

OpenBridge Designer - Integrated modeling, analysis, and design for bridges

Target Audience

This course is designed for bridge engineers, structural engineers, highway engineers, transportation consultants, BIM professionals, infrastructure designers, CAD specialists, and project coordinators involved in bridge design and analysis projects. It is also suitable for engineering consultants, contractors, owner-operators, and professionals seeking to implement model-based bridge delivery workflows and advanced structural analysis methodologies within transportation infrastructure projects.

Course Objectives

The objective of this course is to provide participants with the knowledge and practical skills required to model, analyze, design, and document bridges using OpenBridge Designer. Participants will learn to create intelligent parametric bridge models, perform advanced structural analysis, evaluate multiple design alternatives, apply international design codes, and generate construction-ready deliverables. The course also introduces digital collaboration workflows, construction sequencing, BIM-based project delivery, and integration with Bentley infrastructure solutions to improve project efficiency and decision-making.

Course Outcomes

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

- Create intelligent parametric bridge models using OpenBridge Designer.
- Develop superstructure and substructure components for a wide variety of bridge types.
- Generate analytical models and perform static, dynamic, and nonlinear bridge analysis.
- Apply bridge design methodologies for concrete, steel, composite, and prestressed structures.
- Evaluate construction stages, load combinations, and time-dependent structural behavior.
- Perform clash detection, constructability reviews, and multidisciplinary coordination.
- Integrate bridge projects with OpenRoads, OpenRail, OpenGround, ProjectWise, and SYNCHRO.
- Generate drawings, reports, quantity take-offs, and cost estimates automatically.
- Create visualizations, digital twins, and model-based construction workflows.
- Deliver complete bridge analysis and design projects aligned with modern BIM and digital engineering practices.

Course Outline

The course comprises **56 hours of theory and hands-on laboratory sessions** and is divided into **10 comprehensive modules**. Each module is followed by practical exercises and real-world site development workflows designed to reinforce learning and evaluate the participant's understanding of the concepts covered.

Table of Contents

Module 1: Introduction to OpenBridge Designer and Bridge BIM Workflows

- Overview of OpenBridge Designer
- Bridge Information Modeling (BrIM) Concepts
- User Interface and Project Setup
- Bridge Design Workflow
- 2D and 3D Modeling Environment

Module 2: Bridge Geometry and Parametric Modeling

- Bridge Wizard Workflows
- Alignments and Profiles
- Cross-Section Templates
- Parametric Bridge Components
- Rule-Based and Constraint-Driven Modeling
- Intelligent Bridge Modeling Techniques

Module 3: Superstructure Modeling

- Prestressed Concrete Girder Bridges
- Steel I-Girder Bridges
- Steel Box Girder Bridges
- Segmental Bridges
- Truss Bridges
- Suspension and Cable-Stayed Bridges

Module 4: Substructure Modeling

- Abutment Modeling
- Pier Modeling

- Foundations and Footings
- Bearings and Beam Seats
- Diaphragms and Cross Frames
- Bridge Appurtenances

Module 5: Bridge Analysis Fundamentals

- Analytical Model Generation
- Load Cases and Load Combinations
- Construction Stage Analysis
- Static and Dynamic Analysis
- Creep and Shrinkage Effects
- Structural Behavior Evaluation

Module 6: Advanced Bridge Design and Code Compliance

- Concrete Bridge Design
- Steel Bridge Design
- Composite Bridge Design
- Pre-Tensioned and Post-Tensioned Systems
- International Bridge Design Codes
- Design Optimization Techniques

Module 7: Advanced Structural Analysis

- Nonlinear Analysis
- P-Delta Effects
- Cable Analysis
- Large Displacement Analysis
- Time History Analysis
- Wind and Hydrodynamic Analysis

Module 8: Bridge Coordination and Digital Collaboration

- Clash Detection and Clearance Checks
- OpenRoads and OpenRail Integration
- ProjectWise Collaboration
- OpenGround Integration

Module 9: Documentation, Reporting and Quantity Management

- Automated Drawing Production
- Plan and Elevation Generation
- Bridge Framing Plans
- Quantity Take-Offs
- Cost Estimation Reports
- Material and Geometry Reports

Module 10: Visualization, Construction Planning and Final Project

- 3D Visualization Techniques
- LumenRT Integration
- Construction Sequencing
- Construction Scheduling
- Model-Based Construction Workflows