

Point Cloud Modeling in AVEVA E3D

Target Audience

This course is designed for engineering professionals involved in the creation, modification, and maintenance of 3D plant models using laser scan data. It is suitable for:

- Plant Design Engineers and Designers
- AVEVA E3D Modelers and Administrators
- Piping, Mechanical, and Structural Engineers
- Brownfield and Revamp Project Engineers
- Laser Scanning and Reality Capture Specialists
- Digital Twin and Asset Management Professionals
- EPC (Engineering, Procurement & Construction) Project Teams
- BIM/VDC Professionals working in industrial plant design

Course Objectives

Upon completion of this course, participants will be able to:

- Understand the fundamentals of laser scanning, point cloud technology, and their role in brownfield engineering and digital twin projects.
- Import, visualize, and efficiently manage point cloud data within the AVEVA E3D environment using the Point Cloud Modeling Plugin.
- Reconstruct accurate piping, structural steel, equipment, and cable tray models directly from point cloud data while adhering to existing AVEVA E3D specifications.
- Model insulated piping and validate reconstructed models against laser scan data to ensure dimensional accuracy and project quality.
- Apply industry best practices to improve productivity, reduce modeling time, and streamline as-built documentation and facility revamp workflows.

Course Outcomes

After successfully completing this course, participants will be able to:

- Confidently use the AVEVA E3D Point Cloud Modeling Plugin for as-built plant modeling projects.
- Create accurate 3D models of piping, equipment, structural steel, and cable trays directly from laser scan data.
- Utilize existing AVEVA E3D piping and structural specifications to produce standards-compliant models.

- Validate reconstructed models against point cloud data to ensure accuracy and minimize design discrepancies.
- Implement efficient workflows for brownfield modifications, plant revamps, and digital twin development, leading to improved project quality and reduced engineering effort.

Course Outline: -

The course comprises **16 hours** of instructor-led theory and hands-on labs and is divided into **10 modules**. Each module is followed by practical exercises to reinforce concepts and improve productivity in real-world engineering projects.

Table of Contents: -

Module 1: Introduction to Point Cloud Technology & AVEVA E3D Integration

- Overview of Laser Scanning Technology
- Understanding Point Cloud Data
- Applications in Brownfield Projects
- Digital Twin and As-Built Modeling Concepts
- Introduction to the Point Cloud Modeling Plugin
- Benefits and Workflow Overview
- Supported File Formats and Data Sources

Module 2: Point Cloud Data Preparation

- Laser Scan Acquisition Overview
- Point Cloud Registration Concepts
- Cleaning and Optimizing Scan Data
- Coordinate Systems and Project Alignment
- Import Requirements
- Data Quality Assessment
- Best Practices for Scan Preparation

Module 3: Importing Point Cloud Data into AVEVA E3D

- Plugin Installation and Configuration
- Loading Point Cloud Files
- Coordinate Matching
- Managing Large Point Cloud Datasets

- Visualization Settings
- Navigation within Point Clouds
- Performance Optimization Techniques

Module 4: Point Cloud Navigation & Measurement Tools

- Navigating Dense Point Clouds
- Section Views
- Clipping Planes
- Slice Views
- Distance Measurement
- Angle Measurement
- Elevation Verification
- Reference Point Creation

Module 5: Pipe Modeling from Point Cloud

- Automatic Pipe Detection Concepts
- Manual Pipe Reconstruction
- Creating Straight Pipes
- Elbows
- Reducers
- Branch Connections
- Pipe Supports
- Modeling Using Existing Pipe Specifications
- Centerline Extraction
- Validation Against Point Cloud

Module 6: Modeling Insulated Piping

- Understanding Insulated Pipe Geometry
- Outer Diameter Recognition
- Selecting Proper Pipe Specifications
- Modeling with Insulation Thickness
- Validation Techniques

Module 7: Structural Modeling from Point Clouds

- Structural Steel Identification
- Creating Columns
- Beams
- Bracing
- Platforms
- Ladders
- Handrails
- Structural Member Alignment
- Using Existing Structural Catalogues
- Clash Verification

Module 8: Equipment Modeling

- Equipment Recognition
- Modeling Cylinders
- Vessels
- Tanks
- Pumps
- Heat Exchangers
- Custom Equipment Components
- Nozzle Placement
- Equipment Validation
- Model Accuracy Checking

Module 9: Cable Tray & Miscellaneous Components

- Cable Tray Modeling
- Supports
- Junctions
- Routing Along Point Clouds
- Modeling Small Components

Module 10: Model Validation & Quality Assurance

- Comparing Model Against Scan Data
- Tolerance Verification
- Deviation Analysis
- Clash Detection
- Quality Checks
- Revision Management
- Documentation