

TEACHING & EVALUATION SCHEME

DISCIPLINE: CIVIL ENGINEERING

THIRD SEMESTER

Sl.No.	SUBJECT	Evaluation Scheme							Total Marks
		L	P	THEORY			PRACTICAL		
				END EXAM	INTERNAL ASSESSMENT	Class Test	Assignment	End Examination	
	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	--	--	--	50	50	100
3.	Civil Engineering Drawing – I	--	6	--	--	--	--	50	50
		21	18	400	75	25	100	150	750

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

MECHANICS OF MATERIALS(Th:1)

Periods per week: 5
Total Periods 75

Total Marks:100

Evaluation Scheme
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	Shear force and Bending moment in Beams	09
3	Simple Bending of Beams	12
4	Combined Direct & Bending stress	05
5	Dams , Retaining Walls And Chimneys	04
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 stress.
- 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, 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:
uniform section, varying section, composite section, temperature stresses.

2.0 SHEAR FORCE AND ENDING MOMENTS IN 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

4.0 COMBINED DIRECT AND BENDING 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:

Fundamental features of dams, retaining walls, masonry Chimneys and their stability considerations.

6.0 SHEAR AND TORSION:

- 6.1 Shear stress distribution in beams of rectangular circular and sections symmetrical about vertical axis.
- 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. Stresses on a given plane – State and explain formulae for shear and normal stress components on any inclined plane. Solve numerical problems.

- 8.2 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

REFERENCE 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

Total Periods: 60

Evaluation Scheme

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 of Hydraulics, 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.

SURVEY – I (Th:3)

Periods per week:4
Total Periods:60

Total marks: 100

Evaluation Scheme
Theory- 3hrs
End Term Exam: 80
I.A.: 15+5(asgmt.)=20

TOPIC WISE DISTRIBUTION OF PERIODS:

SL. No.	Topics	Lectures in period
1	INTRODUCTION	03
2	LINEAR MEASUREMENTS	05
3	CHAINING	05
4	CHAIN SURVEYING	12
5	ANGULAR MEASUREMENT	05
6	COMPASS SURVEYING	12
7	COMPUTATION OF AREA	06
8	PLANE TABLE SURVEYING	12
	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 MEASUREMENTS :

- 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 indirect 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 Reconnaissance 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, variation in 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 Determination of areas, computation of areas from plans.

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

8.0 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, 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.

8.8 Plane table surveying in a developed area like town.

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 Periods: 60

Total marks: 100

Evaluation Scheme

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, morrum 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	02
2	Site Investigation	04
3	Foundations	08
4	Walls	08
5	Damp Proofing	04
6	Arches & Lintels	05
7	Doors & Windows	05
8	Floors	05
9	Roofs	04
10	Stairs	05
11	Surface Finishes	04
12	General Idea of Seismic Planning & Design of Building	03
13	Construction Machineries	03
	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 Site 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, driven)

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, 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 pinning ; 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 insulating 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

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 and magnitude.
- 12.2 Seismic Planning of buildings, special design features of earthquake resistant buildings.
- 12.3 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.Monckcton

(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.

2.0 CHAINING:

2.1 Testing and adjusting of a metric chain.

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

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

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

2.5 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 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

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 a prismatic compass and a Surveyor's compass to describe the compasses by drawing neat sketches.

4.2 Testing and adjustment 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 compass, given the length and bearing of one side and included angles.

5.0 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 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)

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 PLANE TABLE SURVEYING :

6.1 Setting 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:

- | | |
|---------------------------------------|------------------------------|
| 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)

Period per week: 6P
Total periods (Practical): 90

Evaluation scheme:
End term examination: 50 marks
Sessional: 50 marks
Total : 1000 marks

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. |

(3) CIVIL ENGINEERING DRAWING-I (Practical-3)

Periods per week: 06
Total Periods: 90

Total marks: 50

Evaluation Scheme

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 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.
- 2.3 Orientation 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)

3.0 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 from 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.

4.0 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.
(gabled / 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 |

SYLLABUS OF THIRD SEMESTER CIVIL ENGINEERING

**Finalised in the syllabus Committee Meeting
held on Dt. 21.06.2010 ,2.30PM at Women's
Polytechnic, Chandrasekharpur, Bhubaneswar**

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