B.TECH CIVIL ENGINEERING – R22

Drafting and Modelling Using AutoCAD Civil 3D

SEMESTER IV

L/T/P/C
3/0/0/S

Value Added Course: Drafting and Modelling Using AutoCAD Civil 3D

Course Duration: 30–40 Hours
Prerequisites: Basic knowledge of Engineering Drawing and Surveying

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UNIT – I: Introduction to AutoCAD Civil 3D and Basic Drafting

- Introduction to CAD and BIM Concepts
- Overview of AutoCAD Civil 3D Interface
- Drawing Setup and Workspace Management
- Coordinate Systems and Units
- Basic Drawing Commands
- Editing and Modification Tools
- Layers, Linetypes, Annotation, and Dimensioning
- Object Properties and Drawing Standards

Practical: Creation of 2D engineering drawings using drafting and editing tools.

UNIT – II: Survey Data Management and Surface Modelling

- Introduction to Surveying Data in Civil 3D
- Importing Survey Points and Field Data
- Point Creation and Point Groups
- Surface Creation from Survey Data
- Triangulated Irregular Network (TIN) Surfaces
- Surface Analysis and Visualization

- Contour Generation and Editing
- Surface Labels and Annotations

Practical: Development of terrain models and contour maps from survey data.

UNIT – III: Alignment and Profile Design

- Introduction to Transportation Design Concepts
- Creation of Horizontal Alignments
- Alignment Geometry and Design Criteria
- Profile Creation from Existing Ground Surface
- Design Profiles and Vertical Alignment
- Profile View Generation and Editing
- Superimposed Profiles and Annotations
- Alignment and Profile Reporting

Practical: Design of road centerline alignments and longitudinal profiles.

UNIT – IV: Corridor Modelling and Earthwork Analysis

- Introduction to Corridor Modelling
- Assembly Creation and Subassemblies
- Corridor Generation and Editing
- Cross-Section Creation and Analysis
- Sample Lines and Section Views
- Earthwork Quantity Computation
- Cut-and-Fill Analysis
- Volume Calculations and Reports

Practical: Development of road corridor models and earthwork quantity estimation.

UNIT – V: Site Development, Pipe Networks and Project Documentation

- Site Grading and Feature Lines

- Parcel Creation and Land Development Applications
- Stormwater and Utility Network Design
- Pipe Network Creation and Management
- Plan Production Tools
- Sheet Creation and Plotting
- Project Documentation and Report Generation
- Industry Applications and Case Studies

Practical: Preparation of a complete Civil 3D project involving surface, alignment, corridor, and utility network design.

Course Outcomes (COs)

After successful completion of this course, students will be able to:

1. Create and edit engineering drawings using AutoCAD Civil 3D tools.
2. Process survey data and generate terrain surface models.
3. Design road alignments, profiles, and transportation corridors.
4. Perform earthwork analysis and quantity calculations for civil engineering projects.
5. Develop site layouts, utility networks, and project documentation using industry-standard software.