DIPLOMA IN CIVIL ENGG I- SEMESTER
ENGINEERING DRAWING - I
(BCE-101)

| Annexure: I |
| BOS   : 12.02.2013 |

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
-	6	3	50	15	35	100

	CONTENTS	
Unit-1	**PRINTING:** Introduction: Need and importance of Drawing as the language of Engineers, Selection and handling of the Drawing Instruments and Equipments. Single stroke printing – capital's Sub-Capitals, small, vertical and italics, with and without serif. Block printing (5:7 type)	**20%**
Unit-II	**SCALES:** Need of a scale, Representative fraction (R.F.) and types of Scales according to the R.F. construction of plain, Diagonal and vernier Scale.	**40%**
Unit-III	**ORTHOGRAPHIC PROJECTIONS:** Introduction to I-Angle and III- Angle systems of orthographic projections. Orthographic Projections of right Solid Prism and pyramid including cylinder and cone. Development of Surfaces. Idea of ellips, parabola & hyperbola.	**40%**

RECOMMENDED BOOKS;

1. **VENUGOPAL, K; New Age International (P) Limited, Publishers.**
2. **Gill, P.S.; S.K. Kataria & Sons.**
3. **Engineering Drawing; Dhawan R.K; S. Chand & Company Ltd.**
4. **Engineering Drawing; Gupta R.B.; Satya Prakashan**

DIPLOMA IN CIVIL ENGG
II- SEMESTER
ENGINEERING DRAWING - II
(BCE-201)

Annexure: I
BOS   : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
	6	3	50	15	35	100

	CONTENTS	
Unit-1	**ISOMETRIC AND PERSPECTIVE PROJECTIONS:** Isometric Projection: Simple right Solids, English Alphabets, 3 Stair Block and model of Simple Machine parts. Perspective Projection: Two point Perspective of plane laminae, right solids and Simple blocks.	**20%**
Unit-II	**BUILDING COMPONENTS:** Types of foundation: Spread, isolated column and dwarf wall footing. Types of Floors: Brick, Cement Concrete, Mosaic, Marble, Stone and Tile Flooring basement floor, roof terracing, Wall Section: Wall Section through Door, Window or Arch openings.	**40%**
Unit-III	**RESIDENTIAL BUILDING :** Simple and working plan. Front, Elevation and Section of 2-roomed, single storeyed residential building.	**40%**

RECOMMENDED BOOKS:

1. A Text book of Civil Engg. Drawing: Indian Publishing house.
2. Chakraborti M; Calcutta.
3. Civil Engg. Drawing; Singh Gurchran Chander Subhash, Standard Publishers Distributors.
4. Civil Engineering Drawing & Design : Ghose D.N; SBS Publishers & Distributor.
5. Drawing & Design of Residential and commercial building: S. Kaleem A. Zaidi, Suhail Siddiqui, Standard Publisher Distributors.

Annexure: I
BOS   : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
4	-	3	10	15	75	100

	CONTENTS	
Unit-1	**CHAIN SURVEYING:** Definition of surveying, principle of surveying. Brief description of different types of chains and tapes, different methods of distance measurements, tape corrections. Optical Square and cross staff. Testing and adjusting of chains, corrections of erroneous distances and areas, ranging of survey lines. Obstacles in chaining and ranging, Field book. Chain triangulation. Tie lines and check lines. Suitability and errors in chain surveying. Calculation of areas by trapezoidal and Simpson's rule.	**20%**
Unit-II	**COMPASS SURVEYING:** Types of meridians and bearings. Systems of measurement of bearing. Conversion of bearing from one system to another. Construction and working of prismatic and Surveyor's compass. Compass traversing. Closing error and its graphical adjustment. Determination of included angles from bearing and vice versa. Local attraction and correction of affected bearing. Magnetic declination. Angle of dip.	**20%**
Unit-III	**PLANE TABLE TURVEYING:** Accessories and methods of plane table surveying, advantages and disadvantages of plane table surveying. Three point problem (mechanical and Lehman's method). Two point problem. Errors in plane tabling.	**20%**
Unit-IV	**LEVELLING:** Definition of terms related to levelling. Brief description of dumpy, tilting and IOP levels. Temporary and permanent adjustment of dumpy level. Methods of calculation of reduce levels. Profile levelling, L-section, cross- section and formation lines. Precautions and errors in levelling, balancing back sight and fore sight distances. Levelling difficulties.	**20%**
Unit-V	**THEODOLITE:** Description of a transit theodolite. Definition of terms. Temporary adjustment of theodolite. Method of reading horizontal and vertical angles. Miscellaneous operations with theodolite. Determination of heights and distances with theodolite when base of the object is accessible.	**20%**

Annexure: I
BOS : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
4	-	3	10	15	75	100

	CONTENTS	
Unit-1	**STONES:** Introduction, requirements of good building stones, uses of stones, classification of stones, common building stones of India and their uses. Stone cladding, artificial or cast stones. **BRICKS:** Bricks, composition of good brick earth, functions of the constituents of brick earth. Characteristics and uses of first class, second class and third class bricks. Classifications of bricks as per B.I.S. Properties of burnt clay bricks, tests for bricks, special bricks. **BUILDING TILES:** Introduction, Types of building tiles.	**20%**
Unit-II	**LIME:** Introduction, Classification of lime, calcinations and slaking of lime. Uses of lime. **AGGREGATES:** Introduction, Types of aggregates, uses of aggregates. **MORTAR:** Introduction, Types of mortar, uses of mortar. **CEMENT:** Introduction, Portland cement, composition of Portland cement. Physical properties of cement. **TESTS FOR CEMENT:** Types of Portland cement and their uses.	**20%**
Unit-III	**TIMBER:** Introduction. Properties of good timber. Preservation of timber. Some common Indian timbers and their uses in civil engineering works. **WOODEN-BASED PRODUCTS:** Introduction, Veneers, plywood, grades and sizes. Hard board, block board, lamin board, batten board, particle board. **PAINTS, VARNISHES AND DISTEMPERS:** Glossary of terms. Characteristics of good paint. Desirable properties of paint, common constituents of paint, types of paint.	**20%**
Unit-IV	**METALS:** Introduction, properties and uses of pig iron, cast iron and wrought iron, steel, mild steel, high tensile steel, high carbon steel. **ASPHALT, TAR AND BITUMEN:** Description and uses of asphalt, tar and bitumen. **PLASTIC:** Introduction. Plastic building products produced in India. Uses of plastic in construction.	**20%**
Unit-V	**CONCRETE:** Introduction. Qualities of good concrete. Plain cement concrete, lean concrete, reinforced cement concrete. **GLASS:** Introduction. Functions and utility of glass. Types of glass and their uses. **INSULATING MATERIALS:** Introduction, Types of heat & sound insulating materials. **ADMIXTURES: Definition.** Function and utility of admixtures. Type of admixtures.	**20%**

Reference Books:-
1. Engineering Materials (Material Science) by S.C. Rangwala
2. Building Materials by S.K. Duggal
3. Civil Engineering Materials by Parbin Singh

Annexure: I
BOS   : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
-	2	3	30	-	20	50

CONTENTS

1. Introduction to basics of computer application (Hardware/software/folder/file/ etc.) with typing practice on Notepad and WordPad

2. Writing of specimen application using MS Word with formatting and page setup commands

3. Preparation of Curriculum Vitae (CV) using MS Word with Indentation and Tab commands

4. Preparation of class time table in MS Word using Table Command

5. Application of Equation Editor for writing mathematical equations

6. Practice of advanced MS Word commands (Header/Footer/Drop Cap/Change Case/Styles/ etc.)

7. Introduction to MS Excel (Components of Excel User interphase/Page Setup/Formatting/Cell Reference etc).

8. Plotting of graphs in MS Excel

9. Introduction to Functions and Formulas in MS Excel

   • Program to solve quadratic Equation

   • Program to solve a design Problem

10. Introduction to MS PowerPoint for developing presentations

Annexure: I
BOS   : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
-	6	3	90	20 (Camp)	40	150

CONTENTS

CHAIN SURVEY:

- Folding & unfolding of chains
- Ranging Of Lines
- Offsetting
- Offsetting with 90 turn
- Offsetting with tie line turn
- Traversing with Chain

COMPASS SURVEY:

- Measurements of Bearing
- Measurements of included angles from bearings
- Traversing with Compass
- Graphical Adjustments

PLAIN TABLE SURVEY:

- Radiation Method
- Intersection Method
- Traversing
- Two - Point problems
- Three – Point problem

LEVELING:

- Rise & Fall method
- Height of Instrument method
- Profile Leveling
- Cross Sectioning

THEODOLITE SURVEY:

- Measurements of horizontal angles
- Measurements of vertical angles

DIPLOMA IN CIVIL ENGG
III- SEMESTER
ENVIRONMENTAL STUDIES & WATER QUALITY
(BCE-301)

Annexure: I
BOS   : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
4	-	3	10	15	75	100

	CONTENTS	
Unit-1	Definitions of Environmental Science, Environmental Engineering and Environmental Management, Concepts of Ecology, Food chain, Food Web. Types of Pollutants, Air Pollution, Water Pollution, Land Pollution: Classification, sources, effects and control measures, Noise Pollution, Odor Pollution.	20%
Unit-II	Role of Non- Conventional sources of energy for environmental pollution control. Composition of atmosphere, Hydrological cycle, Global Warming, Acid Rain, Ozone depletion, deforestation and desertification. Basic concepts of Environmental Impact Assessment (EIA), EIA Objectives. Environmental awareness, public participation, Environmental case studies.	20%
Unit-III	Sources of water supply, intake works, Basic concept of Environmental Chemistry, Water demand, Variation in demand, Population prediction,	20%
Unit-IV	Water quality standards, Water Quality parameters - Physical, Chemical, and Biological parameters – pH, alkalinity, acidity, hardness, solids, plate count, MPN	20%
Unit-V	Water treatment Processes flow sheets, screenings, aeration, sedimentation, Coagulation, flocculation, filtration, softening, and disinfection. Water distribution systems.	20%

Reference Books:-

1. Benny Joseph, 2009, Environmental Studies, Tata McGraw Hill Companies, New Delhi.
2. Suresh K. Dhameja, 2012, Environmental Studies, Katson books, New Delhi.
3. Masters, G.M., 1991, *Introduction to Environmental Engineering and Science*, Prentice-Hall International, Inc., Englewood Cliffs, NJ.
4. Peavy, Rowe & Tchobanoglous "Environmental Engineering", McGraw-Hill Book Co.
5. Henry, J.G. and G.W. Heinke, 1989, *Environmental Science and Engineering*, Prentice-Hall International, Inc., Englewood Cliffs, NJ.

Annexure: I
BOS : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
4	-	3	10	15	75	100

	CONTENTS	
Unit-1	**THEODOLITE SURVEYING:** Introduction, Fundamental lines and desired relations, Permanent adjustment of a transit theodolite, Measurement of horizontal and vertical angles, Methods of traversing, Independent and consecutive coordinates, Adjustment of traverse by transit and Bowditch's rules, various cases of omitted measurements.	**20%**
Unit-II	**CONTOURING:** Definition, contour interval, characteristics of contours, methods of locating contours, interpolation of contours, contour gradient, applications of contour maps **TRIGONOMETRICAL LEVELLING:** Introduction, suitability, different cases of trigonometrical levelling for measurement of heights and distances.	**20%**
Unit-III	**LEVELLING:** Sensitiveness of bubble tube, Curvature and refraction, reciprocal levelling **TACHEOMETRIC SURVEYING:** Introduction, principle, determination of tacheometric constants, specifications of a tacheometer and a stadia rod, fixed hair system of tacheometric surveying with line of sight (i) horizontal and (ii) inclined with staff held vertical, anallactic lens.	**20%**
Unit-IV	**CURVES:** Necessity, sketches of various types of curves in horizontal and vertical plane, elements of a simple circular curve, degree of curve, necessary calculations and methods of layout of simple circular curve by linear and angular methods, method of lay out of a compound curve by deflection angles. Transition curves: Introduction, functions, conditions to be fulfilled by a transition curve, equilibrium and deficient cant, centrifugal ratio, length of transition curve by arbitrary gradient, time rate, and rate of change of radial acceleration, necessary calculations and methods of lay out.	**20%**
Unit-V	**GPS SURVEYING:** Introduction and components of GPS, space segment, control segment and user segment, elements of satellite based surveys-map, datums, GPS receivers, GPS observation methods and their advantages over conventional methods. **REMOTE SENSING AND GIS:** Definition, terminology, types of remote sensing data, applications, advantages and disadvantages. Introduction of GIS, common applications of GIS, advantages of GIS, elements and uses of GIS in resource mapping.	**20%**

DIPLOMA IN CIVIL ENGG
III- SEMESTER
HYDRAULICS
(BCE-303)

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
4	-	3	10	15	75	100

	CONTENTS	
Unit-1	**PROPERTIES OF FLUIDS:** Definition of Fluid Mechanics and Hydraulics. Definition of Fluids International System of Units (SI). Specific Weight. Mass Density **,** Specific Gravity (R.D.) and Viscosity of a Fluid. Newton's Law of Viscosity. **FUILDS STATICS:** Fluid pressure, Pascal's Law, pressure intensity and pressure Head. Derivation and Application of Basic Formula for pressure intensity. Vacuum and Atmospheric Pressure, Absolute and Gauge Pressure Measurement of fluid pressure by piezometers and U-tube Manometers. **HYDROSTATIC FORCE ON SURFACES:** Total Hydrostatic Force on a plane immersed Surface and Centre of Pressure. Simple Applications	20%
Unit-II	**FLOW OF WATER:** Types of flow, Reynolds and Froude numbers: Discharge and Equation of Continuity. Pressure,Velocity, datum and Total Heads, Bernoulli's Theorem. Venturimeter. **ORIFICES:** Definition and Types of Orifices Hydraulic Coefficients. Large Vertical Rectangular Orifice Free, Drowned and partially drowned orifices Time of emptying tanks of uniform cross section by a single orifice, without inflow.	20%
Unit-III	**MOUTHPIECES:** Definition and Types of Mouthpiece. Discharge through an external cylindrical mouthpiece. **NOTICES AND WEIRS:**	20%

	Definition and types of Notches and Weirs. Discharge Formulae for Rectangular, Triangular and Trapezoidal Notch. Cippoletti weir. Francis and Bazin's formula for rectangular weirs. Velocity of approach. Broad crested weirs, Drowned Weirs.	
Unit-IV	**FLOW THROUGH PIPES:** Friction in pipes. Definition of HGL and TEL, Loss of Head due to friction, Sudden Expansion, sudden Contraction, Entrance, Exit. Obstruction and change of direction. Flow through parallel (forked) pipes. Flow from one reservoir to another through a long pipe of uniform and composite section.	**20%**
Unit-V	**OPEN CHANNEL FLOW:** Geometry of Channel and Geometric Elements. Types of flow in open channels. Flow Formulae for Open Channels: Chezy's, Manning's and Kutter's. Depth of maximum discharge. Most economical section for rectangular, triangular and trapezoidal channels.	**20%**

TEXT/REFERENCE BOOKS:
1. P. N. Modi and S. N. Seth, "Hydraulics and Fluid Mechanics". Standard Book House, New Delhi, India.
2. S. Ramamurtham, "Hydraulics and Fluid Mechanics". Dhanpat Rai & Sons, New Delhi, India.
3. R. S. Khurmi, "Hydraulics and Hydraulic Machines". S. Chand & Co., New Delhi, India.

DIPLOMA IN CIVIL ENGG
III-SEMESTER
CIVIL ENGINEERING DRAWING
(BCE-304)

Annexure: I
BOS : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
-	4	3	50	15	35	100

	CONTENTS	
Unit-1	**BUILDING DRAWING AND SERVICES** i) Working drawing of the following including the limitations regarding building heights, built-up area and open space requirements according to local bye-laws: • Double storeyed residential buildings with load bearing walls • Double storeyed framed structured residential buildings • Public buildings ii) General idea about site, key and terrace plan **iii)** Provisions of the following building services	**40%**
Unit-II	**STRUCTURAL DRAWING AND DETAILING OF THE FOLLOWING** i) Beams, Lintels and Slabs ii) Columns and footings **iii)** Staircase	**40%**
Unit-III	**IRRIGATION DRAWINGS** i) Plan and sectional elevation of the following • Sarda type fall • Pipe culvert slab and box culvert • Typical cross section of canal • Schematic layout plan of head work • Various types of bridges	**20%**

Annexure: I
BOS : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
-	6	3	60	-	40	100

CONTENTS
EXPERIMENT NO:1.
Determine of R.L of Various Points by height of Instrument method.
EXPERIMENT NO:2.
Determine of R.L of Various Points by Rise and Fall method.
EXPERIMENT NO:3.
Measurement of Horizontal Angle.
EXPERIMENT NO:4
Measurement of Horizontal Angle.
EXPERIMENT NO:5.
Measurement of Vertical Angle.
EXPERIMENT NO:6
Measurement of Vertical Angle.
EXPERIMENT NO:7.
R. L of the top of an accessible electric pole.
EXPERIMENT NO:8.
R. L of the top of an inaccessible electric pole when instrument station and pole are in the same vertical plane
EXPERIMENT NO:9.
R. L of the top of an inaccessible electric pole when instrument station and pole are not in the same vertical plane.
EXPERIMENT NO:10.
Sensitiveness and radius of Curvature of the bubble tube.
EXPERIMENT NO:11.
True difference in elevation between two points by reciprocal Leveling.
EXPERIMENT NO:12.
Tacheometric Constants of a transit theodolite.
EXPERIMENT NO:13.
Horizontal and vertical distance between two points by tacheometry.

| Annexure: I |
| BOS   : 12.02.2013 |

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
-	4	3	60	-	40	100

CONTENTS

1. Determination of pH using a digital pH Meter.

2. To determine total acidity in water and wastewater samples.

3. To determine total phenolphthalein and methyl orange alkalinity in water and waste water samples.

4. To determine total and calcium hardness in water samples.

5. To determine chloride content in water and waste water samples.

6. To evaluate percentage available chlorine in bleaching powder.

7. To determine dissolved oxygen in water and wastewater samples.

8. To determine Biochemical oxygen demand (BOD) of wastewater samples.

9. To determine Chemical oxygen demand (COD) of wastewater samples.

10. To determine total solids, total dissolved solids (TDS), total suspended solids (TSS) and total volatile solids in water and wastewater samples.

Book recommended:

1. Sawyer, C.N. and P.L. McCarty, 1978, Chemistry for Environmental Engineering, III Edition, McGraw-Hill Book Company, New York.

DIPLOMA IN CIVIL ENGG
III- SEMESTER
HYDRAULICS LAB
(BCE-393)

Annexure: I
BOS   : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
-	4	3	60	-	40	100

CONTENTS

1. Verification of Bernoulli's Theorem.

2. Determination of Cd of the given external cylindrical mouth-pieces

3. Determination of Cd the given triangular / rectangular notch.

4. Determination of loss coefficient due to sudden expansion and sudden contraction for the given pipe arrangement.

5. Determination of coefficient of friction for given pipe.

6. Determination of meter coefficient (Cd) for the given Verturemeter / Orifice-meter.

7. Viscosity determination by falling sphere viscometer.

8. Study of the type of the flow by Reynolds apparatus.

9. Determination of the efficiency of the given centrifugal pump.

DIPLOMA IN CIVIL ENGG
IV - SEMESTER
STRENGTH OF MATERIALS
(BCE-401)

Annexure: I
BOS : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
4	-	3	10	15	75	100

	CONTENTS	
Unit-1	**Simple Stresses and Strain:** Introduction: Types of stresses and strain, Hook's law. Permissible Stresses. Principle of Superposition. Composite Sections. Thermal Stresses. Poisson's ratio, Volumetric Strain. Elastic modulus with their relationship.	**25%**
Unit-II	**Shear Force and Bending Moment:** Type of Support, Type of beams, Type of Load. Shear Force and Bending Moment. SFD and BMD for Cantilevers, Simply Supported and Overhanging beam for Concentrated and Uniformly distributed load. Relationship between S.F and B.M	**25%**
Unit-III	**Geometrical Properties of Area:** Centre of area or Centroids. Moment of Inertia and second moment of area. Theorem of Parallel and Perpendicular axes. Second moment of area of rectangular, Circular, T, I, L and Built up Section.	**25%**
Unit-IV	**Structural Steel Connection:** Description of riveted and welded joints. Design of riveted and welded joints **Frames:** Introduction: Types of Frame. Determination of Forces in Simple trusses by the method of joint and method of section.	**25%**

Reference Books:-

1. **Strength of Material   S. Ramamuthan**
2. **Strength of Material   R.S. Khurmi**
3. **Strength of Material   B.C. Punmia**
4. **Strength of Material   Rajput**

DIPLOMA IN CIVIL ENGG
IV- SEMESTER
STRUCTURAL DESIGN-I
(BCE-402)

Annexure: I
BOS : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
4	-	3	10	15	75	100

	CONTENTS	
Unit-1	**FRESH CONCRETE:** • Overview of Concrete and reinforced concrete. Properties of concrete in Plastic State, Workability, Measurement of workability by Slump, Compaction factor and Vee-bee tests. Segregation and Bleeding of concrete. Recommended slumps for placement in various conditions as per IS: 456-2000. Admixtures (as per IS: 456-2000). Curing and its method. • Concrete Mix Proportioning: Nominal concrete mix, Design concrete mix (IS code method).	**25%**
Unit-II	**HARDENED CONCRETE:** • Mechanical properties of concrete: Compressive Strength and Modulus of elasticity, Tensile Strength, Shrinkage and Creep. Durability and Permeability of concrete, Chemical (Chloride and Sulphate) attack, Thermal properties of concrete (Thermal Conductivity, Coefficient of Thermal Expansion, Fire resistance). • Special purpose concrete: Light weight concrete, High Strength concrete, Polymer concrete, Ready mix concrete, Fiber reinforced concrete, Ferro cement and its uses.	**25%**
Unit-III	**DESIGN OF BEAMS FOR FLEXURE:** • Design concept, Concrete: Stress-Strain curves, Characteristic Strength, and Grades. Reinforcing steel: Stress-Strain curves, Types, Sizes, and Grades. Characteristic Loads, Design methods (Working Stress Method and Limit State Method). Modes of failure. • Limit State Analysis and Design of beams (Rectangular and T-beams).	**25%**
Unit-IV	**DESIGN OF BEAMS FOR SHEAR AND BOND:** • Behavior of Reinforced Concrete beam under Shear. Critical sections for shear design. Types of shear reinforcement. Design of shear reinforcement with vertical stirrups and bent-up bars with vertical stirrups. • Introduction to Bond stress, flexural bond, anchorage (or development) bond, development length in compression and tension, bends and hooks, splicing reinforcement. Design examples.	**25%**

Reference Books:-
1. **Reinforced Concrete - Limit State Design by A. K. Jain**
2. **Reinforced Concrete Design by S. U. Pillai and D. Menon**
3. **Reinforced Concrete Design by S. N. Sinha**
4. **IS: 456-2000, Plain and Reinforced Concrete - Code of Practice**
5. **Civil Engineering Material and Their Testing by S. D. Hasan**
6. **Concrete Technology by M. L. Gambhir**
7. **Concrete Technology by A. M. Neville**

Annexure: I
BOS : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
4	-	3	10	15	75	100

	CONTENTS	
Unit-1	**FOUNDATIONS:** Definitions, classification of foundations, shallow and deep foundations, strap combined footings and mat or raft foundations, design of wall footing, pile foundations, pier foundation and well foundation, introduction to the mass-spring system, free and forced vibration with and without damping, reciprocating and impact type machines.	**20%**
Unit-II	**ARCHITECTURAL DESIGN OR PLANNING:** Orientation and area requirement for various components of a residential building, functional planning of a residential, primary school, a small hospital (with an emergency, OT and 6 bed wards) and a small factory building	**20%**
Unit-III	**ACOUSTIC AND SOUND INSULATION:** Transmission of sound in rooms, coefficient of sound absorption and noise reduction, classification of acoustical materials, acoustic of platable building (auditorium, school, theatre, religious building), sound insulation	**20%**
Unit-IV	**SURFACE FINISHING AND CONSTRUCTION MACHINERY** Plastering: preparation of surface and application of various types of cement plastering on new and old brick masonry, requirements of good plastering, defects in cement plastering and their removal; Pointing: preparation of surface and application of cement pointing on brick work; White/colour washing/distempering: preparation of white/colour washing, various types of distempers, preparation of surfaces, application and defects in distempering; Brief description with necessary sketches of concrete mixers, various types of concrete vibrators and floor grinders.	**20%**
Unit-V	**BUILDING DRAINAGE** Aims of building drainage, different type of sanitary fittings and their applications, layout plan of sanitary fittings and building drainage, testing of building drainage; Building water supply: types of water supply fixtures and their applications, layout of building water supply arrangement, arrangement of house connection from supply mains; Electrification: electrification plan of a single storey residential building; Lightening conductor: brief description with necessary sketches; Fire: causes, fire resisting materials, fire tests, escape means, fire fighting equipments, fire fighting system in a multistoried building, protection; Earthquake: causes, magnitude for minimizing the effect of earthquake on high rise structures	**20%**

Annexure: I
BOS : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
4	-	3	10	15	75	100

	CONTENTS	
Unit-1	**INTRODUCTION, HISTORY AND GEOMETRIC DESIGN OF HIGHWAYS:** A brief historical review of how highway construction methodology evolved. Highway development in India, Road Development Plans, IRC classification of urban and rural roads, Expressways, Cross section elements: Right of way, Carriage way, Camber, Kerbs, Shoulders and Footpaths, Highway cross-sections **HIGHWAY GEOMETRIC DESIGN:** Sight distance, Superelevation, Horizontal alignment design, Types of horizontal curves, Vertical Alignment Design, Types of vertical curves.	**20%**
Unit-II	**TRAFFIC ENGINEERING** Traffic characteristics, Traffic studies, Traffic volume studies, Speed studies, Origin and destination study, Traffic flow characteristics, Traffic capacity, Traffic Density, Space and time Headways, Accident studies, Planning and design of intersections, Traffic control devices.	**20%**
Unit-III	**HIGHWAY MATERIALS AND CONSTRUCTION** Desirable Properties of subgrade soil, Stone aggregates and Bituminous Materials, Tests on stone aggregates (Crushing, Abrasion and Impact Test for aggregates), Tests on bituminous materials (Penetration, Ductility, Viscosity, Binder content and Softening point Tests), **HIGHWAY CONSTRUCTION:** Water bound Macadam, Bituminous and Concrete roads Construction of Joints. Types of project financing agreements (BOT and BLT Methods)	**20%**
Unit-IV	**RAILWAY ENGINEERING:** Types of railways (Monorail, hanging rail, etc.), Rail gauges, Creep of rail, Wear of rail, Rail fixtures, Rail fastenings, Railway sleepers, Points and crossings, Laying of rail tracks, Stations and Yards.	**20%**
Unit-V	**AIRPORT ENGINEERING:** Importance of Airports, Airport Planning, Standards for planning of airports as per ICAO, Site selection survey, Airport Zoning, Runway Orientation, Windrose Diagram, Taxiways and Aprons, Holding Aprons, Planning and layout of Terminal Buildings, Hangars and Parking area.	**20%**

Text Books

1. Khanna, S. K. and Justo, C.E.G. "**Highway Engineering**", Nem Chand and Bros, Roorkee, 8th edition, 2011
2. Khanna, S. K and Arora, M.G & Jain, S. S, "**Airport Planning and Design**", Nem Chand and Bros, Roorkee, 2001

Reference Books

1. Kadiyali, L. R., "**Principles and Practice of Highway Engineering**", Khanna Publishers Ltd. New Delhi, 2000
2. Sehgal, S.B and Bhanot, B. L, "**Highway and Airport Engineering**", S. Chand and Company Ltd. New Delhi, 1978
3. Venkatappa Rao, G., "**Principles of Transportation and Highway Engineering**", Tata McGraw Hill Publishing Co. Ltd. New Delhi, 2000

DIPLOMA IN CIVIL ENGG
IV- SEMESTER
ENVIRONMENTAL ENGINEERING
(BCE-405)

Annexure: I
BOS : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
4	-	3	10	15	75	100

	CONTENTS	
Unit-1	Wastewater Classification, Variation in wastewater flow rates, Wastewater Characteristics: Physical, Chemical and biological Characteristics, Chemical and Biochemical Oxygen demand (COD/BOD), BOD Kinetics, Wastewater effluent standards.	**20%**
Unit-II	Wastewater treatment flow sheets, Screening, Grit removal, Sedimentation, Activated sludge process (ASP), Stabilization ponds, Trickling filters, Biotowers, Rotating biological Contactors, Wastewater irrigation and reuse, Anaerobic wastewater treatment, Septic tank, Sludge treatment and disposal, Nitrification and denitrification.	**20%**
Unit-III	Wastewater Collection Systems, Classification, Types of sewers and drains, Sewer appurtenances: Manholes, Street inlets, Catch basins, Sand traps, Grease traps, Oil traps, Maintenance of Sewers, Sewer cleaning equipment and devices.	**20%**
Unit-IV	Classification of Air Pollution, Sources and generation of gaseous pollutants and particulate pollutants, Effects on materials, health and plants, Air quality monitoring, Standards, Meteorology, Air pollution control methods for removal of particulates and gaseous pollutants.	**20%**
Unit-V	Solid Waste: Classification, Sources and Characteristics, Waste Management: Solid Waste Generation, Collection, Processing and Disposal Methods, Resource Recovery in Waste Management, Biological and Thermal Conversion Processes.	**20%**

Reference Books:-

1. Peavy, H.S., 1985, Environmental Engineering, McGraw-Hill Book Company.
2. K.N.Duggal, 2012, Elements of Environmental Engineering, S. Chand, New Delhi.
3. D. Srinivasan, 2009, Environmental Engineering, PHI, New Delhi.
4. Wark & Warner, Air Pollution- origin and control, Harper and Collins.
5. Tchobanoglous, G., H. Theisen and S. Vigil, 1993, Integrated Solid Waste Management, McGraw-Hill Inc. Singapore.

Annexure: I
BOS : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
-	3	3	40	20 (Camp)	40	100

CONTENTS
OMITTED MEASUREMENT: **Experiment No:1.**   To determine the length and bearing of one side in a closed traverse.   **Experiment No:2.**   To determine the length of one side and bearing of another adjacent side in a closed traverse.
CURVES: **Experiment No:3.**   To set out the Simple circular curve by the method of offset from the chords Produced. **ExperimentNo:4.**   To set out the Simple Circular Curve by Rankin's method of tangential angles.   **ExperimentsNo:5.**   To set out Simple circular Curve by Rankin's Two theodolite method.   **ExperimentNo:6.**   To set out a compound Curve by Rankin's method.
Survey Camp Work.

DIPLOMA IN CIVIL ENGG
IV- SEMESTER
CONSTRUCTION TECHNOLOGY LAB
(BCE-492)

Annexure: I
BOS : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
-	4	3	60	-	40	100

CONTENTS
1. Identification & Demonstration of building materials and tools used in the construction work.   2. Construction of L-Junction with stretcher and header bonds.   3. Construction of L-Junction with one brick thick wall in English and Flemish bonds.   4. Construction of L-Junction with ½ brick thick wall in English and Flemish bonds.   5. Construction of L-Junction with 2 bricks thick wall in English and Flemish bonds.   6. Idea of earth quake resistant load bearing bricks masonry construction and R.C.C structures.   7. Demonstration of various mortars and cement concrete mixes, mixing, transportation, placement, compaction and curing and their methods.   8. Form work, centering & shuttering and their removal.   9. Demonstration of water supply fixtures and sanitary fittings.   10. Site Visits.

Annexure: I
BOS : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
-	2	3	30	-	20	50

CONTENTS
LIST OF EXPERIMENTS **TESTS ON STONE AGGREGATES** • To determine the crushing strength of stone aggregates • To determine the hardness of stone aggregates using Los Angeles abrasion test • To determine the toughness of stone aggregates using Aggregate Impact Test • To determine the Specific Gravity and water absorption of stone aggregates • To determine the stripping value of stone aggregates   **TESTS ON BITUMINOUS MATERIALS** • To Determine the Consistency of Bituminous Materials • To determine the ductility of Bitumen Binder • To determine the softening point of Bitumen using Ring and Ball Test   **FOR DEMONSTRATION** • Benkelman Beam Test • California Bearing Ratio Test

DIPLOMA IN CIVIL ENGG
V- SEMESTER
STRUCTURAL DESIGN-II
(BCE-501)

Annexure: I
BOS : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
4	-	3	10	15	75	100

	CONTENTS	
Unit-1	**SLABS:** One-way and two way slab. Design of rectangular, square and circular slabs with corners free and held down. Provision of reinforcement in slabs.	**25%**
Unit-II	**COLUMNS:** Column and its types. Design of axially loaded column with lateral ties and helical reinforcements. **FOOTINGS:** Footing and its types. Footings used for residential buildings. Design of isolated column footings for square, rectangular and circular column footings	**25%**
Unit-III	**STAIRCASE:** Types of staircase. Design of stairs spanning horizontally and doglegged stairs. Reinforcement sketches. **Pre-stressed Concrete:** Assumptions and general principles of design. Pre-tension and post tension system. Analysis of beams with tendons placed at longitudinal centroidal axis and at an eccentricity, tendons with parabolic profile. Load balancing method. Losses of pre-stress.	**25%**
Unit-IV	**RIVETED CONNECTIONS:** Types of joints; failure of riveted joint; efficiency of joints; chain riveting and diamond riveting. Eccentric connections, simple problems **TENSION MEMBERS:** Common types of tension members. Net sectional area for angles and tees. Design of tension members single and built-up sections. **COMPRESSION MEMBERS:** Common types of Compression Member – Column and Structural Design of Compression members. Single and built-up sections. Design of lacings and battens.	**25%**

Annexure: I
BOS   : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
4	-	3	10	15	75	100

	CONTENTS	
Unit-1	**STRESSES AND STRAINS:** Introduction - Principle stresses and strains Graphical methods: Mohr's circle Distribution of shear stress in rectangular, circular, I and T section. **SLOPE AND DEFLECTION:** Computation of slope and deflection for simple cases of cantilever and simply supported beams for concentrated and uniformly distributed load by 1. Area moment method 2. Double integration method and 3. Macaulay's method	**20%**
Unit-II	**PROPPED BEAMS:** Prop reactions. Bending moment and shear force diagram for simple loading **FIXED BEAM:** Analysis of fixed beams. SFD and BMD for symmetrical, concentrated and uniformly Distributed load.	**20%**
Unit-III	**TORSION:** Torsion of circular shaft, torsional equation. Horse Power transmitted. **CONTINUOUS BEAM:** Analysis by Three-moment Theorem Method. SFD and BMD for symmetrical concentrated and uniformly distributed loads over full span.	**20%**
Unit-IV	**COMBINED DIRECT AND BENDING STRESS:** 1. Stress due to eccentric loads 2. Law of middle third 3. Application of Law of middle third for dams. **PORTAL FRAMES:** BM and SF and thrust for portals with static symmetrical loading.	**20%**
Unit-V	**THREE-HINGED ARCH:** Linear Arch, Eddy's theorem, BM, and Normal Thrust for parabolic, circular arch for Static loading. **INFLUENCE LINES:** **Introduction -** ILD for BM and SF for beams. Application of influence line diagram for determination of SF and BM due to concentrated and uniformly distributed load.	**20%**

DIPLOMA IN CIVIL ENGG
V - SEMESTER
IRRIGATION ENGINEERING
(BCE-503)

Annexure: I
BOS : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
4	-	3	10	15	75	100

	CONTENTS	
Unit-1	**HYDROLOGY**: hydrological cycle, precipitation, types of precipitation. Run off, surface run off, Infiltration, Percolation, Evaporation and Transpiration. Measurement of rainfall. Symons rain gauge, watershed and drainage, catchments area. Estimation of discharge by Dicken's Formula. **WATER REQUIREMENTS OF CROPS**: Crops and Crops Seasons. Sowing time, harve time, Command of canal, gross command area, culturable command area, intensity of Irrigation, base period, duty, delta, relation between duty and delta, kor period, kor depth, outlet discharge factor, problems.	20%
Unit-II	**METHODS OF IRRIGATION**: Natural, artificial, perennial and non-perennial Irrigation Lift and flow irrigation, surface irrigation, sub-surface irrigation and sprinkler Irrigation. **Canals:** Types of canals- Inundation and permanent canals. Main canals, branch Canals, distributory, water course. Outlet. Evaporation and seepage losses. Estimation of losses. Lining of canals, Advantages of lining, types of linings. Design of earthen channels by Kennedy's and Lacey's theories	20%
Unit-III	**HEAD WORKS:** Selection of the site, types of head works, schematic layout of head part of head works. **RIVER TRAINING WORKS:** Problems of alluvial rivers, purpose of river training. Type of river training works. Marginal embankment, guide banks, spur and cut off. **CROSS DRAINAGE WORKS:** Necessity, Selection of site. Types of cross drainage wor Aqueduct, siphon aqueduct, super passage, siphon, and level crossing.	20%
Unit-IV	**DAMS:** Purpose, Selection of site, type and typical section of gravity dam, buttress, arch and earthen dams. Causes of failure of gravity dams. **WELLS AND TUB-WELLS:** Advantages and disadvantages of well irrigation over canal irrigation. Bore and open wells. Types of wells-shallow and deep wells, strata chart, aquifers. Types of tube-wells	20%
Unit-V	**CANAL MASONRY WORKS**: Necessity of fall description of various types of falls, Design of Sarda Type on Bligh's Theory.	20%

Reference Books:-

1. Irrigation and water Power Engg.   B.C Punnia

2. Irrigation Engineering   S.K. Garg.

Annexure: I
BOS   : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
4	-	3	30	20	50	100

	CONTENTS	
Unit-1	Introduction: Definition, Importance. Duties of quantity surveyor. Types of estimates: Preliminary estimates, Plinth area estimate, Cubic rate estimate, Estimate per unit base. Detailed estimates: Definition, Stages of preparation. Measurement: Units of measurement for various items of work as per BIS: 1200, Rules For measurements.	**20%**
Unit-II & III	**Calculation of quantities of items from Drawings:** Methods of calculation of quantities of items: 1. Long wall and short wall method 2. Centre line method **Details of measurements & calculation of quantities of various items of work for:** 1. A small residential building with continuous wall footings 2. RCC work in beams, slabs, columns and lintels (including bar bending schedule) 3. A small RCC framed building 4. A steel roof truss 5. A septic tank with a soak pit 6. A single span RCC slab culvert 7. WBM road 8. RCC/CC road **9.** Arches	**40%**
Unit-IV	Analysis of Rates: Definition, market survey, analysis of rates for various items of work involved in the Above solved problems. Schedule of rates, DSR and CPWD schedule of rates. Abstract of cost.	**20%**
Unit-V	Material statements for the above solved problems.	**20%**

Reference Books:-

1.   Pasrija, H. D., Arora, C. L. and S. Inderjit Singh, "Estimating, Costing and Valuation (Civil)". New Asian Publishers, Delhi.
2.   Rangwala, B. S.; "Estimating and Costing". Anand, Charotar Book Stall.
3.   Kohli, D; and Kohli, R. C.; "A Text Book on Estimating and Costing (Civil) with Drawings". Ramesh Publications, Ambala.
4.   Chakraborti, M; "Estimating, Costing and Specification in Civil Engineering". Calcutta.
5.   Dutta, B. N.; "Estimating and Costing".
6.   Amarjit Agarwal & A. K. Upadhyaya; "Civil Engg Estimating Costing & Valuation".
7.   Birdie, G. S., "Text Book on Estimating and Costing". Dhanpat Rai & Sons, New Delhi.
8.   BIS: 1200
9.   Jagjit Singh, "Estimating & Costing in Civil Engineering".

Annexure: I
BOS   : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
4	-	3	10	15	75	100

	CONTENTS	
Unit-1	**PRINCIPLE OF MAINTENANCE:** Introduction, types of Maintenance, causes which necessitate the maintenance, inspection of building, routine building maintenance, maintenance items for up keeping the building, determination of approximate strength of structural members of old building and age of old building.	**20%**
Unit-II	**STONE AND BRICKS MASONRY MAINTENANCE:** Causes and remedial measures of dampness and efflorescence. Investigation causes, remedial measures of structural cracks in load bearing walls including infill wall, small and Large Cracks.	**20%**
Unit-III	**REPAIR AND RETROFIT:** Introduction, repair, rehabilitation and retrofit, condition assessment of existing buildings, Local and global retrofit strategies, flow chart of a retrofit programme, repair materials.	**20%**
Unit-IV	**RETROFIT OF NON ENGINEERED AND MASONRY BUILDING:** General defects strengthening of foundation, wall and pillars. **RETROFIT OF REINFORCED CEMENT CONCRETE BUILDING:** Local and Global deficiencies, strengthening a wall using concrete, retrofit of foundation, techniques for steel and concrete jacketing of columns and beams.	**20%**
Unit-V	**GENERAL REPAIR CASES IN A BUILDING:** Replacement of broken W.C. Seat and P-trap, batch repair for plaster, leakage through the roof, defects of floor and repair, maintenance of house pipe line and drainage system, sewer maintenance, cleaning of chocked residential sewer line. **SAFETY IN MAINTENANCE:** Safety precaution prior to and during dismantling, dismantling sequence, dismantling of wall and floor.	**20%**

Reference Books:-
1. **Building repair and maintenance Management: P.S. Gahlot, Sanjay Sharma, CBS Publishers & Distributor Pvt. Ltd.**
2. **Maintenance & Repair of Civil Structures:- B.L. Gupta Amit Gupta, Standard Publisher Distributors.**
3. **Handbook on Seismic retrofit of building, C.P.W.D. I.B.C., IIT Madsras, Narosa publishing house.**
4. **Maintenance and repair of building; P.K. Guha, New Central book agency (p) Ltd.**
5. **A manual on maintenance engineering: B.S. Nayak Khanna Publihser.**

Annexure: I
BOS : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
-	4	3	60	-	40	100

CONTENTS

LIST OF EXPERIMENTS

1. Tensile Test
2. Compression Test
3. Hardness Test
4. Impact Value Test
5. Bending Moment
6. Deflection of Beam
   - Simply Supported Beam
   - Fixed Beam
7. Three Hinge Arches
8. Portal Frame
9. Influence Line Diagrams

DIPLOMA IN CIVIL ENGG
V- SEMESTER
CONCRETE LAB
(BCE-592)

Annexure: I
BOS : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
-	4	3	60	-	40	100

CONTENTS

TESTS ON CEMENT:
- Fineness of Cement
- Normal Consistency
- Setting Time
- Tensile Strength
- Compressive Strength
- Soundness of Cement

TESTS ON AGGREGATES
- Sieve Analysis
- Fineness Modulus
- Zonal Classifications

TESTS ON FRESH CONCRETE
- Slump Test
- Compaction Factor Test
- Vee Bee Test

TESTS ON HARDEN CONCRETE
- Compression Test
- Effect of W/C ratio On the Strength Of concrete
- Permeability Test

CONCRETE MIX DESIGN

| Annexure: I |
| BOS : 12.02.2013 |

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
-	2	3	30	-	20	50

CONTENTS

PROJECT PROBLEM:

Selection of project problem on different type of Civil Engineering Work, preliminary site visit, planning, feasibility studies.

Seminar presentation on project problem.

Project topic selection shall be based on procedure defined in Annexure – A.

| Annexure: I |
| BOS : 12.02.2013 |

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
-	2	3	30	-	20	50

CONTENTS

TOPIC: AUTO CAD COMMANDS AND MASONRY BUILDING DRAWINGS

- Learning of AutoCAD Commands
- Single Storeyed residential masonry building with load bearing walls.
  - General idea about double line plan, terrace plan, site plan, key plan, front elevation, sectional elevation, foundation details
- Double storeyed residential masonry building with load bearing walls.
  - General idea about double line plan, first floor plan, terrace plan, site plan, key plan, front elevation, sectional elevation, foundation details

Annexure: I
BOS   : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
4	-	3	10	15	75	100

	CONTENTS	
Unit-1	**Introduction:** Definition of Soil and Soil Mechanics. Soil Formation. Transported and Residual Soils. Soils of India. Importance of Soil Mechanics in Civil Engineering. **Weight Volume Relationship:** Constituents of Soils. Phase Diagram. Definitions' of void ratio, porosity, degree of saturation, moisture content, specific gravity, unit weight, density index, air content. Derivations of Functional relationships. Atterberg's Limits (Liquid, Plastic and Shrinkage Limits).	**20%**
Unit-II	**Soil Classification and Identification:** Particle size and shape and their effect on engineering properties of soil. Field identification test for coarse grained and fine grained soils. Indian Standard Soil Classification System. **Flow of Water through Soils:** Darcy's Law. Laboratory determination of Permeability of Soil. Factors affecting Permeability. Average Permeability of Stratified Soil Mass. Coefficient of Permeability of different types of soils.	**20%**
Unit-III	**Stresses in Soils:** Free Water. Structural Water. Effective Stress. Neutral Stress. Total Stress. Principle of Effective Stress. **Earth Pressure:** Active and Passive earth pressure.	**20%**
Unit-IV	**Compaction and Consolidation:** Definition and concept of Compaction. Factors affecting Compaction. Laboratory Compaction Tests. Definition of Optimum Moisture Content (OMC). Maximum Dry Density. Moisture – Dry Density relationship for typical Soils with different Compactive Efforts. Definitions and types of consolidation. Excess Pore pressure. **Shear Strength:** Importance of determination of shear Strength. Definition of: Cohesion, Angle of Internal Friction, Angle of Repose. C, F and C-F Soils. Coulomb's Equation.	**20%**
Unit-V	**Bearing Capacity:** Concept of Ultimate Bearing Capacity. Safe Bearing Capacity. Allowable Bearing Capacity. Factors affecting Bearing Capacity. Definition of Shallow and Deep Foundations. Introduction of Terzaghi's Bearing Capacity Equation and basic numerical.	**20%**

Reference Books:-
1.Soil Mechanics and Foundation Engineering By B.C. Punia

DIPLOMA IN CIVIL ENGG
VI - SEMESTER
CONSTRUCTION MANAGEMENT
(BCE-602)

| Annexure: I |
| BOS : 12.02.2013 |

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
4	-	3	10	15	75	100

	CONTENTS	
Unit-1	**INTRODUCTION:** Signification, main objectives & functions of construction management, Classification & stages in construction. The construction team: Owner, Engineer & Contractor. Recourses for construction: Men, Machine, Materials, Money & Management. **CONSTRUCTION PLANNING:** Objective, principles advantages, analysis, limitation and stages of planning for construction projects. **CONSTRUCTION SCHEDULING:** Preparation of construction schedule for labour, material, machine & finance.	**20%**
Unit-II	**PROJECT MANAGEMENT - I:** Introduction to network techniques Inter relationship of events, activities. Fulkerson's rule for numbering events. Time estimates. Slack difference between PERT & CPM. Analysis of CPM network. Indentifying critical activities and critical path. **SITE ORGANIZATION:** Principle of storing and stacking of the materials at site location of equipment, urgent labour at site.	**20%**
Unit-III	**PROJECT MANAGEMENT - II:** Float: Different types of floats calculation of float in a network. **CONTROL OF PROCESS:** Project supervision. Method of recording progress. Analysis of progress. Taking corrective action during control of progress. **ENTREPRENEURSHIP:** Entrepreneur, function & quality of entrepreneur. **PURCHASE DEPARTMENT:** Objectives, activities, duties & functions of purchase department.	**20%**
Unit-IV	**TIME COST OPTIMIZATION:** Direct, indirect, and total project cost. Normal & crash cost & time. Cost – time optimization through CPM techniques for simple jobs. **ACCIDENT & SAFETY IN CONSTRUCTION:** definition of accident terms: Partial & total disablement, Injury frequency rate, injury severity rate. Causes of accidents: remedies to avoid accidents. Accident prevention. Importance of safety. Safety measures for storage & handling of building material, construction elements of a building: excavation, drilling & blasting, hot bituminous work, scaffolding ladders, form work, demolition. **CONSTRUCTION LABOUR:** Important provision of the following (as amended). Trade Union act 1926, labour welfare fund Act 1936, Payment of wages act 1936, minimum wages Act 1948. Workers compensation Act 1923, Contract labour (Regulation & Abolition) Act 1970.	**20%**
Unit-V	**MANAGEMENT OF CONSTRUCTION:** introduction, factors affecting selection of construction equipment. Planning of infra structure for mechanization. **MATERIAL MANAGEMENT:** Importance, objectives, functions and uses of materials management. **CONSTRUCTION DISPUTES & THEIR SETTLEMENT:** Introduction, categories of disputes, modes of settlement of disputes.	**20%**

DIPLOMA IN CIVIL ENGG
VI- SEMESTER
EARTHQUAKE ENGINEERING
(BCE-603)

Annexure: I
BOS   : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
3	-	3	10	15	75	100

	CONTENTS	
Unit-1	Introduction of earthquake, continental drift theory, focus, epicenter and focal depth of an earthquake, magnitude and intensity of earthquake, earthquake waves, effects of earthquakes, earthquake recording instruments	**20%**
Unit-II	Phenomenon of earthquake, scientific importance of earthquake, Storey drift, difference between wind and earthquake forces, lesson learnt from past earthquakes, earthquake resistant design of structures	**20%**
Unit-III	Major past earthquakes occurred inside and outside India, general consideration of shape of the building, weak and soft storey, preventive measures before, during and after earthquake	**20%**
Unit-IV	Guidelines of earthquake resistant low strength masonry buildings, General principles in construction of earthquake resistant buildings, introduction to shear wall, portal frames, space frames, seismic zones	**20%**
Unit-V	Hoop, crosstie, lap, splices in beams, anchorage of beam bars in an external joints, beam-web reinforcement, transverse reinforcement in columns, special confining reinforcement in beams, columns, footing and columns under discontinued wall	**20%**

Annexure: I
BOS   : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
4	-	3	30	20	50	100

	CONTENTS	
Unit-I & I1	Calculation of quantities of earth work using different methods (Mean area, Mid area & Prismoidal formula) for: • Road • Railway embankments • Irrigation Canals	**40%**
Unit-III	**Valuations:** Introduction. Purpose of valuation, Principles of valuation**.** Definition of various terms related to valuation like Gross Income, Net Income, Outgoings, scrap, salvage market and Book values, depreciation, sinking fund, year's purchase (Y.P.) etc. Methods of valuation: • Replacement cost method • Rental return method	**20%**
Unit-IV	**Contract System & Mode of Payments/Bills** Introduction, Contract, Contractor, Qualities of a good contractor. Types of contracts, their advantages, disadvantages and suitability, earnest money, security deposit, Mode of Payments. • Types of contracting firms/construction companies. • Types of Bills	**20%**
Unit-V	Introduction**,** Tender form, Tender documents, Tender notice, submission of tender, opening of tenders, scrutiny of tenders, comparative statement of tenders, acceptance of tenders. Specimen form of letter accepting the tender. Informal tender, unbalanced tender. Exercise on preparing tender documents for the construction of the works/project for which the quantities of items were calculated in V-Semester. Detailed Specifications for various items associated with civil construction works.	**20%**

Reference Books:-

1. Pasrija, H. D., Arora, C. L. and S. Inderjit Singh, "Estimating, Costing and Valuation (Civil)". New Asian Publishers, Delhi.
2. Rangwala, B. S.; "Estimating and Costing". Anand, Charotar Book Stall.
3. Kohli, D; and Kohli, R. C.; "A Text Book on Estimating and Costing (Civil) with Drawings". Ramesh Publications, Ambala.
4. Chakraborti, M; "Estimating, Costing and Specification in Civil Engineering". Calcutta.
5. Dutta, B. N.; "Estimating and Costing".
6. Amarjit Agarwal & A. K. Upadhyaya; "Civil Engg Estimating Costing & Valuation".
7. Birdie, G. S., "Text Book on Estimating and Costing". Dhanpat Rai & Sons, New Delhi.
8. BIS:1200 & 9. Jagjit Singh, "Estimating & Costing in Civil Engineering".

DIPLOMA IN CIVIL ENGG
VI- SEMESTER
HYDRAULIC STRUCTURES
(ELECTIVE COURSE)
(BCE-605A)

Annexure: I
BOS   : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
3	-	3	10	15	75	100

	CONTENTS	
Unit-I&11	Creep theories; Bligh's theory, Lanes theory and Khosla theory. Problems of pressure calculations, corrections, thickness of floor and exit gradient. Barrage: dimensional sketch, components and working. Hydraulic design of head regulator and guide bund.	**40%**
Unit-III	Dams: Introduction, Classification: according to use, according to Hydraulic design, according to material. Gravity dams, Arch dams, Buttress dams, Timber dams, Earth dams. Physical factors governing selection of type the dams, Selection for a site for a dam, Introduction, Forces acting on gravity dams, Water pressure, Weight of the dam, Uplift pressure, Elementary profile of a gravity dam, Practical profile of a gravity dam, Limiting height of a gravity dam, high and low gravity dam.	**20%**
Unit-IV	Reservoir: Introduction, Investigation for reservoir planning, Selection of storage for a reservoir, Zones of storage in a reservoir, Calculation of reservoir capacity for a specified yield, Determination of safe yield from a reservoir of a given capacity, Sediment flow in streams: reservoir sedimentation, Reservoir sediment control, Reservoir sedimentation, live and dead storage, methods of checking sedimentation. Hydrograph, unit hydrograph, stability criteria of gravity dams, safety sliding, overturning and crushing.	**20%**
Unit-V	Various types of cross drainage works, Hydraulic design of aqueduct and siphon aqueduct, the various forces of acting on the dam, Selection of suitable type of cross drainage work, Feature of designing of cross drainage work, Fixation of waterway of the drain, Clearance and freeboard: IS code recommendations.	**20%**

DIPLOMA IN CIVIL ENGG
VI- SEMESTER
INDUSTRIAL POLLUTION & CONTROL
(ELECTIVE COURSE)
(BCE-605B)

Annexure: I
BOS   : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
3	-	3	10	15	75	100

	CONTENTS	
Unit-1	Characterization of liquid waste, industrial waste survey, sampling and material balance, segregation and equalization; Disposal of waste in environment, effects on land and receiving waters, disposal standards.	**20%**
Unit-II	Wastewater treatment, physical, chemical, and biological processes Wastewater reclamation, and reuse in industry.	**20%**
Unit-III	Pollution abatement in major industries: Textile, Paper and Pulp, Steel, Sugar, Distillery, Petroleum Refinery, Agro based industries, Food Processing Industries, Slaughterhouses, Tanneries.	**20%**
Unit-IV	Attached and suspended growth Aerobic and Anaerobic wastewater treatment processes their basic process design, mass balance. Nitrification and denitrification processes.	**20%**
Unit-V	Industrial solid waste: Sources, Classification and Characteristics, Management of Industrial solid waste, Material and energy recovery, Hazardous Solid waste, Methods of Disposal of Hazardous wastes: Incineration and Pyrolysis.	**20%**

Reference Books:-

1. S.P.Mahajan , Pollution control in industries, Tata McGraw Hill Company.

2. Rao & Dutta, Wastewater Treatment, Oxford & IBH Publishers.

3. Wark & Warner, "Air Pollution- origin and control, Harper and Collins.

4. S.C. Bhatia, 2003, Managing Industrial Pollution, McMillan India Ltd.

DIPLOMA IN CIVIL ENGG
VI - SEMESTER
ADVANCE CONSTRUCTION TECHNOLOGY
(ELECTIVE COURSE)
(BCE-605C)

Annexure: I	
BOS : 12.02.2013	

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
3	-	3	10	15	75	100

	CONTENTS	
Unit-1	Construction equipments: Selection of construction equipment, excavation and transportation equipment, hoisting equipment, conveying and hauling equipment. Soil stabilization and compaction equipments; Mixers, dewatering equipment; Economic life of construction equipment.	**20%**
Unit-II	Drilling blasting & tunnelling equipments: Explosives: Types, storage, transportation, handing & precautions of explosives, Drilling operation, stemming of bore holes, Detonators, firing the holes. Tunnelling: Types, location; alignment and grade of tunnels; dewatering & ventilation of tunnels: rock stabilization.	**20%**
Unit-III	High rise buildings: Contractions techniques for high rise building e.g. chimneys & cooling towers. Special problems of high rise constructions. Advantages of high risk buildings. Vaastu: Vaastu in construction & its benefits. Vaastu for residential & public buildings. Rain water harvesting: Importance & methodology of rain water harvesting. Concrete under special conditions: Placing of concrete in hot and cold weather. Concerting under water. Advantages, preparation & transportation of ready mix concrete.	**20%**
Unit-IV	Prefabrications: Introduction, advantages and disadvantages, classification and planning requirement in prefabricated construction. Few types of prefabricated elements. Special Foundation: Foundation on reclaimed and expensive soil. Foundation grouting purpose, material used for grouting; Asphalt & Chemical Grouting. Environmental issues in construction: Pollution due to thermal & nuclear power plants. Industrial Pollution: Sewage & Chemical Effluents	**20%**
Unit-V	Fabrication Processes: Meaning & need of fabrication, welding, casting, riveting, threaded jointed. Organization of large structural components: Different departments involved & their welding. Fabrication stops groaning: difference between general drawing & shop drawing. Meaning of templates & their importance. Erection of Steel structures: Meaning & need of erection of steel structures. Erecting equipments, methods & precaution.	**20%**

Annexure: I
BOS : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
3	-	3	10	15	75	100

	CONTENTS	
Unit-1	• Entrepreneurship - Concept/Meaning, Need, Competencies/qualities of an entrepreneur • Entrepreneurial Support System District Industry Centres (DICs), Commercial Banks, State Financial Corporations, Small Industries Service Institutes (SISIs), Small Industries Development Bank of India (SIDBI), National Bank for Agriculture and Rural, Development (NABARD), National Small Industries Corporation (NSIC), and other relevant institutions/organizations at State level.	**25%**
Unit-II	• Market Survey and Opportunity Identification (Business Planning) - How to start a small scale industry, Procedures for registration of small scale industry, List of items reserved for exclusive manufacture in small scale industry, Assessment of demand and supply in potential areas of growth, Understanding business opportunity, Considerations in product selection, Data collection for setting up small ventures. • Project Report Preparation - Preliminary Project Report, Techno-Economic feasibility report, Project Viability.	**25%**
Unit-III	• Managerial Aspects of Small Business - Principles of Management (Definition, functions of management viz planning, organisation, coordination and control, Operational Aspects of Production, Basic principles of financial management, Marketing Techniques, Personnel and Inventory Management, Importance of Communication in business. • Legal Aspects of Small Business - Elementary knowledge of Income Tax, Sales Tax, Patent Rules, Excise Rules, Factory Act and Payment of Wages Act.	**25%**
Unit-IV	• Environmental considerations - Concept of ecology and environment, Factors contributing to Air, Water, Noise pollution, Air, water and noise pollution standards and control, Personal Protection Equipment (PPEs) for safety at work places. • Miscellaneous - Human and Industrial Relations, Human relations and performance in organization, Industrial relations and disputes, Relations with subordinates peers and superiors, Labour welfare, Workers participation in management.	**25%**

RECOMMENDED BOOKS
1. **A Handbook of Entrepreneurship, Ed. by BS Rathore and Dr JS Saini; Aapga Publications, Haryana.**
2. **Entrepreneurship Development by CB Gupta and P Srinivasan; Sultan Chand and Sons, New Delhi**

3. **Environmental Engineering & Management by Suresh K Dhamija; SK Kataria & Sons, New Delhi**
4. **Sharma BR, Environmental and Pollution Awareness; Satya Prakashan, New Delhi**
5. **Thakur Kailash, Environmental Protection Law and policy in India; Deep and Deep Pub., New Delhi**
6. **Handbook of Small Scale Industry by PM Bhandari**
7. **Marketing Management by Philip Kotler, Prentice Hall of India, New Delhi**
8. **Total Quality Management by Dr DD Sharma, Sultan Chand and Sons, New Delhi**
9. **Principles of Management by Philip Kotler TEE Publication**

DIPLOMA IN CIVIL ENGG
VI- SEMESTER
SOIL MECHANICS LAB
(BCE-691)

Annexure: I
BOS : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
-	4	3	60	-	40	100

CONTENTS

LIST OF EXPERIMENT:

1. To classify the given sample of course grained soil .

2. To determine the in-situ density of soil by core cutter method.

3. To determine the specific gravity of the given soil particles, using pycnometer /Density bottle.

4. To determine the optimum Moisture content (OMC)and maximum dry density of a given soil sample.

5. To determine the liquid limit of a given soil by Casagrande's liquid limit apparatus.

6. To determine the plastic limit of a given soil sample.

7. To determine the shrinkage limit of a given soil sample.

FOR DEMONSTRATION ONLY:

1. Coefficient of Permeability using (a) Constant head Permeability Test (b) Falling head permeability Test.

2.Standard Penetration Test (STP)

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
-	3	3	60	-	40	100

CONTENTS
LIST OF EXPERIMENTS

1. Determination of height of the given object using tangential method (base accessible/base not accessible).

2. Determination of height of the given object using Total Station (Remote Height).

3. Determination of the slope of the given line AB by stadia /Tangential method.

4. Determination of the slope of the given line AB by Total Station (Tie Distance).

5. Determination of area of the given closed traverse using Transit Theodolite & tape and plotting of the traverse by latitude & departure method.

6. Determination of area of the given closed traverse using Total Station.

7. Solution of three point problem in hydrographic survey using Theodolite.

8. Layout of simple circular curve by perpendicular offsets from long chord.

9. X-sectioning & L-sectioning of the given existing road by Auto /Dumpy Level & calculation of materials for the proposed/modified section using MS Excel.

10. Preparation of the Topographical Map of the given area by taking the co-ordinates by Total Station (Surveying).

11. Preparation of contour map of the given area using Pythagoras software.

12. Calculation of the materials of Experiment No. 9 using Pythagoras software.

DIPLOMA IN CIVIL ENGG
VI- SEMESTER
PROJECT & CAMP
(BCE-693)

Annexure: I
BOS   : 12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
-	3	3	80	20 (Camp)	50	150

CONTENTS

PROJECT WORK AND DETAILED REPORT :

Development of a detailed project document including data collection, planning, design, estimation, analysis of rates, drawings and detailing etc whichever applicable.

Extensive field work as per requirement.

Submission of detailed project report.

DIPLOMA IN CIVIL ENGG
VI-SEMESTER
CAD LAB-II
BCE-694

Annexure: I
BOS   :   12.02.2013

Pds./Week		Duration of Exam.	Max. Marks			
L	P	Hours	Course Work	Mid-Sem. Exam.	End-Sem. Exam	Total
-	4	3	60	-	40	100

CONTENTS

TOPIC: PLAN AND REINFORCEMENT DETAILING OF RC BUILDINGS

- RC beams and slabs

- RC columns and foundations

- RC staircase

- Overhead water tanks: Intze tank

- Slab culvert