

DEPARTMENT OF CIVIL TECHNOLOGIES

Second Year - Weekly Course Description & Syllabus

1. Soil Mechanics

WEEK	THEORETICAL SYLLABUS	PRACTICAL / LABORATORY SYLLABUS
Week 1	Introduction to Soil Mechanics and Soil Formation	Soil sampling and visual identification
Week 2	Phase Relationships (Void ratio, Porosity, Saturation)	Moisture content determination test
Week 3	Weight-Volume Relationships and Formulas	Specific gravity test of soil solids
Week 4	Soil Grain Size Distribution & Sieve Analysis	Dry and wet sieve analysis laboratory test
Week 5	Hydrometer Analysis for Fine-Grained Soils	Hydrometer analysis laboratory test
Week 6	Atterberg Limits (Liquid & Plastic Limits)	Liquid limit & Plastic limit tests
Week 7	Unified Soil Classification System (USCS)	Soil classification exercise
Week 8	AASHTO Soil Classification System	AASHTO classification practice
Week 9	Soil Compaction Principles & Moisture-Density	Standard Proctor compaction test
Week 10	Field Compaction Control and Methods	Modified Proctor compaction test
Week 11	Soil Permeability & Darcy's Law	Constant head permeability test
Week 12	Permeability Laboratory Testing Methods	Falling head permeability test
Week 13	Seepage through Soils and Flow Nets	Sand cone field density test
Week 14	Effective Stress Concept in Soils	Direct shear test demonstration
Week 15	Shear Strength Principles in Soils	Unconfined compression test

2. Concrete Technology

WEEK	THEORETICAL SYLLABUS	PRACTICAL / LABORATORY SYLLABUS
Week 1	Fresh Concrete Properties and Workability	Slump test for concrete workability
Week 2	Factors Affecting Workability and Segregation	Vebe time & Compacting factor test
Week 3	Concrete Mix Design Principles (ACI Method)	Mix design calculation practice
Week 4	Concrete Batching, Mixing, and Transporting	Batching and trial mix preparation
Week 5	Placement and Compaction of Fresh Concrete	Casting concrete cubes and cylinders
Week 6	Concrete Curing Methods and Hydration	Curing tank setup and monitoring
Week 7	Compressive Strength of Hardened Concrete	Compressive strength test on cubes
Week 8	Tensile & Flexural Strength of Concrete	Splitting tensile test on cylinders
Week 9	Modulus of Elasticity of Concrete	Flexural strength test on beams
Week 10	Chemical Admixtures (Plasticizers, Accelerators)	Testing concrete with admixtures
Week 11	Durability of Concrete and Permeability	Water absorption test of concrete
Week 12	Shrinkage and Creep in Hardened Concrete	Non-destructive testing (Rebound Hammer)
Week 13	Hot Weather Concreting Precautions	Ultrasonic Pulse Velocity (UPV) test
Week 14	Special Concretes (Lightweight, High-Strength)	Core testing procedure demonstration
Week 15	Quality Control & Standard Deviations	Statistical analysis of test results

3. Advanced Surveying

WEEK	THEORETICAL SYLLABUS	PRACTICAL FIELDWORK
Week 1	Theodolite Components and Axis Relationships	Theodolite setup and centering
Week 2	Horizontal Angle Measurement Methods	Repetition and Reiteration angle methods
Week 3	Vertical Angle Measurement and Height Determination	Measuring height of inaccessible objects
Week 4	Traverse Surveying Concepts & Classification	Field traverse planning and marking
Week 5	Traverse Computations (Latitudes & Departures)	Traverse field measurements
Week 6	Traverse Closing Error and Bowditch Adjustment	Traverse adjustment calculations
Week 7	Tacheometric Surveying Principles (Stadia Method)	Tacheometric field constants setup
Week 8	Distance & Elevation Computation via Tacheometry	Field mapping via tacheometry
Week 9	Electronic Distance Measurement (EDM) Principles	EDM instrument handling
Week 10	Total Station Operations and Functions	Total Station setup & data creation
Week 11	Topographic Mapping using Total Station	Field topographic survey execution
Week 12	Engineering Curves: Simple Circular Curve Geometry	Setting out curves by deflection angles
Week 13	Compound and Reverse Curves	Field curve layout techniques
Week 14	Vertical Curves and Transition Curves	Setting out building layout corners
Week 15	Global Positioning System (GPS) in Surveying	Handheld and RTK GPS field practice

4. Computer Applications (AutoCAD)

WEEK	THEORETICAL & LAB COMPUTER TOPICS
Week 1	AutoCAD Interface, Coordinate Systems, and Units Setup
Week 2	Basic Drawing Commands (Line, Circle, Arc, Polyline)
Week 3	Object Snaps, Grid, and Ortho Drawing Aids
Week 4	Modify Commands (Move, Copy, Rotate, Mirror, Scale)
Week 5	Advanced Modify Commands (Trim, Extend, Offset, Fillet, Array)
Week 6	Layer Management, Color, Linetype, and Lineweight Properties
Week 7	Text Creation (Single-line & Multiline) and Text Styles
Week 8	Dimensioning Commands, Styles, and Annotation Settings
Week 9	Hatching Patterns and Gradient Fills for Structural Drawings
Week 10	Block Creation, Insertion, and Dynamic Blocks
Week 11	Drafting Architectural Floor Plans (Grid lines, Walls, Openings)
Week 12	Drafting Foundation Plans and Structural Columns Layout
Week 13	Drafting Structural Reinforced Concrete Beam & Slab Sections
Week 14	Layout Viewports, Page Setup, Scale Adjustment, and Plotting
Week 15	Complete Structural Drawing Project Execution in AutoCAD

5. Quantity Surveying & Estimation

WEEK	THEORETICAL TOPICS
Week 1	Introduction to Quantity Surveying, Bill of Quantities (BOQ), and Units
Week 2	Quantity Take-off Methods (Centerline Method & Long Wall-Short Wall Method)
Week 3	Earthwork Volume Estimation for Foundations (Excavation & Backfilling)
Week 4	Quantities Estimation for Plain Concrete Foundations and Substructure
Week 5	Quantities Estimation for Reinforced Concrete Footings and Columns
Week 6	Brickwork Quantity Estimation for Substructure and Superstructure
Week 7	Reinforced Concrete Quantity Take-off for Beams and Lintels
Week 8	Reinforced Concrete Quantity Take-off for Slabs and Staircases
Week 9	Plastering, Rendering, and Painting Area Quantity Calculations
Week 10	Flooring, Tiling, and Damp-Proof Course (DPC) Calculations
Week 11	Steel Reinforcement Bar Bending Schedules (BBS) Preparation
Week 12	Rate Analysis for Concrete, Brickwork, and Earthwork
Week 13	Specifications Drafting for Structural Construction Items
Week 14	Preparation of Tender Documents and Cost Estimation
Week 15	Complete Bill of Quantities (BOQ) Project Calculation

6. Building Construction & Maintenance

WEEK	THEORETICAL TOPICS
Week 1	Building Components Overview and Site Preparation Work
Week 2	Shallow Foundations: Types, Construction, and Waterproofing
Week 3	Deep Foundations: Piles Types and Construction Procedures
Week 4	Masonry Walls Construction: Bonds, Joints, and Expansion Joints
Week 5	Reinforced Concrete Framing Systems (Columns, Beams, Slabs)
Week 6	Damp-Proofing and Waterproofing Systems in Buildings
Week 7	Roofs and Roofing Materials: Flat and Pitched Roof Construction
Week 8	Staircases Construction and Architectural Dimensions
Week 9	Doors and Windows: Frames, Types, and Installation
Week 10	Building Finishes: Plastering, Tiling, and False Ceilings
Week 11	Causes of Building Defects and Structural Deterioration
Week 12	Cracks in Buildings: Types, Diagnosis, and Monitoring
Week 13	Repair and Retrofitting Methods for Concrete Structures
Week 14	Maintenance of Plumbing, Roofing, and Waterproofing Systems
Week 15	Building Inspection Reports and Maintenance Management

7. Civil & Structural Drawing

WEEK	THEORETICAL & DRAWING STUDIO TOPICS
Week 1	Structural Symbols, Concrete Reinforcement Conventions, and Scales
Week 2	Isolated and Strip Footing Reinforcement Detail Drawings
Week 3	Combined Footing and Mat/Raft Foundation Steel Details
Week 4	Reinforced Concrete Columns Details and Tie Bar Spacing
Week 5	Simply Supported R.C. Beam Detailing (Longitudinal & Cross Sections)
Week 6	Continuous R.C. Beam Detailing and Stirrup Hook Details
Week 7	One-Way Solid Slab Reinforcement Layout and Sections
Week 8	Two-Way Solid Slab Reinforcement Layout and Details
Week 9	Ribbed Slab (Hordy) Construction Detail Drawings
Week 10	Reinforced Concrete Staircase Structural Details
Week 11	Retaining Wall Reinforcement Drawings (Cantilever & Gravity)
Week 12	Steel Truss Connection Details and Structural Steel Sections
Week 13	Sanitary and Plumbing Layout Drawings for Buildings
Week 14	Water Supply Pipe Network Drawings for Multi-story Buildings
Week 15	Complete Structural Working Drawing Set Review

8. Professional Ethics

WEEK	THEORETICAL TOPICS
Week 1	Concepts of Ethics, Morality, and Professional Conduct
Week 2	Engineering Ethics Principles and Professional Responsibilities
Week 3	Safety, Health, and Public Welfare Priorities in Construction
Week 4	Integrity, Honesty, and Avoiding Conflict of Interest
Week 5	Professional Duties towards Clients and Employers
Week 6	Contracts, Fair Competition, and Anti-Corruption Principles
Week 7	Environmental Protection and Sustainable Construction Conduct
Week 8	Intellectual Property Rights and Confidentiality
Week 9	Engineers' Code of Ethics and Professional Associations Rules
Week 10	Legal Liabilities in Engineering Projects and Disputes
Week 11	Whistleblowing and Moral Dilemmas in Workplace
Week 12	Quality Assurance and Accountability in Civil Works
Week 13	Social Responsibility of Engineers in Community Projects
Week 14	Case Studies on Engineering Ethical Failures and Lessons
Week 15	Review of Ethical Standards in Modern Engineering Practice