STATE COUNCIL OF TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

TEACHING AND EVALUATION SCHEME FOR DIPLOMA IN ENGINEERING COURSES

DISCIPLINE: CIVIL ENGINEERING												**SEMESTER: 3RD**
SL NO	**SUBJECT CODE**	**SUBJECT**	**PERIODS**			**EVALUATION SCHEME**						
			L	**T**	**P**	**INTERNAL EXAM**			**END SEM EXAM**	**TERM WORK**	**PRACTICAL EXAM**	**TOTAL MARKS**
						TA	**CT**	**Total**				
THEORY												
1.	CET 301	MECHANICS OF MATERIAL	5			10	20	30	70			100
2.	CET 302	FLUID MECHANICS & HYDRAULIC MACHINES	4			10	20	30	70			100
3.	CET 303	SURVEY-I	4			10	20	30	70			100
4.	CET 304	CIVILENGINEERING MATERIAL	4			10	20	30	70			100
5.	CET 305	CONSTRUCTION TECHNOLOGY	4			10	20	30	70			100
PRACTICAL/TERM WORK												
6.	CEP 301	CIVIL ENGG. LAB-I	-	-	6					25	50	75
7.	CEP 302	SURVEY PRACTICE-I	-	-	6					25	50	75
8.	CEP 303	CIVIL ENGG. DRAWING-I*	-	-	6				50	50		100
GRAND TOTAL			**21**		**18**	**50**	**100**	**150**	**400**	**100**	**100**	**750**

Total Contact hours per week: 39

Abbreviations: L-Lecture, T-Tutorial, P-Practical, TA- Teacher's Assessment, CT- Class test

Minimum Pass Mark in each Theory Subject is 35% and in Practical subject is 50%

* Minimum pass mark in End Sem Exam is 35% & that in term work is 50%

*End Examination of Civil Engineering Drawing-I will be conducted for a time duration of two hours with question supplied by the SCTE&VT and evaluation will also be done by SCTE&VT, Odisha.(Pass marks 35%)

MECHANICS OF MATERIALS

Name of the Course: Diploma in Civil Engineering			
Course code:	CET 301	Semester	3rd
Total Period:	75(60L+15T)	Examination	3 hrs
Theory periods:	5P/week	Class Test:	20
Tutorial:	0P/week	Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

COURSE CONTENTS:

Chapter	Name of topics	Hours
1	**REVIEW OF BASIC CONCEPTS** **1.1 Introduction:** Basic Principle of Mechanics: Force, Moment, Equilibrium, Conditions of equilibrium, Body constraints – Free body diagram	3
2	**GEOMETRICAL PROPERTIES OF SECTIONS** **2.1 Centroid:** Geometrical properties – Definitions and examples of Symmetrical, AntiSymmetrical, Asymmetrical shapes - Definitions of centre of gravity and centroid - Centroid of Symmetrical shapes (solid / hollow square, rectangular, circular, I Sections) - Centroid of Asymmetrical shapes (triangular, semi circular, quadrant, trapezoidal, parabolic sections) - Centroid of Anti Symmetric shapes (S , Z sections) – Built up structural sections – Problems **2.2 Moment of inertia:** Definitions of: Inertia, Moment of Inertia, Polar moment of inertia, Radius of gyration, Section Modulus, Polar modulus - Parallel and perpendicular axes theorems - Derivation of expressions for M.I / Polar M I, Section modulus and Radius of gyration of regular geometrical plane sections (rectangle, circle, triangle) – M.I about centroidal axis / base, Section modulus, Radius of gyration of symmetric, asymmetric, anti symmetric and built up sections – Numerical problems.	10
3	**SIMPLE STRESSES AND STRAINS** **3.1 Introduction to stresses and strains:** Study of strength of material - Mechanical properties of materials – Rigidity, Elasticity, Plasticity, Compressibility, Hardness, Toughness, Stiffness, Brittleness, Ductility, Malleability, Creep, Fatigue, Tenacity, Durability - Definitions of stress and strain - Types of stresses -Tensile, Compressive and Shear stresses - Types of strains - Tensile, Compressive and Shear strains - Complimentary shear stress - Diagonal tensile / compressive - Stresses due to shear - Elongation and Contraction - Longitudinal and Lateral strains - Poisson's Ratio - Volumetric strain –computation of stress, strain, Poisson's ratio, change in dimensions and volume etc- Hooke's law - Elastic Constants - Definitions of: Young's Modulus of Elasticity – Shear modulus (or) Modulus of Rigidity – Bulk Modulus (or) Modulus of Compressibility - Derivations for the relationship between elastic constants - Simple problems - Young's modulus values of few important engineering materials - Numerical problems **3.2 Application of stress and strain in engineering field:** Behaviour of ductile and brittle materials under direct loads – Stress Strain curve of a ductile material - Limit of proportionality, Elastic limit, Yield stress, Ultimate stress, Breaking stress, Actual - Nominal stresses - Working stress - Factor of safety – Percentage elongation -	20

	Percentage reduction in area - Significance of percentage elongation and reduction in area of cross section - Deformation of prismatic, stepped and linearly varying cross-sections bars due to uniaxial load - Deformation of prismatic bars due to its self weight – Temperature stress - Composite Sections – Examples of composite sections in engineering field- Advantages - Assumptions made – Principles of analysis of Composite sections - Modular ratio – Equivalent area - Stresses in the materials - Problems on axially loaded composite sections like RC.C / Encased columns - Numerical problems.	
4	**SHEAR FORCE AND BENDING MOMENT** **4.1 Types of loads and beams:** Concept of Axial load, Transverse load, Concentrated (or) Point load, Uniformly Distributed load (UDL), Varying load – Types of Supports and Reactions: Simple support, Roller support, Hinged support, Fixed support; Vertical reaction, Horizontal reaction, Moment reaction- Types of Beams based on support conditions- Diagrammatic representation of beams, loads and supports– Static equilibrium equations – Determinate and indeterminate beams. **4.2 Shear force and bending moment in beams:** Shear Force and Bending Moment – Conventional signs used for S.F. and B.M – S.F and B.M of general cases of determinate beams – S.F and B.M diagrams for Cantilevers, Simply supported beams and Over hanging beams – Position of maximum BM - Point of contra flexure – Derivation of Relation between intensity of load , S.F and B.M. – Numerical problems on S.F and B.M.(Determinate beams with concentrated loads and udl only)	**10**
5	**STRESSES IN BEAMS AND SHAFTS** **5.1 Stresses in beams due to bending:** Bending stress in beam – Theory of simple bending – Assumptions – Moment of resistance – Derivation of flexure/bending equation– Bending stress distribution – Curvature of beam – Position of N.A and centroidal axis – Stiffness equation – Flexural rigidity – Strength equation – Significance of Section modulus – Numerical problems. **5.2 Shear stresses in beams :** Shear stress distribution in beams of rectangular, circular and standard sections symmetrical about vertical axis **5.3 Stresses in shafts due to torsion:** Concept of torsion - Basic assumptions of pure torsion - torsion of solid and hollow circular sections - polar moment inertia - torsional shearing stresses - angle of twist - torsional rigidity - Derivation of Torsion equation -- Power transmitted by a shaft - Numerical problems. **5.4 Combined bending and direct stresses:** Direct and Indirect stresses – Combination of stresses – Eccentric loads on Columns – Effects of Eccentric loads / Moments on Short columns – Combined direct and bending stresses – Maximum and Minimum stresses in Sections– Problems – Conditions for no tension – Limit of eccentricity – Middle third rule – Core or Kern for square, rectangular and circular sections – Chimneys subjected to uniform wind pressure –Combined stresses in Chimneys due to Self weight and Wind load- Chimneys of hollow square and hollow circular cross sections only	**20**
6	**COMPEX STRESSES AND STRAINS** **6.1 Principal stresses and strains:** Occurrence of normal and tangential stresses - Concept of Principal stress and Principal Planes – major and minor principal stresses and their orientations – stresses on a given plane –shear and normal stress components on any inclined plane – Mohr's circle and its use in solving problems on complex stresses - Numerical problems	**12**

Learning Resources			
Text Books			
Sl. No	**Name of Authors**	**Titles of Book**	**Name of Publisher**
1	R.Subramanian	Strength of Materials	
2	R. K. Rajput.	Strength of Materials	
3	S.Ramamrutham	Engineering Mechanics & Strength of Materials	
4	R.S. Khurmi.	Strength of Materials	
5	Dr. Sadhu Singh	Strength of Materials	
6	R.K. Bansal	Engineering Mechanics & Strength of Materials	
REFERRENCE BOOKS:			
1	G. H. Ryder	Strength of Materials	
2	S.P. Timoshenko, D.H.Young	Elements of Strength of material	
3	James Gere & Goodno	Strength of Materials	

FLUID MECHANICS & HYDRAULIC MACHINES

Name of the Course: Diploma in Civil Engineering			
Course code:	CET 302	Semester	3rd
Total Period:	60(60L)	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Tutorial:		Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

COURSE CONTENTS:

Chapter	Name of topics	Hours
1	**1.0 HYDROSTATICS:** 1.1 **Properties of fluid:** density, specific gravity, surface tension, capillarity, viscosity and their uses 1.2 **Pressure and its measurements:** intensity of pressure, atmospheric pressure, gauge pressure, absolute pressure and vacuum pressure; relationship between atmospheric pressure, absolute pressure and gauge pressure; pressure head; pressure gauges **1.3 Pressure exerted on an immersed surface:** Total pressure, resultant pressure, expression for total pressure exerted on horizontal & vertical surface. 1.4 **Floatation and buoyancy:** Archimedes principle, buoyancy & center of buoyancy, center of pressure, metacenter, metacentric height, numerical problems.	**25**
2	**2.0 KINEMATICS OF FLUID FLOW:** **2.1 Basic equation of fluid flow and their application:** rate of discharge, equation of continuity of liquid flow, total energy of a liquid in motion- potential, kinetic & pressure, Bernoulli's theorem and its limitations. Practical applications of Bernoulli's equation. **2.2 Flow over Notches:** notch, types of notches, discharge through different types of notches and their application.(No Derivation) **2.3 Flow over Weirs:** weir and difference with notches, types of weirs, discharge formulae for different types of weirs and their application.(No Derivation) **2.4 Types of flow through the pipes:** uniform and non uniform; laminar and turbulent; steady and unsteady; Reynold's number and its application	**30**

	2.5 Losses of head of a liquid flowing through pipes: due to friction(statement of Darcy's equation), sudden enlargement, sudden contraction, change of direction of flow, loss at inlet & exit (No derivation, only statement of formulae & their application), total energy lines & hydraulic gradient lines. **2.6 Flow through the Open Channels:** Types of channel sections rectangular, trapezoidal and circular, discharge formulae- Chezy's and Manning's equation, best economical section, phenomenon of hydraulic jump(only description and no derivation)	
3	**3.0 PUMPS:** **3.1 Type of pumps** 3.2 **Centrifugal pump:** basic principles, discharge, horse power of pump, efficiency of centrifugal pump, simple numerical problems 3.3 **Reciprocating pumps:** types, operation, discharge, calculation of horse power, efficiency, simple numerical problems	**5**

Learning Resources			
Text Books			
Sl. No	**Name of Authors**	**Titles of Book**	**Name of Publisher**
1	R.S.Khurmi	A Text Book ofHydraulics,Fluid Mechanics &Hydraulic machines	
2	Abdulla Sheriff	Hydraulics and fluid Mechanics	
3	Modi & seth	fluid Mechanics	
4	R K Bansal	fluid Mechanics	
5	Jagdish lal	A Text Book on Hydraulics	
REFERRENCE BOOKS:			
1	R.S.Khurmi	A Text Book ofHydraulics,Fluid Mechanics &Hydraulic machines	
2	Abdulla Sheriff	Hydraulics and fluid Mechanics	
3	Modi & seth	fluid Mechanics	
4	R K Bansal	fluid Mechanics	
5	Jagdish lal	A Text Book on Hydraulics	

SURVEY – I

Name of the Course: Diploma in Civil Engineering			
Course code:	CET 303	Semester	3rd
Total Period:	60(60L)	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Tutorial:		Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

COURSE CONTENTS:

Chapter	Name of topics	Hours
1	**1.0 INTRODUCTION** 1.1 Definition of surveying and related terms 1.2 Aims and objectives of surveying 1.3 Classification of surveying 1.4 Principles of surveying 1.5 Office work-features, plotting, scales, effect of erroneous scale 1.6 Precision and accuracy of measurements	03
2	**2.0 LINEAR MEASUREMENTS :** 2.1 Measurement of distance by tapes / chains 2.2 Instruments for measuring distance: 2.3 Tapes-types, description (demonstration in class/lab), purposes, suitability 2.4 Chains-types, description (demonstration in class/lab), purposes, suitability, merits and demerits 2.5 Errors and mistakes in linear measurement – classification, Sources of errors and remedies 2.6 Corrections to measured lengths due to-incorrect length, temperature variation, pull, sag, numerical problem applying corrections	05
3	**3.0 CHAINING:** 3.1 Equipment and accessories for chaining description (demonstration in class/lab), purpose 3.2 Use of chain – unfolding & folding, use of arrows, reading a chain, testing and adjustment of chain (demonstration in class/lab). 3.3 Ranging – Purpose, signaling, direct and direct ranging, Line ranger – features and	05

	use, error due to incorrect ranging. 3.4 Methods of chaining – Role of leader and follower, Chaining on flat ground, Chaining on sloping ground – stepping method, Clinometer-features and use, slope correction. 3.5 Setting perpendicular with chain & tape, Chaining across different types of obstacles – Numerical problems on chaining across obstacles	
4	**4.0 CHAIN SURVEYING :** 4.1 Purpose of chain surveying, Principles of chain surveying-well conditioned and ill conditioned triangles 4.2 Accessories in chain surveying – features and use 4.3 Field book – single line & double line, recording entry in Field Book 4.4 Reconnaisance survey – method, index map, reference sketch 4.5 Selection of survey stations, base line, tie lines, Check lines 4.6 Offsets – Necessity, Perpendicular and Oblique offsets, Setting offset with chain & tape, Instruments for setting offset – Cross Staff, Optical Square & their uses, merits & demerits, sources of error & remedies, limiting length of offsets. 4.7 Method of locating different objects 4.8 Plotting – selection of scale, conventional signs, plotting on drawing sheet from field book data. 4.9 Errors in chain surveying – compensating and accumulative errors causes & remedies, Precautions to be taken during chain surveying.	**12**
5	**5.0 ANGULAR MEASUREMENT :** a. Measurement of angles with chain & tape, with compass b. Compass – types – Surveyor's compass, Prismatic compass, features, parts, merits & demerits, suitability of different types, testing & adjustment of compass c. Designation of angles- concept of meridians – Magnetic, True, arbitrary; Concept of bearings – Whole circle bearing, Quadrantal bearing, Reduced bearing, suitability of application, numerical problems on conversion of bearings d. Use of compasses – setting in field-centering, leveling, taking readings, concepts of Fore bearing, Back Bearing, Numerical problems on computation of interior & exterior angles from bearings.	**05**

	e. Effects of earth's magnetism – dip of needle, magnetic declination, variation in declination, numerical problems on application of correction for declination. f. Errors in angle measurement with compass – sources & remedies, precaution during use of compass, maintenance of compass.	
6	**6.0 CHAIN AND COMPAS SURVEYING :** 6.1 Principles of traversing – open & closed traverse, advantages & disadvantages over chain surveying. 6.2 Methods of traversing – locating objects, field book entry. 6.3 Local attraction – causes, detection, errors, corrections, Numerical problems of application of correction due to local attraction. 6.4 Plotting of traverse – check of closing error in closed & open traverse, Bowditch's correction, Gales table 6.5 Errors in chain & compass surveying – sources & remedies, precautions during chain & compass surveying	**12**
7	**COMPUTATION OF AREA:** 7.1 Determination of areas, computation of areas from plans. 7.2 Calculation of area by using ordinate rule, trapezoidal rule, Simpson's rule.	**06**
8	**PLANE TABLE SURVEYING :** 8.1 Objectives of plane table surveying, comparison with chain & compass surveying, use of plane table surveying . 8.2 Principles of plane table surveying. 8.3 Instruments & accessories in plane table surveying – features and uses. 8.4 Setting up plane table – centering, leveling and orientation. 8.5 Methods of plane table surveying – (1) Radiation, (2) Intersection, (3) Traversing, (4) Resection. 8.6 Statements of TWO POINT and THREE POINT PROBLEM . 8.7 Errors in plane table surveying and their corrections, precautions in plane table surveying.	**12**

Learning Resources			
Text Books			
Sl. No	**Name of Authors**	**Titles of Book**	**Name of Publisher**

1	R.Subramanian	Surveying and Levelling	
2	Dr.B.C.Punmia.	Surveying,Vol.-I&II	
3	Alak De	Plane Surveying	
4	R.Agor	A text Book of Surveying &Levelling	
5	Hussain& Nagraj.	Surveying & Levelling	
6	N.N Basak.	Surveying & Levelling	
7	S.C Rangawalla;	Surveying & Levelling	
8	T.P. Kanetkar& S.V.Kulkarni	Surveying & Levelling	

CIVIL ENGINEERING MATERIALS

Name of the Course: Diploma in Civil Engineering			
Course code:	CET 304	Semester	3rd
Total Period:	60(60L)	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Tutorial:		Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

COURSE CONTENTS:

Chapter	Name of topics	Hours
1	**1.0 STONE :** 1.1Classification of rock, uses of stone, natural bed of stone, qualities of good building stone 1.2 Stone quarrying – machines for quarrying, dressing of stone 1.3 Characteristics of different types of stone and their uses	07
2	**2.0 BRICKS:** 2.1 Brick earth – its composition & selection 2.2 Brick making – preparation of brick : moulding, drying, burning in kilns 2.3 Classification of bricks, size of traditional and modular bricks, qualities of good building bricks 2.4 Uses of brick bats and surkis, uses of hollow bricks	08
3	**3.0 CLAY PRODUCTS AND REFRACTORY MATERIALS:** 3.1 Definition and classification of refractory materials 3.2 Properties and uses of refractory materials: tiles, terracotta, porcelain glazing	05
4	**4.0 CEMENT:** 4.1 Types of cements 4.2 Properties of cements 4.3 Testing of quality of cement	05
5	**5.0 SAND GRAVEL, MORRUM AND FLY ASH :** 5.1 Sources and classification of sand 5.2 Bulking factor and fineness of sand 5.3 Qualities and grading of sand for plaster and for masonry work as per BIS specifications (IS : 1542,2116,383) 5.4 Use of gravel, morrum and fly ash as different building material	05
6	**6.0 MORTAR AND CONCRETE:** 6.1 Composition and properties of ingredients in both cement & lime mortar and concrete 6.2 Properties and uses of cement & lime mortar and concrete	05

	6.3 Grading of aggregates in concrete 6.4 Water – cement ratio 6.5 Concreting – mechanical properties of aggregates, mixing of ingredients, placing, compacting and curing of concrete. 6.6 Introduction to R.C.C. and Pre-stressed concrete	
7	**7.0 TIMBER:** 7.1 Classification and structures of timber 7.2 Defects in timber 7.3 Disease and decay of timber 7.4 Seasoning and preservation of timber 7.5 Manufacturing and uses of plywood 7.6 Other building materials as substitutes to timber	**05**
8	**8.0 PAINT, VARNISH AND DISTEMPER:** 8.1 Purpose of painting a surface 8.2 Characteristics of ideal paint and varnish 8.3 Ingredients of paint and varnish 8.4 Process of painting and varnishing 8.5 Repainting of old surfaces 8.6 Purpose of applying distemper, properties, ingredients, process of distempering 8.7 Application of white washing and colour washing	**05**
9	**9.0 IRON AND STEEL:** 9.1 Uses of cast iron, wrought iron, mild steel and tor steel 9.2 Classification and uses of steel	**05**
10	**10.0 BITUMINOUS MATERIAL:** 10.1 Types of bituminous material: tar, bitumen and asphalt, properties and uses 10.2 Different types of asphalt and tar and their uses	**05**
11	**11.0 PLASTICS, HEAT PROOFING AND ACOUSTIC MATERIALS:** 11.1 Plastic and its uses as building material 11.2 Materials used for heat proofing 11.3 Materials used for acoustics and their properties	**05**

Learning Resources			
Text Books			
Sl. No	**Name of Authors**	**Titles of Book**	**Name of Publisher**
1	Rangawala	Text Book of materials	
2	R K Rajput	Engineering materials	

3	S.K.Basu& A.K.Ray	Building materials	
4	Civil Engineering Materials		T.T.T.I,Chandigarh

CONSTRUCTION TECHNOLOGY

Name of the Course: Diploma in Civil Engineering			
Course code:	CET 305	Semester	3rd
Total Period:	60(60L)	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Tutorial:		Teacher's Assessment:	10
Maximum marks:	100	End Semester Examination:	70

COURSE CONTENTS:

Chapter	Name of topics	Hours
1	**1.0 INTRODUCTION :** 1.1 Buildings and their classification of buildings based on occupancy 1.2 Different components of a building.	**02**
2	**2.0 SITE INVESTIGATION:** 2.1 Objectives of site investigation 2.2 Sit e reconnaissance 2.3 Site explorations – methods	**04**
3	**3.0 FOUNDATIONS:** 3.1 Concept of foundation and its purpose 3.2 Types of foundations – shallow and deep 3.3 Shallow foundation-constructional details of : Spread foundations for walls, thumb rules for depth and width of foundation and thickness of concrete block, stepped foundation, combined footing 3.4 Deep foundations : Pile foundations-their suitability, classification of piles according to function, material and installation of concrete piles (under-reamed, bored, driven)	**08**
4	**4.0 WALLS :** 4.1 Purpose of walls 4.2 Classification of walls – load bearing, non-load bearing walls, retaining walls. 4.3 Classification of walls as per materials of construction : brick, stone, reinforced brick, reinforced concrete, precast, hollow and solid concrete block and composite masonry walls. 4.4 Brick masonry : Definition of terms : mortar, bond, facing, backing, hearting, column, pillar, jambs, reveals, soffit, plinth, masonry, header, stretcher, bed of brick, queen closer, king closer, frog and quoin 4.5 Bond – meaning and necessity: English bond for 1, 1-1/2 and 2 Brick thick walls. T, X and right angled corner junctions. Thickness for 1, 1-1/2 and 2 brick square pillars in English bond 4.6 Construction of Brick Walls – Method of laying bricks in walls, precautions observed in the construction of walls, method of bonding new brick work with old (toothing, raking back and block bonding) 4.7 Construction, expansion and contraction joints; purpose and constructional details	**08**

	4.8 Stone Masonry : 4.9 Glossary of terms – Natural bed, bedding planes, string course, corbel, cornice, block-in-course, grouting, mouldings, templates, throating, through stones, parapet, coping, pilaster and buttress 4.10 Types of Stone Masonry : Rubble Masonry : random and coarsed, Ashlar Masonry : Ashlar fine, Ashlar rough, Ashlar facing, specifications for coarsed rubble masonry, principles to be observed in construction of stone masonry walls 4.11 Partition Walls : Constructional details, suitability and uses of brick and wooden partition walls 4.12 Mortars – Preparation, use, average strength and suitability of mason's brick layers and tubular scaffolding 4.13 Shoring and under pining ; Types and uses **4.14** Safety in construction of low rise and high rise buildings	
5	**5.0 DAMP PROOFING :** 5.1 Dampness and its ill effects on bricks, plaster, wooden fixtures, metal fixtures and reinforcement, damage to aesthetic appearance, damage to heat insulting materials, damage to stored articles and health, sources and caused of dampness 5.2 Types of dampness – moisture penetrating the building from outside e.g., rainwater, surface water, ground moisture 5.3 Moisture entrapped during construction i.e. moisture in concrete, masonry construction and plastering work etc. 5.4 Moisture which originates in building itself i.e., water in kitchen and bath rooms etc. 5.5 Damp proofing materials and their specifications ; rich concrete and mortar, bitumen, bitumen mastic 5.6 Methods of damp proofing basement, ground floors plinth and walls, apecial damp proofing arrangements in bathrooms, WC and kitchen, damp proofing for roofs and window sills 5.7 Plinth protection	**04**
6	**6.0 ARCHES AND LINTELS :** 6.1 Purpose of use of arches and lintels 6.2 Glossary of terms used in arches and lintels – abutment, pier, arch ring, intrados, soffit, extrados, voussoiers, Springer, springing line, crown key stone, skew back, span, rise, depth of an arch, haunch, spandrel, jambs, bearing, thickness of lintel, effective span 6.3 Arches : 6.4 Types of arches – Semi circular, segmental, elliptical and parabolic, flat, inverted and relieving 6.5 Types of lintels – wood, iron, reinforced brick and R.C.C.	**05**
7	**7.0 DOORS AND WINDOWS :** 7.1 Glossary of terms used in doors and windows 7.2 Doors – different types of metal doors, flush doors, laced and battened doors, framed and paneled doors, glazed and paneled doors, flush doors, collapsible doors, rolling steel shutters, side sliding doors, door frames, PVC shutters and metal doors 7.3 Windows – different types of metal windows, fully paneled windows, fully glazed windows, casement windows, fanlight windows and ventilators, sky light window frames, louvered shutters (emphasis shall be given for using metals and plastic etc. in place of timber)	**05**

8	**8.0 FLOORS :** 8.1 Ground floors : 8.2 Glossary of terms – floor finish, topping, under layer, base course, rubble filling and their purpose 8.3 Types of floor finishes – cast-in-situ, concrete flooring(monolithic, bonded) terrazzo tile flooring, cast in situ, Terrazzo flooring, timber flooring, description with sketches of the methods of construction of the floors and their specifications 8.4 PVC floor, ceramic floor 8.5 Upper floors 8.6 Flooring on RCC slab 8.7 Flooring on RB slab	**05**
9	**9.0 ROOFS :** 9.1 Types of roofs, concept and function of flat, pitched, hipped, arched and cell roofs 9.2 Glossary of terms for sloped roofs and flat roofs 9.3 Materials used for different roofs 9.4 Different types of weather proof course.	**04**
10	**10.0 STAIRS :** 10.1 Glossary of terms ; Stair case, winder, landing, stringer, newel, baluster, iser, tread, width of stair case, hand rail, nosing. 10.2 Planning and layout of staircase : Relations between rise and tread, determination of width of stair, landing etc. 10.3 Various types of layout – straight flight, dog legged, open well, quarter turn, half turn (newel and geometrical stairs), bifurcated stair, spiral stair.	**05**
11	**11.0 SURFACE FINISHES :** 11.1 Plastering- classification according to use and finishes like grit finish, rough cas, pebble dashed, plain plaster etc, dubbing, proportion of mortars used for different plasters, preparation of mortars, techniques of plastering and curing 11.2 Pointing- different types of pointing, mortar used and method of pointing 11.3 Painting- preparation and application of paints on wooden, steel and plastered wall surfaces 11.4 White washing, colour washing and distempering, application of cement and plastic paints 11.5 Commonly used water repellent for exterior surfaces, their names and application	**04**
12	**12.0 GENERAL IDEA OF SEISMIC PLANNING & DESIGN OF BUILDING**	**03**
13	**13.0CONSTRUCTION MACHINERIES** 13.1 Necessity of use of different types of construction machineries in building construction 13.2 Vibrator, concrete mixer, polishing machine for mosaic 13.3 Hoisting Equipments 13.4 Excavators and transporting equipments	**03**

Learning Resources			
Text Books			
Sl. No	**Name of Authors**	**Titles of Book**	**Name of Publisher**
1	S C Rangawala	Building Construction	
2	R.S Despande and G.V.Vartak	A text book of Building Construction	
3	S.P.Arora and S.P.Bindra	A text book of Building Construction	
4	S.K.Sharmaand B.K.Kaul	A text book of Building Construction	
5	G.J.Kulkarni	A text book of Building Construction	
6	Susil Kumar	A text book of Building Construction	
7	N.K.R. Moorthy	A text book of Building Construction	
8	Verma and Mahesh	Construction Equipment its Planning and application	
9	P.L.Monkckton	Construction Technology for Civil Engineering Technicians	

CIVIL ENGINEERING LABORATORY-I

Name of the Course: Diploma in Civil Engineering			
Course code:	CEP 301	Semester	3rd
Total Period:	90	Examination	4 hrs
Lab. periods:	6P/week	Term Work	25
Maximum marks:	75	End Semester Examination:	50

1.0 MATERIAL TESTING LABORATORY:

A) TEST ON STEEL:

1.1 Determination of Young's Modulus of a material in a tensile testing machine.

B) TESTS ON CEMENT, SANDS, BRICKS, BLOCKS &AGGREGATES.

1.1 Determination of fineness of Cement by sieving.
1.2 Determination of normal Consistency of Cement.
1.3 Determination of initial and final setting time of cement.
1.4 Determination of soundness of Cement by Le-Chatelier apparatus.
1.5 Determination of Compressive Strength of cement .
1.6 Determination of Compressive Strength of Burnt clay,Fly Ash Bricks and Blocks.
1.7 Grading of Fine & Coarse aggregate by sieving for concrete .
1.8 Determination of Specific Gravity and Bulking of sand.
1.9 Determination of Specific Gravity and Bulk density of coarse aggregate.
1.10 Grading of Road Aggregates.
1.11 Determination of Flakiness, Elongation & Angularity No. of Road aggregates.
1.12 Determination of Soundness Test of Road aggregates.
1.13 Determination of Crushing Value Test of aggregates.
1.14 Los-Angles Abrasion Test of aggregate.
1.15 Impact test of aggregate.

2.0 CONCRETE LABORATORY

2.1 Determination of Compressive Strength of concrete cubes .
2.2 Determination of Workability of concrete by:
a) Slump Cone method c)Compaction Factor method.
2.3 Non Destructive test on Concrete:
a)Demonstration on Rebound hammer b) Ultrasonic Pulse measuring Instrument.

3.0 HYDRAULICS LABORATORY:

3.1 Verification of Bernoulli's Theorem.
3.2 Determination of coefficient of Discharge of a rectangular notch .fitted in open Channel.
3.3 Determination of coefficient of Discharge of a Venturimeter, Orificemeter fitted in a pipe.
3.4 Determination of head Loss due to friction and coefficient of friction for flow through pipe.

RECOMMENDED BOOKS:

1.Concrete Laboratory Manual - Gambhir.
2.Cement,Aggregate and concrete Laboratory Manual - Dr. M.Chakraborty.
3. Highway material testing Laboratory manual -S.K.Khanna&C.E.G.Justo.
4. Laboratory manual in Highway material testing - Ajay K. Duggal,
5. Laboratory work in Hydraulic Engineering - G.L.Asawa,
6.Experimental Hydraulics - S.N. Ghosh &S.C Talapatra,
7.Hydraulics Laboratory Manual - S.K.Likhi.
8.Civil Engineering Lab. Practice I - Dr.M.R. Samal, Kalyani Publisher

SURVEY PRACTICE-I

Name of the Course: Diploma in Civil Engineering			
Course code:	CEP 302	Semester	3rd
Total Period:	90	Examination	4hrs
Lab. periods:	6P/week	Term Work	25
Maximum marks:	75	End Semester Examination:	50

Course Contents:

Field Exercises on:

1.0 LINEAR MESUREMENTS:

1.1 Study of essential features of different types of chains and tapes to describe the chains and tapes with neat sketches.

2.0 CHAINING:

2.1 Testing and adjusting of a metric chain.

2.1 Measurement of distance between two points (more than 2 chain lengths apart) with chain including direct ranging.

2.1 Setting out different types of triangles, given the lengths of sides with chain and tape.

2.1 Measurement of distance between two points by chaining across a sloped ground using stepping method and a clinometer.

2.1 Measurement of distance by chaining across a obstacles on the chain line i) a pond ii)a building iii) a stream/ river (in the event of non-availability of stream / river, a pond or lake may be taken, considering that chaining around the same is not possible.

1.0 CHAIN SURVEYING :

1.1 Setting perpendicular offsets to various objects (at least 3) from a chain line using-(1) tape, (2) cross-staff, (3) optical square and comparing the accuracy of the 3 methods

1.2 Setting oblique offsets to objects (at least 3) from a chain using tape

2.0 ANGULAR MEASUREMENT :

2.1 Study of features and parts of a prismatic compass and a Surveyor's compass to describe the compasses by drawing neat sketches.

2.2 Testing and adjustment of Prismatic compass and Surveyor's compass.

2.3 Measurement of bearings of lines (at least 3 lines) and determination of included angles using Prismatic compass and Surveyor's compass.

2.4 Setting out triangles (at least 2) with compass, given the length and bearing of one side and included angles.

3.0 COMPASS SURVEYING:

3.1 Setting out a closed traverse of 5 sides, using prismatic compass, given bearing of one line and included angles and lengths of sides.

3.2 Conducting chain and compass traverse surveying in a given plot of area (2plots) and recording data in the field book. (5 to 6 students/groups)

3.3 Preparation of survey map by plotting, individually, the field book data from exercise 5.2 and computation of the plotted area. (Plotting should be done during class hours)

4.0 PLANE TABLE SURVEYING :

6.1Setting up of Plane Table and Plotting five points by radiation method and five inaccessible points by intersection method.

6.2 Conducting Plane Table surveying in a given plot of area by traversing

(at least a 5-sided traverse and locating the objects

6.3 Plane table surveying by Resection method(two point &three point problem method)

RECOMMENDED BOOKS:

- Surveying and Levelling - R.Subramanian
- Surveying, Vol.-I&II -Dr.B.C.Punmia.
- Plane Surveying -Alak De.
- A text Book of Surveying &Levelling -R.Agor.
- Surveying & Levelling -Hussain& Nagraj.
- Surveying & Levelling -N.N Basak.
- Surveying & Levelling -S.C Rangawalla;
- Surveying &Levelling -T.P. Kanetkar& S.V.Kulkarni

CIVIL ENGINEERING DRAWING-I

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	3rd
Total Period:	90	Examination	2 hrs
Theory periods:	6P/week	Term Work	50
Maximum marks:	100	End Semester Examination:	50

SL. NO.	TOPICS	PERIODS
1	**AUTOCAD SOFTWARE**	**30**
2	**PLAN, ELEVATION AND SECTIONAL ELEVATION OF FLAT ROOF BUILDING FROM LINE DIAGRAM AND GIVEN SPECIFICATIONS USING AUTOCAD SOFTWARE**	**30**
3	**PLAN, ELEVATION AND SECTION OF INCLINED ROOF BUILDING WITH A/C SHEET/GCI/TILES ON WOODEN STRUCTURE USING AUTOCAD SOFTWARE**	**12**
4	**BUILDING PLANNING**	**18**
		90

1.0 AUTOCAD SOFTWARE

1.2 Recap of the Draw, Format, Edit, Dimension, Modify commands 3

1.3 Draw 2D drawings of the following Building Components 9

i) Doors

ii) Windows

iii) Cross section through wall

iv) Spread footing

v) Column footing

vi) Stairs case

vii) R.C.C. T-beam and slab

1.4 Develop Isometric drawings of simple objects 3

1.5 Develop 3D drawings of simple objects. 12

1.6 Print/ Plot the above drawings using the concept of Paper Source on drawing sheets. 3

2.0 BUILDING PLANNING:

2.1 Planning of buildings for specific cost basing on approximate plinth area rate.

2.2 Awareness about prevailing building bye-laws of local Municipal Authority/Urban bodies.

2.3Orientation of building,location of doors/windows/ventilators and the living areas.

2.4 Planning(Line plans only)of school for rural areas,Hostel for polytechnics,market complex and dispensary.

(At least five sheets on Chapter 3&4 should be practiced manually on drawing sheets)

1.0 PLAN, ELEVATION AND SECTIONAL ELEVATION OF FLAT ROOF BUILDING FROM LINE DIAGRAM AND GIVEN SPECIFICATIONS with use of AutoCAD software.

3.1 Plan at window sill level of a single storeyed R.C. roof slab building with elevation and sectional views form given line diagram and specification.

3.2 Detail drawing of Double storeyed pucca building with R.C.C. stair case from line diagram and given specification.

3.3 Preparation of approval drawing of a residential building as per the norms of local approving authority with site plan, index plan etc.

3 PLAN, ELEVATION AND SECTION OF INCLINED ROOF BUILDING WITH AC SHEET/GCI/TILES ON WOODEN STRUCTURE with use of AutoCAD Commands

Detail drawing of inclined roof building from given line diagram and specification. (gabbled / hipped)

RECOMMENDED BOOKS:

1. Civil Engg. Drawing -M.Chakrobarty.
2.Civil Engineering drawing &House Planning -B.P.Verma.
3.Civil Engineering drawing Manual -TTTI,Bhopal.
4.IS12556-1967,10713-1983&I.S-696-1972 of BIS Publication.
5. Civil Engineering drawing Manual -V.Thanikachalan &K. V Natarajan
6. Harnessing AutoCAD -Autodesk Manual
7. AutoCAD -Omura
8. AutoCAD (Architecture) 2010 -William G. Wyatt