TEACHING & EVALUATION SCHEME

DISCIPLINE: CIVIL ENGINEERING   **THIRD SEMESTER**

Sl.No.	SUBJECT	Evaluation Scheme							Total Marks
		L	P	THEORY			PRACTICAL		
				END EXAM	INTERNAL ASSESSMENT		End Examination	Sessional	
					Class Test	Assignment			
	THEORY								
1.	Mechanics of Materials	5	--	80	15	5	--	--	100
2.	Hydraulics	4	--	80	15	5	--	--	100
3.	Survey-I	4	--	80	15	5	--	--	100
4.	Civil Engineering Material	4	--	80	15	5	--	--	100
5.	Construction Technology	4	--	80	15	5	--	--	100

       PRACTICAL/SESSIONAL

1.	Survey practical - I	--	6	--	--	--	50	50	100
2.	Civil Engineering Lab. - I	--	6	--	--	--	25	25	50
3.	Civil Engineering Drawing – I	--	6	--	--	--	50	50	100
		21	18	400	75	25	125	125	**750**

NOTE: Evaluation for I.A.(Theory)& Sessional /Practical to be made as per guidelines of SCTE&VT.

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MECHANICS OF MATERIALS(Th:1)

Periods per week: 5   *Total Marks:100*   *Evaluation Scheme*
Total Periods 75   *Theory – 3hrs*
                                                             End Term Exam: 80
                                                             I.A.: 15+5(Assn.)=20

TOPIC WISE DISTRIBUTION OF PERIODS:

SL. No.	Topics	Lectures in period
1	**Stress and Strain**	15
2	**Beams**	09
3	**Simple Bending of Beams**	10
4	**Combined Direct stress & Bending stress**	03
5	**Dams , Retaining Walls And Chimneys**	08
6	**Shear and Torsion**	10
7	**Columns and Struts**	10
8	**Complex Stresses and Strains**	10
	Total	75

RATIONALE:

Mechanics of materials deals with the internal behavior of variously loaded solid bodies, such as; shafts, bars, beams, plates and columns, as well as structures and machines that are assemblies of these components. Mechanics of materials focuses primarily on mechanical properties of materials, analysis of stress, strain and evaluation of deformations. The subjects like structural analysis, design of structures as well as machines are based on adequate knowledge and understanding of Mechanics of Materials. Therefore, it is an important basic subject for Diploma students in Civil Engineering.

OBJECTIVES:

On completion of study of the subject, the students will be able to –
1. Describe the Mechanical properties of important Engineering materials
2. Determine stresses, strains and deformations in elastic bodies of different shapes under different loading conditions for engineering applications.
3. Determines load carrying capacity of different types of members under axial force, bending moment and torque.
4. Evaluate principal stresses in biaxial stress problems
5. Solve numerical problems.

COURSE CONTENTS:

1.0 Stress and Strain:

1.1   Introduction:

Definitions of stress; types of stress-tensile, compressive and shear.

1.2   Stress-strain Diagram:
Dimensions of a tensile test specimen, tensile test, elastic limit, elastic range,
elastic proportional Limit, point of fracture, plastic range, strain hardening, ultimate, stress, necking, ductility, Yield strength,0.2% proof stress,
allowable stress of ductile and brittle materials, factor of safety. Draw the

stress strain diagram for ductile and brittle materials and indicate the different parts of curve.

1.3   Stress-strain Relations:

Hooke's law, Young's modulus, Shear modulus of rigidity, Poisson's ratio, generalized Hooke's law for two dimensional stress, relation among the elastic constants(No Derivation).

1.4   Stresses, Strains, and Deformations of Axially Loaded Members:

Bars of varying section, bars of composite section, temperature stresses.

2.0 Beams:

2.1   Definition, types of beams – Simply supported and cantilever beams,propped cantilever, fixed-ended and continuous beams.

2.2   Shear force and Bending Moment in Beams:
       Sign conventions and relationships among load, Shearing force and bending moment (No derivation)

2.3   Shear Force and Bending Moment Diagrams:
       Cantilever beam with concentrated and uniformly distributed load, simply supported beam with concentrated and uniformly distributed loads, Over hanging beam.

3.0 Simple Bending of Beams:

3.1   Centroid of an area, moment of inertia of rectangular, solid & hollow circular cross sections, parallel axis theorem, principal moment of inertia

3.2   Assumptions in simple bending , neutral surface, neutral axis, determination of bending stresses in beams with simple cross sections and standard sections used in industry.

4.0 COMBINED BENDING STRESS AND DIRECT STRESS :

4.1   Principles of superposition of bending and axial stresses.

4.2   Expression for resultant stress due to combined bending and direct stress with load eccentric on one of the axis

4.3   Middle-third rule & middle-fourth rule for rectangular and circular base respectively.

5.0 DAMS , RETAINING WALLS AND CHIMNEYS

5.1   Introduction – difference between dams and retaining walls, uses of dams and retaining walls

5.2   Stability of dams, check the stability of rectangular and trapezoidal dams with water face vertical, solve numerical problems

5.3   Stability of retaining walls – solve numerical problems on stability of retaining walls having vertical face to the earth with level earth.

5.4   Masonry Chimneys, Stresses in masonry chimneys due to wind load.

6.0 Shear and Torsion

6.1   Shear stress distribution in beams of rectangular circular and standard sections symmetrical about vertical axis used in industry.

6.2 Basic assumptions for pure torsion, torsion of circular shafts(hollow and solid) – polar moment of inertia, torsional shearing stress, angle of twist, torsional rigidity.

7.0 Columns and Struts:

7.1 Definition of columns and struts; Buckling load (critical or crippling load)(No. derivation); Slenderness ratio, Classification of columns as long and short columns.

7.2 Euler's Theory – Basic assumptions made in Euler's theory for column buckling,
Effective lengths for different end conditions –both ends pinned, one end fixed and the other end free, both ends fixed one end fixed and other end pinned..

7.3 Calculation of safe load on columns in the above case for axial loading only- Problems

8.0 COMPLEX STRESSES AND STRAINS:

8.1 Principal stresses and principal planes – Explain the occurrence and concept of normal and concept of normal and tangential stresses, define & explain concept of principal stresses and principal planes and their orientation. State and explain the formulae with assumptions for major and minor principal stresses and their orientation. Solve numerical problems on complex stresses.

8.2 Stresses on a given plane – State and explain formulae for shear and normal stress components on any inclined plane. Solve numerical problems.

8.3 Use of Mohr's circle – Explain with assumptions the alternative graphical solution procedure(sketch only) by using Mohr's circle without proof. Supplement the solution of numerical problems by Mohr's circle method.

RECOMMENDED BOOKS:

1. Strength of Materials   -R. K. Rajput.
2. Engineering Mechanics & Strength of Materials   –S.Ramamrutham.
3. Strength of Materials   –R.S. Khurmi.
4. Strength of material   - Dr. Sadhu Singh:
5. Engineering Mechanics and Strength of materials   - R.K. Bansal

REFERRENCE BOOKS:

1. Strength of Materials- by G. H. Ryder

2. Elements of Strength of material – by S.P. Timoshenko, D.H.Young;

3. Strength of Materials   -James Gere & Goodno

HYDRAULICS   (Th:2)

Periods per week: 04   **Total marks: 100**

                              Evaluation Scheme
Total Periods: 60   **Theory- 3hrs**
                              End Term Exam: 80
                              I.A.: 20 (15+5)

TOPIC WISE DISTRIBUTION OF PERIODS:

Sl. No.	Topics	Periods
1	**Hydrostatics**	**25**
2	**Kinematics of Fluid Flow**	**30**
3	**Pump**	**05**
	Total	**60**

Rationale:

The subject of Hydraulics deals with behavior of fluid at rest and motion. The civil Engineering profession is much concerned with subjects like water supply, sanitary engineering & irrigation engineering, which need a sound Knowledge of Hydraulics. Therefore, hydraulics is a very important basic subject for students of civil engineering.

OBJECTIVES:

On completion of study of subject, the students will be able to:

i)   Comprehend the fluid pressure & its measurement
ii) State the general principles of the flow of a fluid under different boundary conditions
iii) Know the working of orifices & mouthpieces as required for measurement of discharge
iv) State the terms & principles of flow through pipes
v)   Define the terms and related principles of flow through channels
vi) Know the different types of pumps.

COURSE CONTENTS:

1.0   Hydrostatics:

1.1   Properties of fluids, density, specific gravity, surface tension, capillarity, viscosity and their uses

1.2   Pressure and its measurements: Definitions- intensity of pressure, atmospheric pressure, gauge pressure, absolute pressure and vacuum pressure, relation between atmospheric pressure, absolute pressure and gauge pressure, pressure head, pressure gauges

1.3   Pressure exerted on an immersed surface; Definitions- total pressure, resultant pressure, expression of equation 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

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

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 deduction, 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 deduction)

3.0 Pumps

3.1 Type of pumps

3.2 Centrifugal pumps- 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

RECOMMENDED BOOKS:

1. A Text Book ofHydraulics,Fluid Mechanics &Hydraulic machi - R.S.Khurmi.
2. Hydraulics and fluid Mechanics   -Abdulla Sheriff.
3. Fluid Mechanics   - Modi & Seth.
4. Fluid Mechanics   - R. K. Bansal.
5. A Text Book on Hydraulics   - JagdishLal.

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SURVEY – I   (Th:3)

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Periods per week:4   *Total marks: 100*   *Evaluation Scheme*
Total Periods:60   *Theory- 3hrs*
                                                           End Term Exam: 80
                                                           I.A.: 15+5(asgnmt.)=20

TOPIC WISE DISTRIBUTION OF PERIODS:

SL. No.	Topics	Lectures in period
1	INTRODUCTION	03
2	LINEAR MEASUREMENT	05
3	CHAINING	05
4	CHAIN SURVEYING	10
5	ANGULAR MEASUREMENT	05
6	CHAIN AND COMPASS SURVEYING	08
7	COMPUTATION OF AREA	05
8	LEVELLING	12
9	CONTOURING	05
10	MINOR INSTRUMENTS	02
	Total	60

OBJECTIVES :
On completion of the subject a student will be able to –

1. Comprehend the concepts of surveying.
2. Carry out horizontal linear and angular measurements using appropriate equipment.
3. Conduct survey work in field using horizontal linear and angular measurements.
4. Record the data observed during the survey work.
5. Plot the survey map from the recorded data.
6. Compute the data required for plotting.
7. Interpret the plotted survey map and compute data from it.
8. Determination of elevations of points on the earth surface, using appropriate equipment.
9. Record the data observed during leveling.
10. Compute the data required plotting.

COURSE CONTENTS :
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   Maintenance and adjustments of instruments
      1.7   Precision and accuracy of measurements
2.0   LINEAR MEASUREMENT :
      2.1   Methods of measuring distance by tapes / chains
      2.2   Instruments for measuring distance:
          a. Tapes-types, description (demonstration in class/lab), purposes, suitability
          b. Chains-types, description (demonstration in class/lab), purposes, suitability, merits and demerits
      2.3   Errors and mistakes in linear measurement – classification, Sources of errors and remedies

2.4 correction to measured lengths due to-incorrect length, temperature variation, pull, sag, numerical problem applying corrections

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 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. (demonstration in field)

3.5 Field problems – Setting perpendicular with chain & tape, Chaining across different types of obstacles –
Numerical problems on chaining across obstacles

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 (detailed description to be covered in practical)

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, Features, use & handling (demonstration in field), merits & demerits, suitability, 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.

5.0 ANGULAR MEASUREMENT :

5.1 Measurement of angles with chain & tape, with compass

5.2 Compass – types – Surveyors compass, Prismatic compass, features, parts, (detailed description to be covered in practical), merits & demerits, suitability of different types, testing & adjustment of compass

5.3 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

5.4 Use of compasses – setting in field-centering, leveling, taking readings (demonstration in field), concepts of Fore bearing, Back Bearing, Numerical problems on computation of interior & exterior angles from bearings.

5.5 Effects of earth's magnetism – dip of needle, magnetic declination, variationin declination, numerical problems on application of correction for declination.

5.6 Errors in angle measurement with compass – sources & remedies, precaution during use of compass, maintenance of compass.

6.0 CHAIN AND COMPASS SURVEYING :

6.1 Principles of traversing – open & closed traverse, advantages & dis-advantages 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.

6.5 Errors in chain & compass surveying – sources & remedies, precautions during chain & compass surveying

7.0 COMPUTATION OF AREA :

7.1 Computation of area from plotted survey map

7.2 Use of plani meter(Mechanical or Digital Planimeter)

7.3 Calculation of area by using ordinate rule, trapezoidal rule, Simpson's rule

8.0 LEVELLING :

8.1 Purpose of leveling

8.2 Definition of terms used in leveling – concepts of level surface, Horizontal surface, vertical surface, datum, R. L., B.M.

8.3 Description of essential features and uses of different types of leveling instruments

8.4 Concepts of line of collimation, axis of bubble tube, axis of telescope, Vertical axis

8.5 Levelling staff – types, features and use

8.6 Temporary adjustments of level, taking reading with level

8.7 Concept of bench mark, BS, IS, FS, CP, HI

8.8 Principles of leveling – Simple leveling, Differential leveling

8.9 Field data entry – level Book – height of collimation method and Rise & Fall method, comparison, Numerical problems on reduction of levels applying both methods, Arithmetic checks

8.10 Different types of leveling, uses and methods – Fly leveling, check leveling, Profile leveling – longitudinal sections and cross-sections

8.11 Plotting of profiles

8.12 Effects of curvature and refraction, numerical problems on application of correction

8.13 Reciprocal leveling – principles, methods, numerical problems, precise leveling

8.14 Difficulties in leveling, errors in leveling and precautions

8.15 Sensitiveness of bubble tube, determination of sensitiveness

8.16 Permanent adjustments of different types of levels

8.17 Setting grades and stakes, setting out grades of sewers and related problems

9.0 CONTOURING :

9.1 Definitions of related terms, concepts of contours, characteristics of contours

9.2 Methods of contouring, plotting contour maps

9.3 Interpretation of contour maps, toposheets

9.4 Use of contour maps on civil engineering projects – drawing cross-sections from contour maps, locating proposal routes of roads / railway / canal on a contour map, computation of volume of earthwork from contour map for simple structure.

10.0 MINOR SURVEYING INSTRUMENTS :

10.1 Essential features and use of –(i) Hand Level, (ii) Abney Level, (iii) Plantograph, (iv) Ceylone Ghat Tracer, (v) Box Sextant

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

CIVIL ENGINEERING MATERIALS (Th:4)

Periods per week: 04   *Total marks: 100*   *Evaluation Scheme*
 Total Periods: 60   *Theory- 3hrs*
                                                       End Term Exam: 80
                                                       I.A.: 15+5(ass.)=20

TOPIC WISE DISTRIBUTION OF PERIODS:

SL. No.	Topics	Lectures in period
1	**STONE**	07
2	**BRICKS**	08
3	**CLAY PRODUCTS AND REFRACTORY MATERIALS**	05
4	**CEMENT**	05
5	**SAND, GRAVEL, MORRUM AND FLY ASH**	05
6	**MORTAR AND CONCRETE**	05
7	**TIMBER**	05
8	**PAINT, VARNISH AND DISTEMPER**	05
9	**IRON AND STEEL**	05
10	**BITUMINOUS MATERIAL**	05
11	**PLASTICS, HEAT PROOFING AND ACOUSTIC MATERIALS**	05
		60

OBJECTIVES:
   On completion of the subject a student will be able to –

   i)   Explain the properties and uses of building, stones, bricks, sand, gravel, morum and timber.
   ii) State the uses of lime
   iii) State the importance of cement including their grading
   iv) State the uses of cement concrete and mortar
   v)   State the importance of fly ash
   vi) State the properties and uses of timber and plastics
   vii) State the properties of paints, varnishes and distemper including the method of carrying out the above work

COURSE CONTENTS :
1.0   STONE :
   1.1   Classification 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
2.0   BRICKS
   2.1   Brick earth – its composition & selection
   2.2   Brick making – preparation of brick earth moulding, drying, burning in kiln
   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
3.0   CLAY PRODUCTS AND REFRACTORY MATERIALS
   3.1   Definition, classification of refractory materials
   3.2   Properties and uses of refractory like tiles, terracotta, porcelain glazing

4.0 CEMENT
   4.1 Types of cements
   4.2 Properties of cements
   4.3 Testing of quality of cement

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, morum and fly ash as different building material

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
   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
   6.7 Factors responsible for deterioration of concrete

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 Substitute building materials of timber

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 varnishing
   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

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

10.0 BITUMINOUS MATERIAL
   10.1 Distinction among tar, bitumen and asphalt
   10.2 Different types of asphalt and tar and their uses

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

Recommended Books:
   1. Text book of materials   -Rangawala
   2. Engineering materials   -R.K.Rajput.
   3. Building materials   -S.K.Basu& A.K.Ray;
   4. Civil Engineering Materials   -T.T.T.I,Chandigarh

CONSTRUCTION TECHNOLOGY (Th-5)

Periods per week: 04   *Total marks: 100*   *Evaluation Scheme*
Total Periods: 60   *Theory- 3hrs*
                                                   End Term Exam: 80
                                                   I.A.: 15+5(ass.)=20

Sl. No.	Topics	Periods
1	Introduction	2
2	Site Investigation	2
3	Foundations	10
4	Walls	08
5	Damp Proofing	4
6	Arches & Lintels	5
7	Doors & Windows	5
8	Floors	5
9	Roofs	4
10	Stairs	5
11	Surface Finishes	4
12	General Idea of Seismic Planning & Design of Building	3
13	Construction Machineries	3
	Total	60

COURSE CONTENTS :

1.0   Introduction :

1.1   Definition of a building, classification of buildings based on occupancy

1.2   Different components of a building

2.0   Site Investigation

2.1   Objectives of site investigation

2.2   Sit e reconnaissance

2.3   Site explorations – methods and sampling

2.4   Field and laboratory tests.

3.0   Foundations

3.1   Concept of foundation and its purpose

3.2   Types of foundations – shallow and deep

3.2.1   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

3.2.2   Deep foundations : Pile foundations-their suitability, classification of piles according to function, material and installation of concrete piles (under-reamed, bored, compacted)

4.0   Walls :

4.1   Purpose of walls

4.2   Classification of walls – load bearing, non-load bearing walls, retaining

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, hearing, column, pillar, jambs, reveals, soffit, plinth, masonry, header, stretcher, bed of brick, queen closer, king closer, frog and quoin

    4.4.1 Bond – meaning and necessity: English bond, bond only 1. 1-1/2 and 2 Brick thick walls in English Bond. T, X and right angled corner junctions. Thickness for 1, 1-1/2 and 2 brick square pillars in English bond

    4.4.2 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)

    4.4.3 Construction, expansion and contraction joints; purpose and constructional details

4.5 Stone Masonry :

    4.5.1 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

    4.5.2 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

4.6 Partition Walls : Constructional details, suitability and uses of brick and wooden partition walls

4.7 Mortars – Preparation, use, average strength and suitability of mason's brick layers and tubular scaffolding

4.8 Shoring and under pining ; Types and uses

4.9 Safety in construction of low rise and high rise buildings

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, sourcesand 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

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 :

6.3.1 Types of arches – Semi circular, segmental, elliptical and parabolic, flat, inverted and relieving

6.3.2 Types of lintels – wood, iron, reinforced brick and R.C.C.

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)

8.0 Floors :

8.1 Ground floors :

8.1.1 Glossary of terms – floor finish, topping, under layer, base course, rubble filling and their purpose

8.1.2 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

8.1.3 PVC floor, ceramic floor

8.2 Upper floors

8.2.1 Flooring on RCC slab

8.2.2 Flooring on RB slab

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.

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.

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

12.0   General Idea of Seismic in Planning & Design of Buildings:

     12.1   Earthquake and its intensity on buildings

     12.2   Earthquake prone areas of Orissa State

13.0   Construction 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

Recommended Books:

1. Building Construction   -S.C.Rangawala.
2. A text book of Building Construction   -Gupta,Susil Kumar,Singia,D.R.,and Juneja.
3. A text book of Building Construction   -R.S Despande and G.V.Vartak.
4. A text book of Building Construction   -S.P.Arora and S.P.Bindra.
5. A text book of Building Construction   -S.K.Sharmaand B.K.Kaul.,
6. A text book of Building Construction   -G.J.Kulkarni.
7. Building Construction   -Susil Kumar.
8. A text book of Building Construction   -N.K.R. Moorthy.
9. Construction Equipment its Planning and application;-Verma and Mahesh.
10. Construction Technology for Civil Engineering Technicians- P.L.Monckton

(1)Survey Practical-I   (Practical-I)

Periods per week: 06   *Total marks: 100*   *Evaluation Scheme*
 Total Periods: 90

                              End Term Exam: 50
                              Sessional.: 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.

10.0 CHAINING:

   10.1   Testing and adjusting of a metric chain.
   10.2   Measurement of distance between two points (more than 2 chain lengths apart) with chain including direct ranging.
   10.3   Setting out different types of triangles, given the lengths of sides with chain and tape.
   10.4   Measurement of distance between two points by chaining across a sloped ground using stepping method and a clinometer.
   10.5   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.

3.0   CHAIN SURVEYING :

   3.1   Setting perpendicular offsets to vatious 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
   3.2   Setting oblique offsets to objects (at least 3) from a chain using tape

4.0   ANGULAR MEASUREMENT :

   4.1   Study of features and parts of aprismatic compass and a Surveyor's compass to describe the compasses by drawing neat sketches.
   4.2   Testing and sdjustment of Prismatic compass and Surveyor's compass.
   4.3   Measurement of bearings of lines (at least 3 lines) and determination of included angles using Prismatic compass and Surveyor's compass.
   4.4   Setting out triangles (at least 2) with cpmpass, given the length and bearing of one side and included angles.

5.0   CHAIN AND COMPASS SURVEYING:

   5.1   Setting out a closed traverse of 5 sides, using prismatic compass, given bearing of one line and included angles and lengths of sides.
   5.2   Conductiong chain and compass traverse surveying in a given plot of area (2plots) and recording data in the field book. (5 to 6 students/groups)
   5.3   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)

6.0   LEVELLING :

6.1   Study of essential features and parts of different types of levels

6.2   Study of essential features of different types of leveling staffs

6.3   Making temporary adjustments of Levels

6.4   Determining Reduced Levels of five given points taking staff readings with Levels.

6.5   Determining the difference of levels between two points (3 pairs of points / group) by taking staff readings form single set up of level, recording the readings in level book and application of Arithmetic check. (At least 3 change points must be covered)

6.6   Conduct Fly Levelling (Compound) between two distant points with respect to R.L. of a given B.M. and reduction of levels by both height of collimation and rise & fall method and applying Arithmetic check. (At least 3 change points must be covered)

6.7   Finding R. L. of (1) roof, (2) chaja or canopy with reference to the R.L. of given B.M. by taking inverted staff reading.

6.8   Conduct profile leveling along the given alignment for a road / canal for 150m length, taking L. S. at every 15m and C. S. at 1m & 3m apart on both sides at every 30m interval and recording the data in level book and applying arithmetical check.

6.9   Plotting the profile of the alignment surveyed in Exercise 6.8 and drawing the grade of alignment desired (To be drawn during the class hours)

6.10   Setting out the given grades for a sewer along a given alignment

7.0   CONTOURING :

7.1   Locating contour points in the given area by direct method / indirect method

7.2   Conducting block level survey inn the given area

7.3   Plotting and drawing contour map of a given area by radial method.

8.0   USE OF PLANIMETER TO DTERMINE AREA OF FIGURES

8.1   Use of Mechanical and Digital planimeter

9.0   Study and use of Minor Instruments: Like –(i) Hand Level, (ii) Abney Level, (iii) Pantograph, (iv) Ceylon Ghat Tracer, (v) Box Sextant

Recommended Books:

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

Civil Engineering Laboratory-I   (Practical-2)

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 normal Consistency of Cement.
   1.2 Determination of initial and final setting time of cement.
   1.3 Determination of fineness of Cement by sieving.
   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.

(3) CIVIL ENGINEERING DRAWING-I (using AutoCAD Software) (Practical-3)

Periods per week: 06　　　**Total marks: 150**　**Evaluation Scheme**
Total Periods: 90

End Exam: 50
Sessional: 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   3
  sheets.

2.0 **PLAN, ELEVATION AND SECTIONAL ELEVATION OF FLAT ROOF BUILDING FROM LINE DIAGRAM AND GIVEN SPECIFICATIONS with use of AutoCAD Commands**
2.1 Plan at window sill level a single storeyed R.C. roof slab building with elevation and sectional views form given line diagram and specification.
2.2 Detail drawing of Double storeyed pucca building with R.C.C. stair case from line diagram and given specification

2.3   Preparation of approval drawing of a residential building as per the norms of local approving authority with site plan, index plan
  (Practice on drawing sheets to be done also)

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

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

2.0 BUILDING PLANNING (Manual)

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

  2.1 Awareness about prevailing building by law of local municipal authorities

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

  2.3 Planning (line plans only) of school for rural areas, Hostel for polytechnics, market complex and dispensary

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