

Advanced Certificate in Intelligent BIM

Automation with **Revit**, **Dynamo** & **AI**

Target Audience

This course is designed for architects, structural engineers, MEP engineers, BIM engineers, BIM coordinators, designers, CAD/BIM professionals, project engineers, and other construction professionals who want to develop multidisciplinary BIM skills using Autodesk Revit and improve BIM productivity through Dynamo automation and AI-assisted workflows.

It is suitable for professionals who want practical experience in architectural, structural, and MEP modelling; multidisciplinary coordination; construction-level BIM delivery; automation; model data management; and AI-supported BIM processes.

Course Objective

The objective of this course is to develop practical, multidisciplinary BIM capabilities using Autodesk Revit while introducing participants to automation and AI-assisted BIM workflows.

Participants will learn to establish coordinated BIM projects, create Architecture, Structure, HVAC, Electrical, Plumbing and Fire Protection models, produce construction documentation, manage BIM information, coordinate multidisciplinary models, and perform model QA/QC. The course then progresses into Dynamo-based automation for repetitive BIM processes and practical applications of AI for model checking, data analysis, documentation, reporting, and automation development.

The programme combines instructor-led concepts and demonstrations with extensive practical exercises so that participants can apply the skills to realistic multidisciplinary BIM workflows.

Course Outcomes

After completing this course, participants will be able to:

- **Configure** multidisciplinary Revit projects using appropriate templates, levels, grids, coordinates, links, worksets, naming conventions, and BIM standards.
- **Create** detailed architectural models incorporating building elements, spaces, materials, assemblies, schedules, phasing, and design alternatives.
- **Develop** structural BIM models containing foundations, framing systems, structural walls, slabs, reinforcement fundamentals, openings, and associated documentation.
- **Design** coordinated HVAC and mechanical BIM systems using spaces, zones, equipment, duct networks, air terminals, sizing concepts, and routing methods.

- **Develop** electrical BIM systems incorporating equipment, lighting, power distribution, circuits, containment, panel information, and schedules.
- **Create** plumbing and fire-protection BIM systems incorporating water, drainage, piping, pumps, sprinklers, hydrants, and service-room arrangements.
- **Apply** multidisciplinary coordination techniques using linked models, Copy/Monitor, interference checking, Coordination Review, service zones, openings, sleeves, clearances, and federated-model concepts.
- **Prepare** coordinated sheets, annotations, view templates, schedules, quantities, and construction-level BIM documentation.
- **Implement** LOD 300/350/400 and information-rich modelling practices, including families, parameters, assemblies, asset information, model auditing, QA/QC, and quantity take-off.
- **Develop** reusable Dynamo workflows for parameter management, element manipulation, data extraction, schedule automation, and repetitive modelling activities.
- **Apply** AI-assisted techniques to BIM documentation, Dynamo/Python development, model checking, data validation, quantity analysis, reporting, and issue classification.
- **Use** prompt-engineering techniques for BIM tasks while applying appropriate human verification, data-security, and responsible-AI practices.
- **Verify and troubleshoot** BIM models and automated workflows through structured checking, testing, coordination, and data-validation procedures.

Course Outline

The course comprises **80 hours of theory, demonstrations, and practical labs**, including approximately **40 hours of instructor-led class activities and 40 hours of hands-on practice**, and is divided into **12 progressive modules** covering BIM foundations, multidisciplinary Revit modelling, model coordination, construction-level BIM delivery, Dynamo automation, and AI-enabled BIM productivity.

Guided hands-on exercises are included throughout the course to reinforce learning and evaluate participants' understanding and practical application of the concepts covered. The redesigned sequence retains the technical scope specified in the source SOW while reorganising it into a progressive multidisciplinary learning path.

Module 1. Building the Foundation for Multidisciplinary BIM

- Understanding BIM workflows across Architecture, Structure, and MEP disciplines
- Establishing BIM project standards and BIM Execution Plan concepts
- Understanding Revit's multidisciplinary project environment
- Selecting and configuring project templates and standards
- Establishing levels and grids for coordinated modelling
- Working with project coordinates and the Project Base Point
- Linking CAD information and Revit models
- Organising collaborative models using worksets
- Understanding LOD and LOIN concepts
- Establishing model organisation and naming conventions
- Understanding multidisciplinary model coordination workflows

- **Lab 1: Set Up a Coordinated Multidisciplinary BIM Project**

Module 2. Architectural BIM Modelling and Spatial Development

- Creating and managing walls, floors, roofs, and ceilings
- Developing curtain-wall systems
- Placing and managing doors, windows, and building components
- Creating rooms and areas for space planning
- Developing shafts and building openings
- Modelling stairs, ramps, and railings
- Applying architectural materials
- Creating and managing assemblies
- Developing architectural details
- Organising building information for coordinated design
- **Lab 2: Develop an Architectural Building Model from Project Setup to Detailed Building Elements**

Module 3. Architectural Information, Quantification and Documentation

- Preparing architectural schedules and quantities
- Working with model information for quantity reporting
- Developing construction documentation
- Applying view-based documentation practices
- Managing project phasing
- Developing and comparing design options
- Coordinating architectural documentation with model changes
- **Lab 3: Produce Architectural Schedules, Quantities and Construction Documentation**

Module 4. Structural BIM Modelling and Documentation

- Configuring a Revit project for structural modelling
- Coordinating structural grids and levels
- Modelling foundations and footings
- Developing pile systems
- Creating structural columns and beams
- Building structural framing systems
- Modelling structural slabs
- Developing structural walls
- Creating bracing systems
- Understanding reinforcement fundamentals
- Managing structural openings and embeds
- Preparing structural schedules
- Producing structural BIM documentation
- **Lab 4: Build and Document a Coordinated Structural BIM Model**

Module 5. HVAC and Mechanical BIM Systems

- Setting up a project for MEP mechanical modelling
- Creating and managing spaces and zones
- Placing mechanical equipment
- Developing duct networks using ducts, fittings, and accessories
- Modelling supply-air systems
- Modelling return-air and exhaust-air systems
- Placing and connecting air terminals
- Understanding fundamental duct-sizing concepts
- Connecting mechanical equipment to distribution systems
- Applying routing preferences
- Preparing mechanical schedules
- Developing equipment-room models
- Coordinating mechanical services with Architecture and Structure
- **Lab 5: Model and Coordinate an HVAC Distribution System and Equipment Room**

Module 6. Electrical BIM and Power Distribution

- Establishing the electrical BIM project environment
- Placing electrical equipment and devices
- Creating and managing electrical panels
- Preparing panel schedules
- Modelling cable trays
- Modelling conduits and electrical containment
- Placing lighting fixtures
- Developing power-distribution systems
- Creating electrical circuits
- Managing electrical load information
- Connecting equipment within electrical systems
- Preparing electrical schedules
- Producing electrical documentation
- **Lab 6: Create a Coordinated Electrical, Lighting and Power Distribution Model**

Module 7. Plumbing, Drainage and Fire-Protection BIM

- Understanding plumbing-system fundamentals
- Developing domestic-water systems
- Modelling sanitary and drainage systems
- Creating pipe networks using pipes and fittings
- Adding pumps and plumbing equipment
- Understanding pipe-sizing concepts
- Configuring slopes for drainage networks
- Modelling fire-protection systems
- Creating sprinkler systems
- Modelling hydrants and fire-service piping

- Developing plant and service-room layouts
- Establishing coordinated MEP service zones
- Coordinating plumbing and fire services with other disciplines
- **Lab 7: Develop Coordinated Plumbing, Drainage and Fire-Protection Systems**

Module 8. Multidisciplinary BIM Coordination and Issue Resolution

- Managing linked multidisciplinary models
- Applying Copy/Monitor for coordinated project elements
- Performing Revit Interference Checking
- Using Coordination Review
- Coordinating MEP services across disciplines
- Coordinating structural openings and sleeves
- Reviewing ceilings against MEP service zones
- Checking equipment access and maintenance clearances
- Understanding federated BIM models
- Introducing Navisworks clash-detection concepts
- Working with coordination viewpoints and issues
- **Lab 8: Review a Federated Model, Identify Coordination Issues and Prepare Resolution Actions**

Module 9. Construction-Level BIM, Families and Information Management

- Understanding LOD 300, LOD 350, and LOD 400 requirements
- Applying LOI principles to information-rich BIM models
- Developing advanced Revit families
- Creating and managing nested families
- Working with shared parameters
- Working with project parameters
- Developing custom MEP families
- Creating detailed components and assemblies
- Developing construction-level model information
- Managing project phasing for delivery workflows
- Incorporating asset information into BIM elements
- Applying BIM standards to model development
- **Lab 9: Develop Information-Rich BIM Content for Construction-Level Delivery**

Module 10. BIM QA/QC, Documentation and Quantity Intelligence

- Establishing model QA/QC procedures
- Performing model auditing
- Reviewing model organisation against BIM standards
- Preparing coordinated sheets
- Applying view templates
- Creating and managing annotations
- Producing multidisciplinary schedules
- Generating quantities from BIM information
- Performing quantity take-off

- Validating model information before project delivery
- **Lab 10: Audit a Multidisciplinary BIM Model and Produce a Coordinated Delivery Package**

Module 11. Dynamo Automation for Revit Productivity

- Understanding visual programming for BIM
- Introducing Dynamo for Revit
- Working with nodes, inputs, and outputs
- Selecting Revit elements through Dynamo
- Filtering model elements for automation
- Reading, modifying, and managing parameters
- Automating naming processes
- Automating parameter population
- Automating element placement
- Performing batch modifications
- Automating schedule-related workflows
- Extracting BIM data through Dynamo
- Processing MEP model data
- Automating repetitive modelling operations
- Developing reusable Dynamo scripts for BIM productivity
- **Lab 11: Build a Reusable Dynamo Workflow for Model Data and Repetitive BIM Tasks**

Module 12. AI-Enabled BIM Automation and Integrated Project Application

- Understanding AI-assisted BIM workflows
- Applying AI to improve design and documentation productivity
- Using AI assistance for Dynamo development
- Using AI assistance for Python development
- Applying AI to family and parameter workflows
- Supporting automated model checking with AI
- Using AI-assisted approaches for BIM data validation
- Applying AI to quantity and schedule analysis
- Generating BIM documentation and reports with AI assistance
- Exploring natural-language interaction with BIM data
- Using AI to support clash and issue classification
- Developing effective prompts for BIM-related tasks
- Understanding responsible AI use in professional BIM workflows
- Protecting project and organisational data when using AI tools
- Applying human verification to AI-generated outputs
- **Lab 12: Integrated Capstone – Automate, Analyse and Validate a Multidisciplinary BIM Workflow Using Revit, Dynamo and AI**