Advance Autodesk Civil 3D Training Program

1. TARGET AUDIENCE:

This course is designed for civil engineering students, BIM engineers, CAD technicians, surveyors, and land development professionals who want to master Autodesk Civil 3D for real-world projects. It is also beneficial for infrastructure engineers, site engineers, architects, urban planners, and professionals transitioning into BIM-based workflows.

2. COURSE OBJECTIVE:

The objective of this course is to provide a complete understanding of land development and surveying workflows using Autodesk Civil 3D. It focuses on transforming raw survey data into engineering models and developing surfaces, alignments, corridors, grading, parcels, and construction-ready outputs.

3. COURSE OUTCOMES:

By the end of the course, learners will be able to process survey data, create surfaces, design alignments and profiles, develop corridors, perform grading, create parcels, design basic drainage networks, generate quantities, and produce final plan sheets for land development projects.

4. COURSE OUTLINE:

The course comprises **30 hours** of theory and hands-on labs and is divided into **09 modules**. Each module includes practical exercises and assignments covering survey data processing, surface modeling, alignment and corridor design, grading, parcels, pipe networks, quantity takeoff, and a complete land development project.

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Module 1: Data Management & Collaboration

- **Project Structure Best Practices:** Setting up centralized working folders and advanced Data Shortcuts.
- **Reference Templates (DWT):** Managing, updating, and syncing corporate CAD standards across multiple project files.
- **Troubleshooting Data References**: Repairing broken links, promoting shortcuts, and managing XML data.
- **Cloud Collaboration:** Workflows using Autodesk Docs, Desktop Connector, and BIM Collaborate Pro.

Module 2: Profile and Alignment Tools

- **Complex Alignments:** Designing compound curves, reverse curves, and spiral transitions.
- Superelevation: Calculating, editing, and resolving overlapping superelevation data; creating diagrams.
- **Advanced Profile Creation:** Utilizing Best Fit, Superimposed, and Surface profiles for complex vertical design.
- **Design Criteria:** Applying and customizing local design standards and design checks.

Module 3: Surface Modeling & Analysis

- **Complex Data Integration:** Generating surfaces from Point, LIDAR, and DEM files.
- **Surface Editing:** Utilizing complex breaklines, destructive/non-destructive boundaries, and surface smoothing algorithms.
- **Surface Analysis:** Running water drop analysis, catchment/watershed delineation, and elevation/slope banding.
- **Volume Tracking:** Using the Volume Dashboard, creating grid volume surfaces, and calculating bounded earthwork.

Module 4: Grading & Site Development

- **Mastering Feature Lines:** Understanding site topology, resolving split-point elevations, and prioritizing feature line styles.
- **Grading Criteria:** Creating and saving custom grading criteria sets for repetitive site conditions.
- **Grading Operations:** Working with Grading Groups, transition grading, and automated earthwork balancing.
- **Complex Site Design:** Sizing and optimizing stormwater ponds, basins, etc

Module 5: Corridor Modeling

- **Multi-Baseline Corridors:** Managing complex, interconnected corridor regions.
- **Advanced Targeting:** Utilizing conditional subassemblies, offset/elevation targets, and feature line targeting.
- **Intersection & Cul-de-sac Modeling:** Manual and wizard-driven workflows for complex road junctions.
- **Data Extraction:** Extracting dynamic feature lines, surfaces, and 3D solids from corridor models.
- **Subassembly Composer (Overview):** Introduction to creating logic-based, custom subassemblies.

Module 6: Pipe Networks

- **Part Builder & Catalogs:** Modifying existing parts and creating custom structures/pipes.

- **Pressure Networks:** Profile layout routing, fitting management, and dynamic editing.
- **Interference Checking:** Identifying and resolving clashes between gravity, pressure, and utility networks.
- **Hydraulic Integration:** Exporting and importing data with Storm and Sanitary Analysis (SSA).

Module 7: Quantity Takeoff & Reporting

- **QTO Manager Setup:** Creating and managing master Pay Item Lists and categorization.
- **Assigning Pay Items:** Attaching codes to pipe networks, corridors, feature lines, and 2D blocks.
- **Material Computations:** Defining complex material lists and sub-criteria for structural earthwork.
- **Custom Reporting:** Generating, exporting, and customizing volume, earthwork, and quantity reports.

Module 8: Civil 3D & BIM Integration

- **Coordinate Systems:** Establishing and managing Shared Reference Points between Civil 3D and Autodesk Revit.
- **Navisworks Coordination:** Exporting models for multi-disciplinary clash detection and timeline simulations.
- **InfraWorks Interoperability:** Round-tripping models for conceptual design, context creation, and visualization.
- **Open BIM Standards:** Best practices for exporting and managing Industry Foundation Classes (IFC) files.

Module 9: Productivity Tools

- **Plan Production Tools:** Automating the creation of plan/profile sheets using View Frames and Sheet Sets.
- **Project Explorer:** Utilizing the Project Explorer interface for efficient model navigation, editing, and custom report generation.
