

Smart Plant Modeling through BIM in AVEVA E3D

Target Audience

This course is intended for professionals and graduates involved in the planning, design, coordination, and delivery of industrial and infrastructure projects using BIM methodologies and **AVEVA E3D**. The target audience includes:

- Civil, Mechanical, Electrical, Structural, and Piping Engineers working on EPC and industrial BIM projects
- BIM Designers, PDMS / AVEVA E3D Modelers, and Coordinators (Beginner to Intermediate level)
- AVEVA E3D Project Administrators, Lead Designers, and Engineering Coordinators
- Engineering graduates aspiring to build careers in Plant Design, Oil & Gas, Power, and Process industries
- Professionals transitioning from PDMS or traditional 3D design tools to BIM-driven AVEVA E3D workflows

Course Objectives

The objective of this course is to provide participants with a **comprehensive understanding of BIM concepts, standards, and workflows as implemented in AVEVA E3D** for smart plant modeling. The course focuses on integrating **ISO 19650-aligned BIM principles** with AVEVA E3D's data-centric and object-based design environment. Participants will gain clarity on BIM dimensions, multi-discipline collaboration, information management, model validation, and lifecycle data, along with a strong conceptual foundation for administering, modeling, reviewing, and delivering BIM-compliant plant models in large-scale EPC projects.

Course Outcomes

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

- Explain and apply core BIM concepts, standards, and ISO 19650 workflows within AVEVA E3D projects
- Understand and manage BIM data structures, intelligent objects, attributes, and model hierarchies in E3D
- Apply BIM dimensions (3D to 7D) to support design, construction, cost, and asset lifecycle requirements
- Coordinate multi-discipline BIM models, manage collaboration workflows, and handle design changes effectively
- Perform BIM-based model review, validation, clash detection, and quality control activities

- Generate BIM-compliant deliverables including intelligent drawings, reports, quantities, and data handover packages
- Support construction, fabrication, and asset lifecycle workflows using model-driven information
- Follow BIM governance, best practices, and project delivery standards aligned with industrial EPC requirements

Course Outline

The course comprises **88-hours** of theory and labs and is divided into **20** different Modules. Each chapter will be followed by hands-on lab exercises to reinforce learning and gauge understanding of the topics covered.

Table of Contents: -

Part 1: BIM Fundamentals & Workflows for Smart Plant Modeling using Aveva E3D

Module 1. Introduction to BIM for Industrial Projects

- Definition and evolution of BIM
- BIM vs traditional 3D modeling
- BIM use cases in plant and infrastructure projects
- BIM maturity levels (Level 0–3)
- Role of BIM in digital transformation

Module 2. BIM Standards and Frameworks

- Overview of ISO 19650 series
- Common Data Environment (CDE) concept
- Information management lifecycle
- BIM Execution Plan (BEP) fundamentals
- Naming conventions, metadata, and classification systems

Module 3. AVEVA E3D in the BIM Ecosystem

- AVEVA E3D as a BIM authoring platform
- Position of E3D within AVEVA Unified Engineering

- Object-based modeling philosophy
- Data-centric design approach
- Multi-discipline collaboration in E3D

Module 4. BIM Data Structure in AVEVA E3D

- Intelligent objects and attributes
- Model hierarchy and databases
- Ownership, permissions, and access control
- Consistency, validation, and data integrity
- Relationship between geometry and data

Module 5. BIM Dimensions in AVEVA E3D

- 3D: Intelligent plant modeling
- 4D: Construction sequencing and scheduling concepts
- 5D: Quantity take-offs and cost linkage
- 6D: Asset and lifecycle information
- 7D: Facility management and operations data

Module 6. Multi-Discipline BIM Modeling Concepts

- Piping, equipment, structural, HVAC, and electrical integration
- Interdisciplinary model coordination
- Clash detection principles
- Model dependency and change propagation
- Design intent and constructability

Module 7. BIM Collaboration and Coordination

- Concurrent engineering workflows
- Workshare and multi-user environments
- Model versioning and revisions
- Design change management
- Coordination with external BIM tools

Module 8. Model Review, Validation, and Quality Control

- Model health checks
- Rule-based validation concepts
- Clash detection workflows
- Design compliance and standards checking

Module 9. BIM Deliverables from AVEVA E3D

- Intelligent drawings and reports
- Schedules, quantities, and BOMs
- Model-based deliverables vs traditional outputs
- Data handover requirements
- IFC and neutral format concepts

Module 10. BIM for Construction and Fabrication

- Construction-ready models
- Spool and fabrication data concepts
- Model-driven construction planning
- Site coordination and model usage
- As-built model philosophy

Module 11. BIM for Asset Lifecycle Management

- Transition from design to operations
- Asset information requirements (AIR)
- Digital twin concept overview
- Maintenance and operations data

Module 12. BIM Governance and Best Practices

- BIM roles and responsibilities
- Model ownership and accountability
- Risk management in BIM projects
- Lessons learned and common pitfalls
- Future trends in industrial BIM

Part – 2: Smart Plant Modeling in Aveva E3D

Module 13: Introduction to AVEVA Everything E3D

- Overview of AVEVA E3D ecosystem and modules
- Project lifecycle and data flow
- Roles and responsibilities in an E3D project

Module 14: AVEVA E3D Administration

- Project creation and configuration
- Team and user management
- NT authentication and access control rights (ACR)
- Database creation, multiple databases, DB ranges
- Database merging, backtracking, and reconfiguration
- Project locking, claim expunges, and project expunges
- Extract controls, date & stamp, font management
- DICE reports and database validation
- Creating UDAs in Lexicon

Module 15: AVEVA Paragon – Catalogue & Specification Management

- Introduction to Paragon and catalogue philosophy
- Table World fundamentals
- Nominal bore, branch, and reducer tables
- Piping catalogues and piping specifications
- Bolt specifications (old and new methods)
- Insulation specification setup
- Structural catalogue and structural specifications
- Cable tray catalogue and specification
- MDS customization concepts

Module 16: Isodraft Administration

- Isodraft environment and project setup
- Option file creation and control
- Template settings for piping isometrics

- MTO configuration and customization
- Isometric extraction workflows

Module 17: Draw Administration

- Draw admin setup and drawing standards
- Backing sheet and title block creation
- Representation rules and styles
- SYMBOL template creation
- Manual and auto tagging configuration

Module 18: AVEVA E3D Design – Modelling

- Design module interface and workflows
- Equipment modelling techniques
- Piping modelling using specifications
- Structural modelling (frames, members, grids)
- Pipe support modelling
- Cable tray modelling
- HVAC duct modelling

Module 19: Drafting & Extraction

- Isometric generation and review
- General arrangement drawings
- Annotation, dimensioning, and tagging
- Drawing revisions and updates

Module 20: Project Delivery & Best Practices

- Model checking and quality control
- Coordination between disciplines
- Final deliverables and handover
- Industry best practices and lessons learned