AutoCAD Civil 3D Essentials for Surveyors – 24.0 Hours (3 Days)

Course Description

Summary

This class introduces the model-based design technology in AutoCAD® Civil 3D®, and provides an introduction to its survey functionality. The class examines the Civil 3D interface and environment, the management of settings and styles, and how surveyors manage data obtained in the field.

The Civil 3D Essentials for Surveyors' class moves from an examination of the Civil 3D interface and concepts through the start of a typical survey and design project. Consideration is given to the best way to organize drawings and data for Civil 3D and to the organization and creation of a Project through the Civil 3D program. Participants receive an in-depth examination of the Civil 3D Survey project and its database and how the survey portion of Civil 3D brings data security and multi-drawing point access to Civil 3D.

Topics addressed in this class are appropriate for surveyors engaged in most survey applications, such as topographic, mapping, ALTA, boundary, stakeout and engineering support. Civil 3D has powerful tools applicable across a wide range of survey applications, and this course brings real project application experience to the training and effective use of Civil 3D for surveyors.

Note: This course provides a core introduction to Civil 3D topics pertinent to surveyors, as well as the specific survey functionality within the program. Thorough familiarity with AutoCAD is essential.

Topics and Schedule

Civil 3D Concepts and Environment
    Civil 3D and AutoCAD® Interface
    Civil 3D Object Concepts
    Civil 3D Settings Hierarchy and Control of Civil 3D

Creating Data in Civil 3D - Existing Surface from Aerial Drawing
    Critical Surface Feature Settings
    Data Types for Digital Terrain Modeling
    Adding Spot Elevation Data
    Adding and Managing Contour Data
    Changing the Civil 3D Surface Appearance with Object Styles
    Creating Breakline Data from Drawing Information
    Surface Editing
    Adding Surface Boundaries
    Surface Management in Civil 3D and Data Integrity

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Working with Civil 3D Point Data
   Civil 3D Point Data Concepts
   Creating Point Data in Civil 3D
   Civil 3D Point Data Display with Object Styles and Label Styles
   Point Description Keys and Point Management
   Manipulating Point Display with Point Groups
   Importing Point Data from ASCII Files
   Point Data Editing
   Point Data Organization with Point Groups
   Point Data Security and Civil 3D Point Locking
   Using the Civil 3D Survey Point Database for Project Points

Surface Creation from Civil 3D Point Data
   Point Management for Surface Creation
   Breakline Creation from Civil 3D Points
   Merging Civil 3D Surfaces
   Surface Contour Display and Labeling with Surface Label Styles
   Surfaces and Volumes in Civil 3D

Civil 3D Project Management
   Civil 3D Project Management Concepts and Tools
   Adding Surface Data to the Civil 3D Project
   Starting Multiple Drawings in the Project with Point and Surface Data
   Creating a Slope Analysis Drawing from Project Surface Data

Civil 3D Survey Overview
   Civil 3D Survey Concepts
   The Civil 3D Survey Database
   Controlling Display of the Survey Interface
   Civil 3D Survey Projects, Data Security and Integrity

Review of Pertinent Civil 3D Point Concepts
   Point Object Concepts – Object and Label Styles
   Point Display Control Hierarchy in Civil 3D
   Point Display Flexibility in Civil 3D versus Land Desktop
   Importance of Civil 3D Unit Settings – Fieldbook/Drawing/Project

How Civil 3D Operates with Survey
   Survey Points Contrasted with Civil 3D Points
   Civil 3D Description Keys, Styles, Layers and Display
   Symbol Scaling with Description keys
   Point Style Availability and Description Keys

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Creating the Civil 3D Survey Project and Database
   Organizing the Survey Project within Job Folders
   Setting the Survey Working Folder
   Survey Working Folder Management from Project to Project
   Creating the Survey Database
   Survey Database Settings and Significance
   Control Points versus Non-control Points in Civil 3D Survey
   Point Availability in the Survey Database versus Display in Drawing
   Survey Network Concepts and Initial Display Style
   Data Organized and Displayed on the Survey Tab
   Import and Export of Survey Settings and Storage Locations

Creating Data in Civil 3D Survey
   Importing Survey Data – Import Types, Import Wizard and Import Events
   Capabilities of Import Strategies – Observation versus Coordinate Imports
   Survey Data Collection Link and Other Survey Interfaces in Civil 3D
   Setting Import Error Tolerances and Significance of Their Values
   Import Settings and Options in the Import Wizard
   Import Point Protection Strategy in Civil 3D Contrasted with Land Desktop
   Coordinate Entry, Control Points and Points Held
   Renumbering and Managing Point Numbers on Import
   Point Group Considerations on Import
   Overview of Linework Strategies in Civil 3D
   Managing Fieldbooks and Import Files
   Import Events, Their Management and Use

Interacting with Civil 3D Survey Data
   Civil 3D Survey "Points" Commands and Interface with the Drawing
   Designation of Survey Points in the Civil 3D Drawing and Prospector
   Viewing and Analyzing the Survey Network through Network Styles
   Setups and Observations as Displayed in Civil 3D Survey
   Using the Civil 3D Survey Preview
   Listing Survey Point Data by Setup and Other Lists
   Inversing between Survey Points in the Survey Command Window

Editing Data in Civil 3D Survey
   Editing Capabilities and Limitations within the Survey Interface
   Editing Setups versus Editing Points
   Translating and Rotating Survey Data
   When to Disconnect from the Database for Editing and Its Ramifications

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Traverse and Network Analysis in Civil 3D Survey
Defining Traverses in Civil 3D
Traverse Loop Reporting and Closure Options
Network versus Loop-Based Analysis
Least Squares Settings and Least Squares Analysis

Survey Utilities
Using the Survey Database Change Log
Using the Survey Log and Batch Files in the Survey Command Window
Survey Command Language
Manually Entering Survey Data
Network Settings, Update and Auto-Update
Exporting Fieldbooks
Uploading Point Data

Survey Figure Capabilities and Management
Survey Figures – Overview and Applications
Creating Figures from Civil 3D and SmartDraft®
Figure Interaction with Parcels, Feature Lines and Corridors

Prerequisites

Thorough familiarity with AutoCAD is essential.

Learning Objectives

1. Participants will be able to produce Digital Terrain Models from photogrammetric and surveyed data in the sample land development project used in the course.

2. Participants will be able to import, manage and stylize surveyed point data provided in the sample land development project used in the course.

3. Participants will be able to create and organize a Civil 3D Survey project using the sample survey project data used in the course.

4. Participants will be able to create traverse closure reports and perform traverse analysis in the sample land development project used in the course.