

| COURSE TITLE: BUILDING MATERIALS | | | | | | | | |
|----------------------------------|----------|-------------------|-------|----------|----------|------|-----------|-----|
| COURSE CODE: 3330601 | | | | | | | | |
| TEACHING SCHEME | TOTAL | EVALUATION SCHEME | TOTAL | | | | | |
| THEORY | TUTORIAL | PRACTICAL | | EXTERNAL | MID TERM | VIVA | PRACTICAL | |
| 3 | 0 | 2 | 5 | 70 | 30 | 20 | 30 | 150 |

UNIT-01 INTRODUCTION

1.1 Physical, chemical and engineering properties of building materials. **1.2** Application of building materials **1.3** Alternative materials for the given items in building construction.

UNIT-02 CLAY PRODUCTS

2.1 Classification of clay products **2.2** Types of bricks **2.3** Manufacturing process of bricks

2.4 Test on bricks **2.5** Standard requirements and grades of bricks as per BIS **2.6** Types of clay tiles and its uses

UNIT-03 ROCKS & STONES

3.1 Classification of rocks **3.2** Rock products **3.3** Characteristics of stones - Structure, texture, strength, gravity, porosity, absorption, hardness, durability, weight. **3.4** Standard requirement of building stone **3.5** Important stones used in construction with its suitability.

UNIT-04 LIME & POZZOLONAS

4.1 Sources and classification of Lime **4.2** Uses of lime with specific field situation **4.3** Types of pozzolanic materials **4.4** Advantages of addition of pozzolanic material

UNIT-05 MATERIALS FOR CONCRETE

5.1 Types of cement with their specific use **5.2** Grade of cement as per BIS **5.3** Engineering properties of cement **5.4** Field and laboratory test of cement as per BIS **5.5** Methods of storing the cement **5.6** Types of aggregate as per BIS **5.7** Requirements of aggregate as per BIS **5.8** Engineering properties of aggregate **5.9** Test on aggregate

UNIT-06 TIMBER

6.1 Types of timber **6.2** Uses and application of timber **6.3** Defects in timber and wood **6.4** Seasoning **6.5** Wood products with specific uses

UNIT-07 MISCELLANEOUS CONSTRUCTION MATERIALS

7.1 Plastics and PVC **7.2** Ceramic products **7.3** Paints and Varnish **7.4** Materials for damp proofing, water proofing **7.5** Materials for anti termite treatment **7.6** Steel and iron materials **7.7** Materials used for false ceiling **7.8** Asbestos **7.9** Concrete blocks

LIST OF PRACTICALS:

1. Conduct local market survey for different civil engineering materials with respect to applications cost, and quality
2. Perform tests on given sample of brick such as
 - Soundness
 - Water absorption
 - Compressive strength
3. Conduct field test on given sample of brick and cement
4. Perform lab tests on given sample of cement
 - Initial and final setting time
 - Compressive strength

5. Conduct field test on given sample of fine and coarse aggregate
6. Perform test on given sample of fine aggregate
 - Sieve analysis
 - Silt and clay content
7. Assess the quality of different types of timber and timber products (please arrange to visit nearby saw mill or timber mart)

BOOK:

| SR. No. | Title of Books | Author | Publications |
|---------|-----------------------|--------------|--------------|
| 01 | Engineering Materials | S C Rangwala | Charotar |

| COURSE TITLE: CONSTRUCTION TECHNOLOGY | | | | | | | | |
|---------------------------------------|----------|-----------|-------|-------------------|----------|------|-----------|-------|
| COURSE CODE: 3330602 | | | | | | | | |
| TEACHING SCHEME | | | TOTAL | EVALUATION SCHEME | | | | TOTAL |
| THEORY | TUTORIAL | PRACTICAL | | EXTERNAL | MID TERM | VIVA | PRACTICAL | |
| 3 | 0 | 2 | 5 | 70 | 30 | 20 | 30 | 150 |

UNIT-1 INRODUCTION

1.1 Introduction of various Civil Engineering structures 1.2 Functions of various components of building and other structures

UNIT-2 FOUNDATIONS

2.1 Classification and types of foundations 2.2 Selection of the suitable type of foundation for required structure and as per situation 2.3 Foundations in black cotton soil, loose soils etc. 2.4 Timbering in trenches failures in foundation Precautions & remedial measures

UNIT-3 BUILDING CONSTRUCTIONS

3.1 Brick and stone masonry 3.2 Selection of suitable type of masonry 3.3 Construction procedures. 3.4 Ingredients of concrete. 3.5 Production of concrete, transportation, placing, compaction, curing 3.6 Concrete in different situations viz. hot weather, cold weather, under water etc. 3.7 Purpose & types of scaffolding and centering 3.8 Suitability of scaffolding as per situations and type of structures.

3.9 Erection of centering for different component

UNIT-4 BUILDING ITEMS

4.1 Plastering & pointing- its purpose, various types, construction procedures, advantages and disadvantages, suitability of each. 4.2 Damp proof course (DPC) 4.3 Anti-termite measures and treatments 4.4 Construction joints-need and materials used. 4.5 Plumbing and electrification- various types of fittings and laying procedure.

UNIT-5 CONSTRUCTION MACHINERY

5.1 Purpose, advantages and disadvantages. 5.2 Machineries used for earthwork and for other construction works. Mortar – Types & specific uses 5.3 their details, special features, suitable uses, specifications.

UNIT-6 BUILDING MAINTENANCE AND SAFETY MEASURES

6.1 Purpose, need, importance, methods. 6.2 Causes and types of defects in buildings. 6.3 Preparation of report on maintenance work. 6.4 Remedial measures and execution procedure of any one type of building maintenance work. 6.5 Importance of various Laws / Norms /

Regulations / Acts for safety. 6.6 Precautions and precautionary Measures. 6.7 Post-accident procedures. Give Examples.

LIST OF PRACTICALS:

1. Sketches:

- Foundations
- Brick and stone masonry
- Scaffolding and masonry
- types of damp proof force

2. Field work

- Layout for foundation for a given plan of building
- Exercise for carry out masonry work

3. Field visit for following

- Excavation
- Foundation
- Flooring
- Masonry
- Plastering & pointing

BOOK:

| S. No. | Title of Books | Author |
|--------|-----------------------|----------------|
| 1 | Building Construction | S. C. Rangwala |

| COURSE TITLE:HYDRAULICS | | | | | | | | |
|-------------------------|----------|-----------|-------|-------------------|----------|------|-----------|-------|
| COURSE CODE: 3330603 | | | | | | | | |
| TEACHING SCHEME | | | TOTAL | EVALUATION SCHEME | | | | TOTAL |
| THEORY | TUTORIAL | PRACTICAL | | EXTERNAL | MID TERM | VIVA | PRACTICAL | |
| 3 | 1 | 2 | 6 | 70 | 30 | 20 | 30 | 150 |

UNIT-1 INTRODUCTION PRESSURE AND PRESSURE MANAGEMENT

1.1 Technical terms used in Hydraulics – Fluid Mechanics, Hydrostatics, Hydro-kinematics, Hydro-Dynamics-Ideal and Real Fluid.**1.2** Properties of liquid – Viscosity-Density-Specific Gravity-Surface Tension-Capillarity Vapor Pressure-Elasticity.**1.3** Various types of pressure – Atmospheric Pressure- Gauge Pressure-Absolute Pressure Vacuum Pressure-Separation Pressure/s**1.4** Measurement of pressure/s by different methods**1.5** Measurement of difference of pressure using “U” tube Manometer and inverted “U” tube Manometer

UNIT-2 HYDROSTATIC

2.1 Relationship between pressure and depth of liquid **2.1.1** Pressure diagram for different conditions **2.2** Total pressure and center of pressure **2.2.1** Computation of Total Pressure and depth of center of pressure

UNIT-3 HYDROKINEMATICS & HYDRODYNAMICS

3.1 Types of flow - Laminar --Turbulent --Uniform -- Non-uniform –Steady--Un-steady – Rotational and irrotational --One, Two and Three Dimensional flow**3.2** Reynolds’s number **3.3** Continuity Equation **3.4** Types of Energy – Potential, Pressure and kinematics

3.5 Bernoulli's Equation and its applications. 3.6 Momentum Equation

UNIT-4 HYDRAULIC COEFFICIENT, NOTCHES & WEIR

4.1 Definition and types of orifice **4.2** Various Hydraulic Coefficients and its relation - Coefficient of Contraction, Velocity, Discharge. **4.3** Types of notches and weirs **4.4** Computation of discharge through notches **4.4.1** Rectangular Notch **4.4.2** V -Notch.

4.5 Computation of discharge through weirs **4.5.1** Discharge through narrow crested and broad Crested weir. **4.5.2** Discharge through Cipolletti weir.

UNIT-5 FLOW THROUGH PIPES

5.1 Characteristics of flow through pipes **5.2** Major and Minor Energy (Head) losses in pipe Flow- frictional loss, loss of head at entry, exit, sudden enlargement and contraction and at bend.

5.2.1 Computation of major head by Darcy Weisbach Equation. **5.3** Hydraulic Gradient Line (HGL) and Total Energy line (TEL) **5.4** Design of Pipeline-using formula & Nomo gram

UNIT-6 FLOW THROUGH CHANNELS

6.1 Characteristics of open channel flow **6.1.1** Comparison of pipe flow and channel flow.

6.1.2 Field examples of open channel **6.2** Analyse uniform flow **6.2.1** Fraud's number,

6.2.2 Hydraulic mean depth- concept & computation **6.2.3** Use of Chezy's and Manning's formulae. **6.2.4** Most economical sections of channel **6.2.4.1** Rectangular, Trapezoidal and circular shapes. **6.3** Specific Energy Diagram **6.4** River Gauging **6.4.1** Measurement of mean velocity using surface float, velocity rod and current meter.

LIST OF PRACTICALS:

1. Measure the pressure of water in pipe using
2. Piezometer (b) Different types of manometers
3. Determine discharge through a given venturimeter.
4. Determine coefficient such as C_c , C_v , and C_d for different types of orifices
5. Compute coefficient of discharge for V notch and Preparation of calibration graph for interpolation and extrapolation
6. Compute coefficient of discharge for Rectangular notch and Preparation of calibration graph for interpolation and extrapolation
7. Determine loss of head in various diameter of pipes and effect of material of pipe on loss of head
8. Demonstrate functioning of Bernoulli's Apparatus
9. Demonstrate use of Reynolds's number

LIST OF TUTORIALS:

1. Solve numerical problems based Pressure measurement
2. Solve numerical problems based on Hydrostatics
3. Solve numerical problems based on Hydrodynamic and Hydro kinematics
4. Solve numerical problems based on Hydraulic coefficient, notches and weirs
5. Solve numerical problems based on Flow through pipes
6. Solve numerical problems based on Flow through Open Channel

BOOK:

| S. No. | Title of Books | Author | Publication |
|--------|---------------------------------|------------|-------------|
| 1 | Hydraulics, Fluid Mechanics and | R K Bansal | S.Chand |

| | | | |
|--|-------------------|--|--|
| | Hydraulic machine | | |
|--|-------------------|--|--|

| COURSE TITLE: STRUCTURAL MECHANICS | | | | | | | | |
|------------------------------------|----------|-------------------|----------|----------|------|-----------|----|-----|
| COURSE CODE:3330604 | | | | | | | | |
| TEACHING SCHEME | TOTAL | EVALUATION SCHEME | TOTAL | | | | | |
| THEORY | TUTORIAL | PRACTICAL | EXTERNAL | MID TERM | VIVA | PRACTICAL | | |
| 4 | 1 | 2 | 7 | 70 | 30 | 20 | 30 | 150 |

UNIT-1 DIRECT STRESS & STRAIN

1.1 Different types of Structures and Loads **1.2** Direct Stress, linear Strain, and Hook's Law Numerical Problems on Direct Stress & Linear Strain. Stress Strain curve of Mild Steel. Modulus of Elasticity. Yield, Breaking & Ultimate Stress and factor of Safety along with numerical problems **1.3** Lateral Strain and Poisson's ratio with numerical problems **1.4** Basics Concepts of Shear Stress, Shear Strain & Shear Modulus **1.5** Bulk Modulus, volumetric Strain along with numerical Problems **1.6** Differentiate between Sudden, Gradual & Impact Loads Define Strain Energy, and Proof Resilience for Sudden and Gradual & Impact Load along with numerical problems

UNIT-2 MOMENT OF INERTIA

2.1 Moment of Inertia & its Importance **2.2** Parallel & Perpendicular Axis Theorem **2.3** Formula of Moment of Inertia of solid & hollow sections like Rectangle, Triangle, Circle **2.4** Moment of Inertia about C.G for I section, H section, Channel Section, Angle Section, T Section and Built up Section having flange plates to I & H Section and of Double Channels back to back & toe to toe

UNIT-3 S.F & B.M IN BEAM

3.1 Statically Determinate Beam like Cantilever, Simply Supported & Over Hang Beam **3.2** Shear Force and Bending Moment and its relationship **3.3** Sagging & Hogging Bending Moment and its importance **3.4** Point of Contra-flexure & its importance **3.5** S.F & B.M Diagram for Cantilever, Simply Supported & over Hang Beam subjected to Point Load and/ or U.D.L

UNIT-4 BENDING SHEAR & STRESSES IN BEAM

4.1 Bending Theory Equation Bending stress, Sectional Modulus, Neutral Axis Apply Bending theory to statically determinate beams having rectangular or circular section **4.2** Shear Stress equation Shear Stress Distribution Diagram for Solid & Hollow Rectangular And Circular Section Apply shear Stress Equation & Draw Shear Stress Distribution Diagram for I, H, T, Channel & Angle Section.

UNIT-5 ANALYSIS OF TRUSS

5.1 Perfect & Imperfect Truss **5.2** Various trusses for different spans and application **5.3** Analysis of Triangle, Howe, and North Light & Fan trusses under Panel Point Loads using Graphical & Method of Joint

UNIT-6 COLUMN & STRUT

6.1 Column & Strut **6.2** Short & Long Column **6.3** End Condition of Column and effective Length of Column & Modes of Failure in column

6.4 Radius of Gyration, Slenderness Ratio **6.5** Euler’s Crippling Load **6.6** Rankin’s load Buckling Load of Column

LIST OF PRACTICALS:

1. Conduct Tension test on a given sample of mild steel and draw Stress Strain Curve
2. Determine Young’s Modulus of wire of given material
3. Calculate impact value of mild steel using IZOD impact test apparatus
4. Calculate impact value of mild steel using Charpy impact test apparatus
5. Solve at least six problems pertaining to Unit-01
6. Work out Moment of Inertia of Fly Wheel
7. Solve Four Problems of Moment of Inertia
8. Solve at Least Eight numerical Problems of Unit-04
9. Analyse Truss using Graphical Method (At least THREE Trusses) and verify using analytical method.
10. Demonstrate End Conditions of Column using suitable model/example
11. Solve Least Six numerical Problems pertaining Unit-06

LIST OF TUTORIALS:

1. Solve few problems of Unit-3 and give similar exercises at least 12 to the students to practice
2. Solve PROBLEMS OF Unit-5 and ask students to practice for at least 04 problems based on Method of Joint

BOOK:

| S. No. | Title of Books | Author |
|--------|--|-----------------|
| 1. | Strength of Material & Mechanics of structures | Dr. B C Punamia |

| COURSE TITLE: SURVEYING | | | | | | | | |
|-------------------------|----------|-----------|-------|-------------------|----------|------|-----------|-------|
| COURSE CODE:3330605 | | | | | | | | |
| TEACHING SCHEME | | | TOTAL | EVALUATION SCHEME | | | | TOTAL |
| THEORY | TUTORIAL | PRACTICAL | | EXTERNAL | MID TERM | VIVA | PRACTICAL | |
| 3 | 0 | 6 | 9 | 70 | 30 | 60 | 90 | 250 |

UNIT-1 INTRODUCTION & SCALES

1.1 Definitions **1.2** Objective and uses of surveying **1.3** Plain and Geodetic Survey**1.4** Classification of Survey
1.5 Principals of Survey **1.6** Types of Scale and selection of scale**1.7** Construction of diagonal scale

UNIT-2 CHAIN SURVEY

2.1 Introduction **2.2** Instruments used in chain survey Metric Chain, Tapes, Arrow, Tapes, Ranging rod, Offset rod, Open cross staff, optical square**2.3** Technical terms related with chain survey Survey Station, Base line, Check line, Tie line, Offset, and Tie station
2.4 Method of Chaining **2.5** Errors in length due to incorrect length and related problems.
2.6 Obstacles in chaining **2.7** Ranging-Direct Ranging & Indirect Ranging**2.8** Types of offsets -Perpendicular & Oblique **2.9** Location Sketch of survey station and running measurements of building. **2.10**Conventional Signs

UNIT-3 COMPASS SURVEY

3.1 Introduction-Triangulation Survey & Traversing **3.2** Components of Prismatic Compass
3.3 Functions of different parts of prismatic compass **3.4** Differentiate Prismatic and Surveyor compass **3.5** Method to use Prismatic Compass **3.6** Technical Terms - True Meridian & Bearing, - Magnetic Meridian & Bearing, - Arbitrary Meridian & Bearing, - Dip of Magnetic needle - Declination,- Fore Bearing & Back Bearing **3.7** Whole Circle Bearing System and Reduced Bearing System & examples on conversion of given bearing to another bearing (from one form to another) **3.8** Method of finding included angles from bearings & examples **3.9** Local attraction and Closing error with relevant examples **3.10** Errors in compass survey and elimination of errors

UNIT-4 LEVELLING

4.1 Introduction **4.2** Basic terminology related with leveling like Level surfaces, Horizontal & vertical surfaces, Datum, Bench Marks, Reduced Level, Rise, Fall, Line of collimation, Axis of Telescope, Axis of bubble tube, Station, Back sight, Fore sight, intermediate sight, Change point, Height of instruments, Focusing and parallax, etc. **4.3** Types of Level Dumpy Level, Tilting Level, Auto Level, Digital Level **4.4** Components of Dumpy Level with neat sketch **4.5** Types of Leveling Staffs Self-reading staff & Target staff **4.6** Temporary adjustment of Level **4.7** Classification of Leveling- Simple Leveling, Differential Leveling, Fly Leveling, Profile Leveling, Reciprocal Leveling and Precise Leveling **4.8** Examples & methods of finding out the R. L. in Level Book by H.I. Methods and Rise & Fall Methods with necessary check. **4.9** Correction for Curvature and refraction and related examples **4.10** Errors in Leveling **4.11** Contour **4.12** Uses of contours **4.13** Characteristics of contours **4.14** Methods of Contouring **4.15** Interpolation of contours **4.16** Preparing drawing & estimation of gradients **4.17** Calculation of capacity of reservoirs & related examples

UNIT-5 PLANE TABLE SURVEY

5.1 Introduction to Plane Table surveying **5.2** Equipment's and accessories of plane table survey **5.3** Advantages and disadvantages of plane table survey **5.4** Orientation of plane table survey **5.5** Methods of setting up plane table over the station **5.6** Points to be kept in mind during plane table surveying **5.7** Errors in plane table surveying

UNIT-6 INTRODUCTION TO GLOBAL POSITIONING SYSTEM (GPS)

6.1 Introduction to GPS **6.2** Maps & types of digital map **6.3** Fundamentals of GPS **6.4** Uses of GPS **6.5** GPS Receivers (Hand Held GPS Receivers) **6.6** Field procedures of GPS **6.7** Observations and applications in Civil Engineering

LIST OF PRACTICALS:

1. Perform ranging and chaining operations in different field conditions.
2. Take offsets (Perpendicular and Oblique) in different field conditions.
3. Perform temporary adjustments of Prismatic Compass
4. Determine bearings of different survey lines by using Prismatic Compass
5. Determine included angles from measured bearings.
6. Project in chain, tape and compass Survey: survey the given area /field and prepare the drawing sheet
7. Perform temporary adjustments of Level
8. Carry out profile Levelling in different field conditions
9. Project in Profile Levelling: Carry out the Levelling survey on an undulated ground and prepare the drawing sheet (minimum area under survey 100m X 60 m)

Set plane table by different orientation methods on given survey station Project in Plane Table Survey: Prepare map of open vacant land (min 1000 sq.) using any plane table method

10. Demonstrate use of Global Positioning System (GPS)

LIST OF BOOKS

| S. No. | Title of Books | Author | Publication |
|---------------|------------------------------|------------------|---------------------------------|
| 1 | Surveying and Leveling Vol-I | Dr. B. C. Punmia | Laxmi Publications Pvt. Ltd. |