KOENIG
step forward

AUTODESK
Authorized Training Center

Advanced BIM Coordination, Data Management & Automation

Course Description

This course provides a complete journey from mastering COBie, Navisworks, Autodesk Construction Cloud (ACC) and advanced automation with Dynamo. Participants will learn how to create Clash detection, Simulation in Navisworks, manage construction data and workflows in ACC, and use Dynamo for visual programming, automation, and integration with Revit. With hands-on exercises, scripting, and real-world use cases, this course equips learners to streamline BIM workflows, enhance project collaboration, and apply computational design effectively.

Audience Profile

- BIM Managers and Coordinators
- Architects, Structural, MEP Engineers, and Designers
- Revit Power Users and CAD Technicians
- Construction and Project Managers working with ACC
- Professionals aiming to automate BIM workflows using Dynamo

Prerequisite

- Basic knowledge of Revit interface and modeling
- Familiarity with construction project workflows
- Understanding of BIM concepts (advantageous but not mandatory)
- Basic programming knowledge (helpful for Dynamo scripting but not required)

Course Outline

This course comprises 96 hours of Theory and Labs and is divided into 4 Modules. Each Module will be followed by hands-on lab exercises to reinforce learning and gauge understanding of topics covered.

AUTODESK Navisworks Manage

AUTODESK Construction Cloud

Dynamo

KOENIG
step forward

AUTODESK
Authorized Training Center

Table of Contents (TOC)

7. COBie Tools & Software Ecosystem
    - COBie Plugins for Revit
    - COBie in Navisworks / Solibri for QC
    - IFC & COBie Interoperability
    - Open-Source & Commercial COBie Tools
8. Data Quality, Validation & Checking
    - COBie Quality Rules
    - Automatic Validation Tools
    - Manual QA/QC Techniques
    - Tracking Missing or Inconsistent Data
9. COBie for FM & Operations
    - Using COBie in CAFM/CMMS Systems
    - Linking Assets, Maintenance, Warranties & O&M
    - Asset Tagging Concepts
    - COBie as Part of Digital Handover
10. Practical Exercises
    - Filling Basic COBie Sheets from a Sample Project
    - Creating COBie Data in Revit
    - Validating a COBie Workbook
    - Exporting a Complete COBie Deliverable

Module 2: Navisworks

1. Introduction to Navisworks
    - Overview of Navisworks Manage vs Simulate
    - Supported file formats (NWC, NWD, NWF)
    - Interface and navigation tools
2. File Aggregation
    - Importing Revit, AutoCAD, IFC files
    - Understanding file types: NWF (workspace), NWD (snapshot), NWC (cache)
3. Basic Navigation
    - Walkthrough, orbit, zoom, pan
    - Viewpoints and saved views
4. Clash Detection
    - Setting up clash tests

- Clash rules and tolerances
- Clash grouping and filtering
- Exporting clash reports

5. Time liner (4D Simulation)
   - Linking tasks to model elements
   - Importing schedules (MS Project, Primavera, Excel)
   - Simulating construction sequences
6. Quantification
   - Model-based quantity take-off
   - Using catalogues and item mappings
   - Exporting quantities to Excel
7. Animation & Viewpoints
   - Creating animations and walkthroughs
   - Sectioning and cutting planes
   - Redlining and markup tools
8. Advanced Clash Management
   - Clash coordination workflows
   - Integration with BIM 360 or Autodesk Construction Cloud
   - Clash resolution tracking
9. Navisworks + BIM 360/ACC Integration
   - Cloud-based coordination
   - Issue tracking and model versioning
10. Customizing Navisworks
    - Using plugins and add-ons
    - Scripting with Navisworks API (for automation)
11. Collaboration & Communication
    - Publishing NWD files for stakeholders
    - Using viewpoints and comments for coordination

Module 3: Autodesk Construction Cloud (ACC)

1. Overview of ACC
   - Project Admin and setup
   - Adding and managing project members, roles, and permissions
2. Document Management
   - Folder setup, file creation & uploading

3. Forms and RFIs
   - Form template creation, new forms, importing forms
   - RFI creation and management
4. Schedules
   - Creating & importing schedules
   - Review and transmittal
5. Issues and Markups
   - Issue categories & types
   - Creating, importing, and managing issues
   - Markup creation
6. Submittals and Meetings
   - Submittal workflows
   - Scheduling meetings & templates
7. Assets & Systems
   - Creating/importing assets & systems
   - Asset & system categories, custom fields
8. Reports
   - Report generation
   - Template creation for reports

Module 4: Revit Dynamo

1. Introduction to Dynamo
   - What is Dynamo?
   - Why Use Dynamo in BIM Workflows
   - History & Evolution of Dynamo
   - Dynamo vs. Revit Macros
2. Interface & Anatomy
   - Workspace Layout & Navigation
   - Library, Nodes & Wires
   - Preview Window & Geometry Preview
   - Package Manager – Installation & Updates
   - Execution Bar & Run Settings
   - Python Scripts & Code Blocks Fundamentals
3. Core Competencies
   - Geometry Creation Tools
   - Geometry Modifiers & Transformations
   - Data Creation, Control & Manipulation

- Visualization Techniques & Basic Analysis

4. Visual Programming Concepts
   - Understanding Data Types
   - Algorithms & Logical Workflows
   - Design Script Basics
   - Hobby Scripts & ChatGPT-Assisted Logic Generation
5. Getting Started with Dynamo (Revit Context)
   - Installation & Version Compatibility
   - Execution Types, Input Types & File Extensions
   - Revit Hierarchy
     - Categories
     - Families
     - Types
     - Instances
6. Scripting Integration
   - Design Script Fundamentals
   - Python Basics (IronPython)
   - Variables, Lists & Data Structures
   - Operators & Functions
   - Code Block Scripting Best Practices
7. Logic Development
   - Conditional Logic (If/Else)
   - Boolean Operations
   - Looping Concepts
   - Arithmetic & Logical Operators
   - Applying Logic to Revit Automation
8. Interoperability & Data Exchange
   - Import/Export with Excel
   - Data Mapping Techniques
   - Validation of Incoming/Outgoing Data
   - Error Handling & Workflow Debugging
9. Element Selection Techniques
   - Manual Selection Nodes
   - Programmatic selection via Filters
   - Filtering by Categories

- Filtering by Parameters

10. Node Management
    - Strategies for Finding Nodes
    - Understanding the Node Library
    - Useful Shortcuts & Search Techniques
11. Parent & Child Concepts in Data
    - Hierarchical Data Structures
    - Tree-Like Data Flows in Dynamo
    - Managing Parent–Child Relationships
12. Dot Notation & API Insights
    - Accessing Properties via Dot Notation
    - Calling API Methods from Dynamo
    - Understanding DLLs & Assemblies
    - Relationship Between Dynamo & Revit API
13. Dynamo Standards
    - Color Coding & Grouping Nodes
    - Wiring Best Practices
    - Script Cleanup & Documentation
    - When to Use Custom Nodes
14. Advanced Data Concepts
    - Lists & Nested Data Hierarchies
    - Flattening, Unflattening, chunking
    - Filtering, Sorting & Grouping Data
15. Custom Node Creation & Dynamo Player
    - Creating Custom Nodes
    - Publishing & Managing Custom Packages
    - Using Dynamo Player for Non-Technical Users
16. Generative Design Concepts
    - Introduction to Generative Design
    - Parameter Studies & Optimization
    - Using Dynamo for Design Exploration
17. Advanced DesignScript & Python Integration
    - Node-to-Code & Code-to-Node
    - IntelliSense & Coding Behaviors

- Hybrid Workflows – Nodes + Python + DS

18. Troubleshooting & Debugging
    - Common Errors & Warnings
    - Version Conflicts & Package Issues
    - Debugging Techniques & Best Practices
19. Beyond Dynamo
    - IronPython Deep Dive
    - Exploring the Revit API
    - Namespaces, Classes & Methods
    - Scaling Up to Add-Ins & Automation
20. Geometry in Dynamo
    - Points, Vectors & Coordinate Systems
    - Curves, Polygons, Surfaces & Solids
    - Adaptive Components & Paneling Systems
    - Randomized Geometry & Façade Modeling