

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.

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AUTOCAD CIVIL 3D ESSENTIALS FOR SURVEYORS – THREE DAYS

Overall Course Length	24 Hours
Instructional Time	21 HOURS

PROFESSIONAL DEVELOPMENT HOURS (PDHs)

New York State Land Surveyors	21.0 PDHs
New York State Professional Engineers	21.0 PDHs



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