beam. Position of the Neutral Axis. Resisting moment of the section, critical neutral axis, and actual neutral axis, concept of balanced, under reinforced and over-reinforced sections.					
UNIT II	DESIGN BASED ON WORKING STRESS METHOD				10
Shear Strength: Permissible shear stresses as per IS: 456, development of stresses in reinforcement, development length and anchoring of bars. Bond Strength: Concept of bond, local and average, permissible bond stresses for plain and deformed bars as per IS, minimum length of embedment of bars, minimum splice length, actual bond stress in RCC beams and slabs, bond length as per IS: 456. Design of Lintel. Design of a Cantilever Beam and Slab.					
UNIT III	DESIGN BASED ON WORKING STRESS METHOD				08
Design of singly reinforced beams as per IS: 456 from the given data such as span load and properties of material used. Design of Doubly Reinforced Concrete Beams: (i) Doubly reinforced concrete beam and its necessity. (ii) Strength of a doubly reinforced concrete beam section. (iii) Method of design: Simple problems only. (iv) Reinforcement details of doubly reinforced concrete beam.					
UNIT IV	DESIGN BASED ON LIMIT STATE METHOD				06
[A] Fundamentals of Limit State Method: (i) Theory of limit state method (ii) Partial safety factors (iii) Flexural strength. (iv) Shear strength. (v) Development length of bars [B] Design of the following: (i) singly reinforced rectangular beam. (ii) One way slab (simply supported.)					
UNIT V	PRE – STRESSED CONCRETE				06
(i) Concept of restressing. (ii) Situations where prestressed concrete is used. (iii) Materials used in prestressed concrete and their specifications as per IS. (iv) Post-tensioning and pre-tensioning. (v) Systems of prestressing. (vi) Freyssinet, Magnol-Blaten and Lee-Mecall (vii) Sketch showing Prestressing arrangement for RCC beam (No numerical problems be asked in the examination.)					
References					
Books:	1. Reinforced cement concrete: AK Jain. 2. Reinforced cement concrete : Sushil kumar				

DCMS-502	TRANSPORTATION ENGG.					
Pre-requisite NONE	Co-requisite NONE	L 03	T 01	P 00	C -	
Objective	Students should be able to: 1. Organize, supervise and co-ordinate construction activities of road. 2. Get the basic knowledge of railways.					
UNIT I	INTRODUCTION OF HIGHWAY & ROAD GEOMETRICS					
	Introduction :(i) Importance of Highway transportation. (ii) Functions of IRC. (iii) IRC classification of roads. (iv) Organization of state highways department. Road Geometrics: Glossary of terms used in geometrics and their importance: Right of way, Formation width, Road margin, Road Shoulder, Carriage way, Side slopes, Kerbs, formation levels, Camber and Gradient. (i) Design and average running speed, Stopping and passing sight distances. (ii) Curves necessity, Horizontal and Vertical curves including Transition curves and Super elevation, Methods of providing Super elevation. (iii) Use of IRC design tables and specifications for finding elements of Road geometrics. Drawing of typical cross sections in cutting and filling on straight and at a curve. (iv) Under pass & over pass (fly overs and bridges).					07
UNIT II	HIGHWAY SURVEYS AND PLANS					
	Highway Surveys& Plans: Designation of a topographic map. Reading the data given on a topographic map. (ii) Basic considerations governing alignment for a road in plain and hilly area. (iii) Highway location. Marking of alignment. Importance of various stages viz: (a) Reconnaissance survey: Conduct reconnaissance and prepare reconnaissance report. (b) Preliminary survey: Object, organizing, conducting and information to be collected. (c) Location survey. (d) Standards for preparing the highway plans as per Ministry of Transport. Road Materials: (i) Different types of road materials in use: Soil, Aggregates, and Binders. (ii) Function of soil as Highway sub grade. (iii) C.B.R: Method of finding. CBR value and its significance. (iv) Aggregates: Requirements of road aggregates as per IS Specifications. (v) Binders: Common binders: Cement, Bitumen and Tar, Properties as per IS specifications, penetration and Viscosity test, procedures and significance. Cut back and emulsion and their uses in the base course: (vi) In the base Surfacing :(a) Surface dressing. (b) (i) Premix carpet. (ii) Semi dense carpet (S.D.C) (c) Asphalt concrete. (d) Grouting. Maintenance of Track.					10
UNIT III	ROAD PAVEMENTS					
	(i) Road pavement: Flexible and rigid pavement, their merits and demerits, typical cross-sections, Functions of various components. (ii) Preparation of sub grade. Methods of checking camber, Gradient and Alignment as per recommendations of IRC, Equipment used for sub grade preparation. (iii) Flexible pavements: Sub base necessity and purpose. Purpose of Stabilization. Types of Stabilization :(a) Mechanical stabilization. (b) Lime stabilization. (c) Cement stabilization. (iv) Base course: (a) Brick soling. (b) Stone soling. (c) Metaling: water bound macadam and bituminous macadam. (v) Methods of constructions as per Ministry of Surface and Transport, Government of India, specifications and quality control; equipment (vi) Rigid pavements: Construction of concrete roads as per IRC Specifications, Form laying, Mixing and placing the concrete, Compacting and finishing, Curing, joints in concrete pavement, Equipment used.					09

UNIT IV	INTRODUCTION OF RAILWAYS	
<p>Permanent Way: Definition of a permanent way, components of a permanent way, sub grade, ballast, sleepers, rails, fixtures and fastenings. Concept of gauge and different gauges present in India. Suitability of these gauges under different conditions. (i) Rails: Function of rails. Different types of rail sections-double header, bull headed and flat footed their standard length, weights and comparison. Creep: Its definition, causes, effects and prevention. Wear of rails, its causes and effects. (ii) Sleepers: Function of sleepers, Different types of sleepers, wooden, steel, cast iron (pot type), concrete and pre stressed concrete, their sizes, shapes, characteristics and spacing. (iii) Ballast: Function, materials used for making ballast stone, brick, slag and cinder, their characteristics. (iv) Fixtures And Fastenings: (a) Connections of rail to rail-Fishplate and fish bolts. (b) Connection of Rail to sleepers, Sketches of connection between flat footed rails with various types sleepers with details of fixtures and fasteners used.</p>		08
UNIT V	SUPER-ELEVATION& POINTS AND CROSSINGS	
<p>Super-elevation-its necessity and limiting value. Definition of equilibrium cant and cant deficiency, Widening of gauge on curves.</p> <p>Points and Crossings: Necessity and details of arrangement, sketch of a turnout definition of stock rail, tongue rail, check rail, lead rail, wing rail, point rail, splice rail, stretcher bar, throw of switch, heel of switch, nose of crossing, angle of crossing, overall length of turnout, facing and trailing points, diamond crossing, cross over, triangle.</p>		06
References		
Books:	<ol style="list-style-type: none"> 1. Highway Engineering: Khanna& Justo 2. Transportation Engineering :Kamala 	

DCMS-503	CONSTRUCTION EQUIPMENT & MAINTENANCE				
Pre-requisite NONE	Co-requisite NONE	L 03	T 01	P 00	C -
Objective	Students should be able to: <ol style="list-style-type: none"> 1. Study and understand the various maintenance like RCC Maintenance, Steel Work Maintenance, Road Maintenance and Building Maintenance. 2. Select suitable construction equipment for execution of various constructions activities. 				
UNIT I	HOISTING EQUIPMENT , CONVEYING EQUIPMENT & EXCAVATION EQUIPMENT				08
Hoisting equipment: Principle and working of Tower cranes, Crawler cranes, Truck Mounted cranes, Gantry cranes, Mast cranes, Derricks. Conveying equipment: Working of belt conveyors. Types of Belts and Conveying mechanism. Capacity and use of Dumpers, tractors and trucks. Excavation equipment: Use, Working and output of Bulldozers, Scrapers, Graders.					
UNIT II	COMPACTING EQUIPMENT, CONCRETE MIXERS & EQUIPMENT FOR TRANSPORTATION OF CONCRETE				08
Compacting equipment: Use and types of rollers. Rammers: Use and Working. Concrete mixers: Types of concrete mixers. Weigh batching equipment, Equipment for transportation of concrete: Trolleys, Lifts, Transit mixers, Concrete vibrator, Stone crushers: Types of stone crushers, capacity and working.					
UNIT III	MISCELLANEOUS EQUIPMENT & EQUIPMENT MANAGEMENT				08
Miscellaneous equipment: Pile driving equipment, Pile hammers, selection of hammers. Bitumen paver, Grouting equipment, Floor polishing machine. Equipment management: Standard equipment, special equipment, selection of equipment, owning and operating cost of construction equipment. Economic life of construction equipment. Preventive maintenance of equipment, breakdown maintenance of equipment.					
UNIT IV	RCC MAINTENANCE & STEEL WORK MAINTENANCE				07
RCC Maintenance: Common defects and their causes. Cracking of hardened concrete. Repair of Cracks: Ordinary procedure, Polymer based repairs, Resin based repair. Repair and Strengthening of column, Concrete floor slab and beams. Leak scaling. Steel Work Maintenance: Repainting of iron and steel work. Defects of painting.					
UNIT V	ROAD MAINTENANCE & BUILDING MAINTENANCE				09
Road Maintenance: Defects and maintenance in WBM, Bituminous and Concrete road. Building Maintenance: Inspection of a building; routine building maintenance. Patch repairs for plaster, Leakage through the roofs, Defects of floors and repair. Special repair cases in a building e.g. broke WC, Drain and sewer pipe to be replaced, opening to be made in existing wall, cleaning of choked residential Sewer Line. Replacement of broken WC gully trap. Departmental procedure for repair of building. Water Supply Distribution: Method to detect leakage. Maintenance of valves, Maintenance of house pipe line and Drainage System. Sewer Maintenance.					
References					
Books:	<ol style="list-style-type: none"> 1. Construction Planning and equipment: R. Satya Narayana and S.C.Saxena 2. Construction planning, equipment and methods :R. L. Peurifoy 				

DCE-504	IRRIGATION ENGINEERING				
Pre-requisite NONE	Co-requisite NONE	L 03	T 01	P 00	C -
Objective	Students should be able to: 1. Collect the data for irrigation system. 2. Decide the section of Dams, Weirs and Barrages. 3. Classify the Canals and design the Canals.				
UNIT I	INTRODUCTION				08
Introduction; Definition of irrigation. Necessity of irrigation. History of development of irrigation in India. Types of irrigation Sources of irrigation water. Rain Fall & Run – Off: Definition of rainfall & run-off, catchments area, Dicken's&Ryve's formulae. Types of rain gauges – Automatic& Non - Automatic Stream gauging. Water Requirement of Crops:Definition of crop season Duty, Delta and Base Period, their Relationship Gross command area, cultural command area. Intensity of Irrigation, Irrigable area, Water requirement of different crops- Kharif and Rabi					
UNIT II	LIFT IRRIGATION & FLOW IRRIGATION				08
Lift Irrigation; Types of Wells, shallow & deep well, aquifer types, ground water flow, construction of open wells and tube wells. Yield of an open/tube well and problems Methods of lifting water - manual and mechanical devices, use of wind mills.Flow Irrigation: Irrigation canals, Perennial Irrigation, Different Parts of irrigation canals and their functions. Sketches of different canal cross-sections. Classification of canals according to their Alignment.Design of irrigation canals –Chezy's formula, Manning's formula, Kennedy's and Lacey's silt theories and equations, comparison of above two silt theories. Equations, critical velocity ratio. Use of Garrets and Lacey's charts. Various types of canal lining - Advantages & disadvantages					
UNIT III	CANAL HEAD WORKS AND REGULATORY WORKS				08
Canal Head Works: Definition, object, general layout, functions of different parts. Difference between Weir and Barrage Regulatory Works: Functions and explanation of terms used. Cross and Head regulators. Falls. Energy dissipaters. Outlets-Different types. Escapes.					
UNIT IV	CROSS DRAINAGE WORKS & DAMS				08
Cross Drainage Works: Functions and necessity of the following types: Aqueduct, Syphon, Super passage, Level crossing, inlet and outlet. Constructional details of the above Dams: Earthen dams-types, causes of failure Classification into masonry & concrete dams, Labelled cross-section of gravity dam, Spillway					
UNIT V	WATER LOGGING AND DRAINAGE& GROUND WATER RECHARGE				08
Water Logging and Drainage: Definition causes and effects, detection, prevention and remedies. Surface and sub-surface drains and their layout. Major Irrigation Projects in India Practice: Visits to at least one of the Irrigation Projects and write specific report about the same. Ground Water Recharge: Aim, Method and Advantage					
References					
Books:	1. Irrigation Engg: B.C. Punmia 2. Irrigation Engg: Sushil Kumar				

DCE-505	SURVEYING- II				
Pre- requisite NONE	Co- requisite NONE	L 03	T 01	P 00	C -
Objective	Students should be able to: 1. Know about the advance survey equipment. 2. Set out circular curve in the field.				
UNIT I	PLANE TABLE SURVEYING				08
Plane Table surveying:(i) Purpose of plane table surveying. Equipment used in plane table survey (a) Plane table, (b) Alidade (Plain and Telescopic),(c) accessories. (ii) Method of plane tabling (a) centering (b) leveling (c) Orientation. (iii) Methods of plane table surveying (a) Radiation, (b) Intersection, (c) Traversing (d) Resection. (iv)Two point problem. (v) Three point problem by (a) Mechanical Method (Tracing paper) (b) Bessel's Graphical Method. (c) Trial and error method. Errors in plane table survey and precautions to control them. Testing and adjustment of plane table and alidade					
UNIT II	CONTOURING				08
Contouring: concept of contour, Purpose of contouring, Contour interval and horizontal equivalent, Factors affecting contour interval, characteristics of contour, Methods of contouring direct and indirect, use of stadia measurements in contour survey. Interpolation of contours; Use of contour map, Drawing cross section from a contour map, Marking alignment of a road, railway and a canal on a contour map, Computation of earthwork and reservoir capacity from a contour map.					
UNIT III	THEODOLITE SURVEYING				08
Theodolite Surveying:Working of a transit Vernier theodolite, Fundamental axes of a theodolite and their relation, Temporary adjustments of a transit theodolite, least count and concept of transiting, swinging, face left, face right and changing face, Measurement of horizontal and vertical angles. Prolonging a line (forward and backward) Measurement of bearing of a line, Traversing by included angles and deflection angle method, traversing by stadia measurement, Theodolite triangulation and plotting a traverse, concept of coordinate and solution of omitted measurements (one side affected), Errors in theodolite survey and precautions taken to minimize them, Limits of precision in theodolite traversing. Principle and working of a micro-optic theodolite. Brief introduction to tachometry					
UNIT IV	TOTAL STATION &AUTO LEVEL				06
Total Station & Auto Level:Working and application of total station and auto level. Curves:Simple circular curves:(i) Need and definition of a simple circular curve; Elements of simple circular curve, Degree of the curve, radius of the curve, tangent length, point of intersection (Apex point), tangent point, length of curve, long chord, deflection angle, apex distance and mid-ordinate.					
UNIT V	CURVES				10
Setting out of simple circular curve: (a)By linear measurements only:(i)Offsets from the tangents. (ii) Successive bisection of arcs. (iii)Offsets from the chord produced. (b) By Tangential angles using a theodolite. (ii)Transition Curves: Need (centrifugal force and super elevation) and definition of transition curve, requirements of transition curves; length of transition curves for roads by cubic parabola; calculation of offsets for a transition curve; setting out of a transition curve by tangential offsets only. (iii) Vertical curves Setting out of a vertical curve.					
References					
Books:	1. Surveying Engg : B.C. Punmia, Vol-1 &Vol-2 2. Surveying Engg: S.K. Duggal ,Vol-1				

DCMS-506	PROJECT MANAGEMENT IN CONSTRUCTION				
Pre-requisite NONE	Co-requisite NONE	L 03	T 01	P 00	C -
Objective	Students should be able to: <ol style="list-style-type: none"> 1. Know the various management techniques for successful completion of construction projects. 2. Know the concepts of quality assurance and control techniques in construction. 				
UNIT I	INTRODUCTION				08
Introduction to project management Processes-Initiating, Planning, Executing, Controlling, and Closing processes; Project Integration Management- Project plan development, Project plan execution, and Overall change control.					
UNIT II	PROJECT SCOPE MANAGEMENT& PROJECT TIME MANAGEMENT-				08
Project Scope Management -Initiation, Scope planning, Scope definition, Scope verification, and Scope change control; Project Time Management-Activity definition- work breakdown structure, Activity sequencing– scheduling logic, precedence diagramming method, arrow diagramming method, Activity duration estimation, Schedule development and analysis - critical path method					
UNIT III	PROJECT COST MANAGEMENT				08
Project Cost Management -Resource planning, Cost estimating Quantitative Methods in Construction Management: Introduction and concepts of probability and statistics, CPM/PERT techniques					
UNIT IV	PROJECT RESOURCE MANAGEMENT& PROJECT QUALITY MANAGEMENT				08
Project Resource Management -Resource aggregation, Resource levelling–method of moments, double moments. Project Quality Management – Quality planning, Quality assurance, and Quality control; Project Risk Management-Risk identification, Risk quantification					
UNIT V	PROJECT PROCUREMENT MANAGEMENT				08
Project Procurement Management - Procurement planning, Solicitation planning, Solicitation; Material Management; Value Management; Knowledge Management.					
References					
Books:	<ol style="list-style-type: none"> 1. Project management in construction :S.M.Levy 2. Hand book of Construction Management: JoyP.K 				

DCE-554	CIVIL ENGG. DRAWING – II				
Pre- requisite NONE	Co- Requisite NONE	L 00	T 00	P 03	C -
Objective	Students should be able to: 1. Deal with preparation and reading drawings of the Steel & R.C.C structure and public health engg..				
UNIT I	STEEL STRUCTURAL DRAWING				
1. Preparation of a working drawing (elevation, plan, details of joints at ridge, eaves and other connections) for a riveted steel roof truss resting on a masonry wall for the given span, shape of the truss and the design data regarding the size of the members and the connections. Also calculate the quantity of steel for the truss. [2 Sheets] 2. Tubular Steel Roof Trusses: Types of trusses for different spans. Details of column - truss connection. Simple trusses using tubular sections, North light provision. [1 Sheet] 3. Steel connections (a, b, c, d) riveted and (e) welded all unstiffened. (a) Beam to beam connections (seated and framed) (b) Beam to column (seated and framed) (c) Column base connections (slab base & gusseted base) [1 Sheet for a, b, c,]					
UNIT II	R.C.C. STRUCTURES (ON COMPUTER BY AUTO CAD)				
a.) PUBLIC BUILDING: Plan elevation & sections of a public building like School. Hospital, Canteen, Community hall, guest house. At least double storied showing details of following RCC elements: (i) R.C.C. beam singly reinforced and doubly reinforced giving the size and number of bars, stirrups their size and spacing. (ii) Details of reinforcement for a RCC square and circular column with isolated square footing. (iii) Details of reinforcement for a cantilever beam with given data regarding the size of the beam and the reinforcement, Anchorage of reinforcement. [2 Sheets]					
UNIT III	PUBLIC BUILDING				
1. Details of reinforcement in plan and section for a simply supported RCC. One way slab with intermediate support and two way slab. Bar bending schedule should be prepared. 2. Details of reinforcement of a two storied internal and corner column. In this, the details of reinforcement at the junction with beams must be shown. [2 Sheets]					
UNIT IV	PUBLIC BUILDING				
1. Details of reinforcement of the junction of a secondary beam with the main beam with the given data. 2. Sectional details of T-beam showing details of bars. 3. Details of reinforcement for a cantilever retaining wall with the given design data regarding the reinforcement, size and shape of the wall. 4. Details of reinforcement in a simple circular overhead water tank. [3 Sheets]					
UNIT V	IRRIGATION ENGINEERING				
1. Typical sections of a channel. Typical Cross-section of an unlined and lined channel in cutting, partly cutting and fully in filling. 2. Typical L-section of a distributary. 3. Plan and cross-section of tube well with pump house. 4. Plan, cross-section and L-section of a distributary fall with details of wing wall, pitching, flooring and tube well. [3 Sheets]					
References					
Books:	1. Civil Engg Drawing :Gurucharan Singh 2. Civil Engg Drawing:V.B.Sikka				

DCE-555	SURVEYING LAB - II				
Pre- requisite NONE	Co- requisite NONE	L 00	T 00	P 03	C -
Objective	Students should be able to: 1. Use the survey instrument. 2. Plot the plan by using plane table. 3. Measure height of objects with the help of level.				
Experiment 1	Setting the plane table (a) Marking the North direction. (b) Plotting a few points by radiation method				
Experiment 2	Orientation by. (a) Trough compass (b) Back sighting.				
Experiment 3	Plotting a few points by intersection method.				
Experiment 4	Two point problem.				
Experiment 5	Three point problem by (a) Tracing paper method. (b) Bessel's graphical method. (c) Trial and error method				
Experiment 6	Contouring Preparing a contour plan by radial line method by the use of a Tangent Clinometers / Tachometer				
Experiment 7	To find the difference of level between two distant points by taking staff readings on different stations from the single setting				
Experiment 8	To find the difference of level between two points by taking at least four change points.				
Reference					
Books:	1. Surveying Engg: B.C. Punmia, Vol-1 &Vol-2 2. Surveying Engg:S.K. Duggal ,Vol-1				

DCE-601	DESIGN OF REINFORCED CONCRETE STRUCTURE – II				
Pre- requisite NONE	Co- requisite NONE	L 03	T 01	P 00	C -
Objective	Students should be able to: <ol style="list-style-type: none"> 1. Analyze the section by Limit Stress Method 2. Select Proper materials and calculate the design values for the materials. 3. Understand the basic principles of design of R.C.C. sections. 				
UNIT I	DESIGN OF RCC SLABS& DESIGN OF REINFORCED BRICK				08
Design of RCC Slabs: (i) Structural behavior of slabs under uniformly Distributed load (UDL). (ii) Types of end supports. (iii) Design of one way slab. (iv) Design of Two-way slab with the help of tables of IS: 456. (Corners not held down)-IS-code method. (v) Detailing of reinforcement. Design of Reinforced Brick-Work: (i) Plain brick masonry, permissible stresses. (ii) Reinforced Brick work and its use in slabs and lintels. (iii) Limitations of the use of R.B. Work. (iv) General principles of design of reinforced brick lintels and slabs. (v) Design of R.B. beams, slab and lintels					
UNIT II	DESIGN OF TEE BEAMS				08
Design of Tee Beams :(i) Structural behavior of a beam and slab floor laid monolithically. (ii) Rules for the design of T-Beams. (iii) Economical depth of T-Beams, Strength of T-Beams. (iv) Design of singly reinforced Tee-Beams. (v) Detailing of reinforcement.					
UNIT III	DESIGNS OF COLUMNS & COLUMN FOOTINGS				08
Designs of Columns & Column Footings :(i) Concept of long and short columns. (ii) IS specifications for main and lateral Reinforcement. (iii) Behavior of RCC column under axial load. (iv) Design of Axially loaded short and long columns with hinged ends (circular, square and rectangular as per IS specifications). (v) Concept of column footing. Design criteria. Design of square isolated column footings. (vi) Detailing of reinforcement.					
UNIT IV	CANTILEVER RETAINING WALL				08
Cantilever Retaining Wall : Concept of design and function of different parts of a Cantilever retaining wall and reinforcement details (No numerical shall be asked in the examination) Water Tank: Components of Overhead Water Tanks (Dome Shaped), Description of different component e.g. roof, side wall and ring beam, floor slabs, supporting structure and foundations (only reinforcement details be shown and emphasized).					
UNIT V	COMPONENTS OF MULTI-STORIED FRAMED STRUCTURES				08
Components of Multi-Storied Framed Structures : General concept of multistoried framed structures of Columns, beam, slabs, and footing, design criteria and method of placing reinforcement in framed structures. Lifts basements (only diagrams to be taught. No numerical shall be asked in the examination)					
References					
Books:	<ol style="list-style-type: none"> 1. Reinforced cement concrete: AK Jain. 2. Reinforced cement concrete :Sushil kumar 				

DCMS-602	FIELD PRACTICES IN CONSTRUCTION				
Pre-requisite NONE	Co-requisite NONE	L 03	T 01	P 00	C -
Objective	Students should be able to: <ol style="list-style-type: none"> 1. Know about layouts of buildings drawings & BBS. 2. Know the different properties of materials by conducting test on materials. 3. Understand the overall and detailed planning of formwork, plant and site equipment. 				
UNIT 1	INTRODUCTION				10
Introduction to layouts, Field layout of frame building and load bearing structure, Types of drawings; Key plan, Structural drawing, Foundation layout drawings, plumbing & Electrical drawing, duties of site Engineer.					
UNIT 2	TESTS ON MATERIALS				09
Field test of Brick, Steel Bar, Coarse Aggregate, Coarse & fine Sand, Cement and Concrete and Rebound Hammer Test.					
UNIT 3	FORM WORK				06
Form Work- Types of formwork, Materials used, time required for Stripping of formwork, IS Codes Recommendation, Centering & leveling of formwork, Shuttering oil & its Uses, Nails, Binding wire & its gauges, Bearing Plaster.					
UNIT 4	INDIAN STANDARD CODE				07
Lapping of steel-in column & slab, Space/Cover Block, Nominal Cover- as per IS Code, pH value of Water, Curing of Concrete, Method of curing of concrete, Time Requirement for Concrete					
UNIT 5	BAR BENDING SCHEDULE				08
Introduction to BBS, properties of BBS for footing, column, slab. Estimation of Quantities of RCC, Excavation, shuttering etc., Rate analysis, Equipment's used in Construction Industry-1 ft., Mixer, Shovel, Plumb bob, spirit level					
References					
Books:	<ol style="list-style-type: none"> 1. Engineering materials:R.K. Rajput 2. Indian standard Codes 				

DCE-603	ESTIMATING, COSTING AND VALUATION				
Pre- requisite NONE	Co- requisite NONE	L 03	T 01	P 00	C -
Objective	Students should be able to: <ol style="list-style-type: none"> 1. Decide Approximate Cost Of Civil Engineering Structure. 2. Prepare estimate for civil engineering work. 3. Prepare rate analysis of item of construction. 				
UNIT I	BUILDING				09
Introduction to Estimating:Types of estimates, drawings (to be attached with these estimates. Preparation of rough cost estimates). Units of measurement and units of payment of different items of work. Different methods of taking out quantities: Centre line in-to-in/out-to-put methods. (a) Preparation of a detailed estimate, complete with detailed reports, specifications, abstract of cost and material statement for a small residential building with a flat roof. (b) Preparation of a detailed estimate with specification, abstract of cost and material statement for pitched roof with steel truss only.					
UNIT II	SPECIFICATIONS & ANALYSIS OF RATES				09
Specifications: Need, general and detailed specifications, method of writing specifications, Analysis of rates: (i) Steps in the analysis of rates for any item of work, requirement of material, labour, sundries T. & P. contractors profit. (ii) Calculation of quantities of materials for: (a) Plain cement concrete of different proportions. (b) Brick masonry in cement and lime mortar. (c) Plastering and pointing with cement mortar in different proportions. (d) White washing. Analysis of Rates:Analysis of rates of the following item of work when the data regarding labour, rates of material and rates of labour is given. (a) Earth work in excavation and filling with a concept of lead and lift. (b) Cement concrete in foundation. (c) R.C.C. and R.B. in roof slabs. (d) First class burnt brick masonry in cement mortar. (e) Cement plaster. (f) Cement pointing: Flush, deep pointing. Tender and preparation of tender document.					
UNIT III	IRRIGATION				07
Preparation of detailed estimate for a brick lined distributary from a given section. Public health: Preparation of detailed estimate for laying a water supply line (C.I. Pipe). Preparation of detailed estimates for sanitary and water supply fittings in a domestic building containing one Set of toilets and septic tank.					
UNIT IV	ROADS				07
Methods for calculating earth work using: (i) Average depth. (ii) Average cross sectional area. (iii) Graphical method. Calculations of quantities of materials for roads in plains from given drawings. Preparation of detailed estimate using the above quantities. Detailed estimate of a single span slab culvert with return wing walls. Calculation of quantities of different items of work for a masonry retaining wall from given drawings.					
UNIT V	VALUATION				08
Purpose of valuation, principles of valuation. Definition of terms such as depreciation, sinking fund, salvages and scraps value. Valuation of a building property by replacement cost method and rental return method. Method of calculation of standard rent-Concept of capitalized value and years purchase.					
References					
Books:	<ol style="list-style-type: none"> 1. Estimating, Costing and valuation: B.N.Dutta. 2. Estimating & costing:S.C. Rangwala 				

DCE-604	DESIGN OF STEEL AND MASONRY STRUCTURES				
Pre- requisite NONE	Co- requisite NONE	L 03	T 01	P 00	C -
Objective	Students should be able to: <ol style="list-style-type: none"> 1. Analyze the steel structure and its members for determining the forces acting in the member. 2. Design the tension member, compression member, beam, purlins and column bases and their connection. 				
UNIT I	STRUCTURAL STEEL SECTIONS & STRUCTURAL STEEL CONNECTIONS				09
Structural Steel and Sections: Properties of structural steel as per IS: 226 and IS: 1977. (ii) Designation of structural steel sections as per IS Handbook and IS: 800. Structural Steel Connections : (i) Riveted connections - types of rivets, permissible stresses in rivets. Types of riveted joints, Failure of riveted joints, Assumptions made in the design of riveted joints. Specification for riveted joints. Design of riveted joints for axially loaded members. (ii) Welded Connections: Comparison between riveted and welded joints, types of welds, permissible stresses in welds, types of welded connections, strength of welded joint, Design of welded joints for axially loaded members.					
UNIT II	TENSION MEMBERS & COMPRESSION MEMBERS				08
Tension Members: Forms of common sections. Permissible Stresses in tension for steel. Strength of a tension member. Design of tension members (flats, angles & Tee Sections only). Tension splice and their design. Compression Members: Design of struts and columns as per IS:800. Effective length, slenderness ratio and permissible stresses, simple and built up sections, concept of lacings in built-up columns					
UNIT III	BEAMS				07
Design criteria, allowable stresses, Design of laterally restrained beams including simple built-up sections. Checks for web bulking, web crippling and deflection.					
UNIT IV	COLUMN BASES				08
Column bases, design of simple column base. (B) Steel Roof Trusses: Different types of trusses, Loads on roof trusses. Various combinations of loads to cause worst condition. Design of angle and tubular trusses (Tension and compression members), Design of purlins.					
UNIT V	MASONRY AND FOUNDATION STRUCTURES				08
Gravity masonry dams, retaining walls and chimneys subjected to lateral pressures. Design of masonry wall foundation (stepped footing).					
References					
Books:	<ol style="list-style-type: none"> 1. Design of steel structure: S.K.Duggal. 2. Design of steel Structure: L. S. Negi 				

DCMS-605	QUALITY AND SAFETY MANAGEMENT IN CONSTRUCTION				
Pre- requisite NONE	Co -requisite NONE	L 03	T 01	P 00	C -
Objective	Students should be able to: <ol style="list-style-type: none"> 1. Know the concepts of quality assurance and control techniques in construction. 2. Know the concepts of Total quality management. 3. Know the different Construction hazard and safety guidelines. 				
UNIT I	INTRODUCTION				08
Introduction to quality; Importance of quality; Quality transition- quality control and inspection, quality assurance, total quality management; Evolution of quality management.					
UNIT II	PLANNING AND CONTROL OF QUALITY				08
Planning and control of quality during design of structures; Tools and techniques for quality management; Inspection of material and machinery.					
UNIT III	QUALITY ASSURANCE				08
Quality assurance in construction; Systems quality management; Quality standards/codes in design and Construction;(ISO: 9000);					
UNIT IV	TOTAL QUALITY MANAGEMENT				08
Total quality management (TQM)-principles, tools and techniques. Introduction to safety; Safety and Health programs in construction industry; Planning for safety provisions.					
UNIT V	CONSTRUCTION HAZARD AND SAFETY GUIDELINES				08
Construction hazard and safety guidelines; Prevention techniques for construction accidents; Site management with regard to safety recommendations; Training for safety awareness and implementation; Construction safety and health manual.					
References					
Books:	<ol style="list-style-type: none"> 1. Planning, analysis, selection, financing, implementation, a review: P. Chandra 2. Financing-Asset-based financial engineering, :J. D. Finnerty 				

DCMS-606	CONTRACT MANAGEMENT				
Pre-requisite NONE	Co-requisite NONE	L 03	T 01	P 00	C -
Objective	Students should be able to: 1. Know the various types of construction contracts and their legal aspects and provisions. 2. Know the construction laws.				
UNIT I	INTRODUCTION				
Contract management – Introduction, Overview of contract management, overview of activities in contract management. Planning & People – Resource management. Contract formation – Formation of contract, contract startup, managing relationship.					08
UNIT II	CONTRACT MANAGEMENT				
Contract Administration & Payments – Contract administration, Payments. Managing Risk and Change – Managing risk & managing change. Contract Closure & Review – Ending a contract, Post implementation review.					08
UNIT III	CONSTRUCTION LAWS				
Construction Law-Public law; Government Departments and Local Authorities; Private Law, Contracts, property law and building law.					08
UNIT IV	CONSTRUCTION CONTRACTS				
Construction Contracts - Contract Specifications, types of contract documents used for construction. Contract Procurement-Selecting contractor. Contract Management in various situations – Contract management in NCB works, contract management in ICB works contract, contract management in consultancy.					08
UNIT V	LEGAL REQUIREMENTS				
Legal aspect in contract management – Contract management in legal view, dispute resolution, integrity in contract management Managing performance – Introduction, monitoring & measurement.					08
References					
Books:	<ol style="list-style-type: none"> 1. Planning, analysis, selection, financing, implementation, and review: P.Chandra. 2. Construction Contracts : Jimmie Hinze 3. Contracts and the Legal Environment For Engineers and Architects : Joseph T.Bockrath 				

DCE-651	REINFORCED CEMENT CONCRETE & HIGHWAY LAB				
Pre- requisite NONE	Co- requisite NONE	L 00	T 00	P 02	C -
Objective	Students should be able to: 1. Know the properties of materials used in highway. 2. Improve the quality of work.				
Experiment 1	Determination of resistance to abrasion of aggregates by Los Angel's Abrasion Testing Machine.				
Experiment 2	Determination of Aggregate impact value by aggregate impact tester.				
Experiment 3	Determination of C.B.R. Value of sub grade soil.				
Experiment 4	Determination of Aggregate crushing value by aggregate crushing test apparatus.				
Experiment 5	Determination of Penetration Value of bitumen.				
Experiment 6	Determination of softening point of bitumen.				
Experiment 7	Determination of ductility of bitumen.				
Experiment 8	Determination of flash and fire point of bitumen.				
Experiment 9	Determination of Compressive Strength of Cement by Cube test.				
Experiment 10	Determine the workability of fresh mix (M-15) by slump test.				
Experiment 11	Determine Initial and Final setting time of Cement.				
Experiment 12	Determine Normal Consistency of Cement.				
Reference					
Books:	1. Highway Engineering: Khanna & Justo 2. Engineering materials :R.K. Rajput				

