Autodesk Advanced Revit MEP Engineering & Automation

1. TARGET AUDIENCE:

This course is designed for beginner civil, mechanical, electrical, and plumbing (MEP) engineers, site engineers, draftsmen, and fresh graduates who have a basic understanding of Revit and want to build a solid foundation in 3D modeling, project setup, and basic coordination.

You should understand:

- Basic engineering concepts of HVAC, Electrical, or Plumbing systems.
- Standard building layout signs and terms.
- Basic structural drawings.
- Only a basic understanding of Revit is required; this course builds your confidence from the ground up.

The ideal learner:

- Works on basic residential or commercial building projects.
- Wants to shift from 2D AutoCAD drafting to basic 3D BIM modelling.
- Is preparing for entry-level Revit modeler or MEP draftsman interviews.
- Wants a clear, simple guide to daily Revit design tasks without advanced scripting.

2. COURSE OBJECTIVE:

Learn to navigate, model, and organize basic multi-discipline MEP building networks using Revit, resolve common software issues, and perform basic sheet documentation.

By the end of this course, you will:

- Navigate the Revit interface and open/sync project models confidently.
- Model basic ductwork, cable trays, conduits, and plumbing systems.
- Use basic visibility tools, filters, and colour codes to clear up drawings.
- Setup sheets, add notes, create basic schedules, and print your work.
- Fix everyday modelling glitches and use basic plug-ins to help your workflow.

3. COURSE OUTLINE:

The course comprises **40 hours** of simple theory, step-by-step live modelling, and practical assignments, divided into **8 progressive modules**.

Course Table of Contents

Module 1: Project Setup, Collaboration, & Advanced Phasing

- **Lesson 1.1: Multi-Discipline Workspace Link Optimization**
  - Managing linked models and architectural backgrounds.
  - Controlling architectural design options within your core MEP file.
  - Importing, editing, and managing CAD text control and 2D draw orders in Revit.
- **Lesson 1.2: Advanced Document Ingestion & Template Infrastructure**
  - Executing high-volume documentation tasks: Attaching multi-page PDFs simultaneously.
  - Step-by-step process: Creating a highly efficient Electrical template from scratch.
- **Lesson 1.3: Timeline & Phasing Controls**
  - Controlling existing vs. new elements using Phase Filters and View Templates.
  - Configuring automated family phase matching according to active plan phases.
  - Visual graphics overrides for demolition phases: Setting up dashed lines

Module 2: The Parameter Ecosystem & Custom Family Creation

- **Lesson 2.1: Mastering Revit Parameter Hierarchy**
  - Deep dive into Global, Project, Instance, and Shared parameters.
  - Methods for transferring project standards, family constraints, and custom shared parameter schemas.
- **Lesson 2.2: Family Modeling Fundamentals & Structural Adaptations**
  - Basic family creation geometry, constraints, functions, and built-in parameter logic.
  - How to successfully convert hosted families into non-hosted families
  - Converting manufacturer-provided family assets from Type properties to Instance properties.
  - Managing legacy requirements: Safely downsizing/converting families from newer Revit versions to older releases.
- **Lesson 2.3: Equipment Spatial Clearance Modelling**
  - Defining operational envelopes: Creating transparent vs. opaque clearance spaces within equipment families.

Module 3: Advanced Views, Visualization, & Custom Filters

- **Lesson 3.1: View Ranges & Visibility Graphics (V/G)**
  - Deconstructing complex View Ranges and leveraging Temporary View Properties for swift debugging.
  - Managing Reflected Ceiling Plans (RCP): Forcing door visibility in RCP views.

  - Controlling drawing readability: Showing ceiling grids directly on mechanical/electrical floor plans.
- **Lesson 3.2: Precision View Filters & View Layering**
  - Utilizing conditional "AND" and "OR" rule structures within custom view filters.
  - System color-coding strategies (Emergency power, normal power, low voltage) to optimize drawing readability.
  - Layering text and tags from linked CAD files below active 3D MEP equipment and system runs.

Module 4: Mechanical (HVAC) Engineering & Performance Workflows

- **Lesson 4.1: Component Modelling & Mechanical Libraries**
  - Building out functional mechanical family examples: AHUs, RTUs, Fire/Smoke Dampers, and custom Duct/Pipe support.
- **Lesson 4.2: Aerodynamic Calculations & Airflow Integrity**
  - Conducting native duct External Static Pressure (ESP) calculations within Revit networks.
  - Troubleshooting airflows: Resolving the "Zero CFM" error drop when capping Outside Air (OA) ducts (Case Study: Project MSI).
- **Lesson 4.3: Structural Clearances & Thermal Graphics**
  - Troubleshooting insulation visibility: Fixing disappearing duct insulation on non-horizontal/non-vertical angular duct transitions (Case Study: Christian High School).
- **Lesson 4.4: Early-Stage Environmental Analytics**
  - Generating and exporting a clean Energy Analysis Model (EAM) for external software (Energy Pro) directly from your 3D geometry.

Module 5: Electrical Systems, Distribution, & Panel Schedules

- **Lesson 5.1: Power Distribution Content Creation**
  - Modelling and configuring core distribution hardware: Panels, switchboards, transformers, and decorative lighting.
  - Physical layout design: Routing cable trays, conduits, structural supports, and generating native Single Line Diagrams (SLD).
- **Lesson 5.2: Masterclass on Panel Schedules & Code Compliance**
  - Configuring and editing custom Panel Schedule Templates.
  - Advanced interface modifications: Increasing keynote symbol sizes and embedding mini breakers.
  - Automating calculations: Formatting panel schedules to display live conduit sizes, wire sizing, and voltage drop metrics in Revit 2026.
  - Circuit Management: Merging cables for multi-wire branch circuits
  - Documenting legacy infrastructure: Documenting existing panel circuit metrics without altering active live loads.

- **Lesson 5.3: Photometrics, Space Tagging, & Sound Arrays**
  - Automating space identification using Room Tags.
  - Executing native photometric lighting performance analysis.
  - Setting up specialized electrical applications: Sound arrays and acoustic elements.

Module 6: Plumbing Engineering & Fabrication Networks

- **Lesson 6.1: Piping System Architectures**
  - Creating and isolating specialized Pipe System Classifications.
  - Managing vent/sewer network re-routing (Hot Water and Hot Water Return system logic).
  - Graphic corrections: Forcing single-line riser drawings to display as full-diameter 3D pipes in vertical orientations.
- **Lesson 6.2: Component Modelling & Fabrication Data Ingestion**
  - Plumbing equipment family creation: Water Heaters, Interceptors, and Water Softeners.
  - Transitioning design to constructability: Creating material profiles and importing fabrication-ready pipe material specs.

Module 7: Advanced Data Management, Keynotes, & Estimating

- **Lesson 7.1: Advanced Quantification & Estimating**
  - Extracting exact quantities: Generating a dynamic Bill of Quantities (BOQ) directly from the model.
- **Lesson 7.2: Tabular Detailing & Legend Management**
  - Configuring multi-column, formula-driven tables working seamlessly like Excel/CAD (Case Study: Main Residence Fixture Unit Calculations).
  - Advanced keynote workflows: Creating a fully formatted keynote list linked directly to project legends.
- **Lesson 7.3: Project Interoperability**
  - Evaluating external data plugins: Professional alternatives to DiRoots for linking live Excel data sheets to Revit.

Module 8: Sheet Management, Multi-Software Coordination, & Troubleshooting

- **Lesson 8.1: Automation, Plugins, & Power-User Tools**
  - Leveraging Dynamo to supercharge everyday MEP task efficiency.
  - Deploying power-user plugins: Maximizing your output with pyRevit, DiRoots, and essential MEP utilities.
- **Lesson 8.2: Comprehensive Interdisciplinary Coordination**
  - Bridging platforms: Transitioning legacy MP coordination data (CAD format) into native Electrical models (Revit format).
  - Running Coordination Reviews to automatically audit Copy/Monitor alerts for lighting fixtures.

    - Navisworks Integration: Mastering the global user interface, tab functions, and cross-platform clash detection.
- **Lesson 8.3: Professional Output & Error Resolution**
    - Automating documentation sets: Sheet setup, sorting, and linking revision cloud parameters to title blocks.
    - Configuring global Print Setups and generating full 3D print file outputs.
- **Lesson 8.4: Troubleshooting Technical Glitches**
    - Fixing the Scope Box Glitch: Resolving spontaneous floor plan rotations when opening scope boxes.
