Table of Contents

Dedication iii
Preface xiii

Chapter 1: Introduction to Autodesk Revit 2022 for MEP

Introduction to Autodesk Revit for MEP 1-2
Mechanical Discipline 1-2
Electrical Discipline 1-2
Plumbing Discipline 1-2
Autodesk Revit as a Building Information Modeler (BIM) 1-3
Basic Concepts and Principles 1-3
Understanding the Parametric Building Modeling Technology 1-4
Terms Used in Autodesk Revit for MEP 1-5
Creating an MEP Model Using Parametric Elements 1-7
Visibility/Graphics Overrides, Scale, and Detail Level 1-8
Extracting Project Information 1-8
Creating an MEP Drawing Set 1-9
Creating an Unusual Building Geometry 1-9
Flexibility of Creating Special Elements 1-9
Creating Services Layouts 1-9
Working on Large Projects 1-9
Working in Large Teams and Coordinating with Consultants 1-10
Starting Autodesk Revit 2022 1-10
User Interface 1-11
Title Bar 1-12
Ribbon 1-12
Application Frame 1-15
Status Bar 1-16
View Control Bar 1-16
Options Bar 1-17
Type Selector 1-17
Drawing Area 1-17
Project Browser 1-17
Keyboard Accelerators 1-18
Properties Palette 1-18

Dialog Boxes 1-19
Multiple Document Environment 1-20
Interoperability of Autodesk Revit 1-21
Building Information Modeling and Autodesk Revit 2022 1-21
Autodesk Construction Cloud Enhanced 1-22
Autodesk Revit Help Enhanced 1-23
Self-Evaluation Test 1-23
Review Questions 1-23

Chapter 2: Getting Started with an MEP Project

Overview of an BIM-MEP Project 2-2
Essentials for an MEP Project 2-2
Starting a New MEP Project 2-3
Project Units 2-4
- Common Unit Type 2-5
- HVAC Unit Type 2-9
- Electrical Unit Type 2-10
- Piping Unit Type 2-11

Project Templates 2-12
- Creating a Custom Project Template 2-12
- Settings for the Project Template Enhanced 2-13

Linking Revit Models and Sharing Coordinates 2-21
- Managing the Linked Revit Models in the Project Browser 2-22
- Converting Linked Models to Groups - Binding Links 2-22
- Controlling the Visibility of Linked Models 2-23
- Managing Links 2-24
- Including Elements of Linked Models in Schedules 2-25
- Copying Linked Model Elements 2-25
- Copying and Monitoring Linked Model Elements 2-25

Snaps Tool 2-26
- Dimension Snaps Area 2-27
- Object Snaps Area 2-27
- Temporary Overrides Area 2-28

Saving an MEP Project 2-28
- Using the Save As Tool 2-28
- Using the Save Tool 2-29

The Options Dialog Box 2-29
- General Tab 2-30
- Graphics Tab 2-31
- Hardware Tab 2-32
- File Locations Tab 2-33
- Rendering Tab 2-33
- Check Spelling Tab 2-34
- SteeringWheels Tab 2-35
- ViewCube Tab 2-36
- User Interface Tab 2-38

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Closing an MEP Project 2-38
Exiting an MEP Project 2-38
Opening an Existing MEP Project 2-39
Opening an Existing Project Using the Open Tool 2-39
Using the Windows Explorer to Open an Existing Project 2-40
Tutorial 1 2-40
Self-Evaluation Test 2-49
Review Questions 2-50
Exercise 1 2-51

Chapter 3: Creating Building Envelopes

Introduction 3-2
Levels 3-2
Understanding Level Properties 3-4
Adding Levels 3-7
Modifying Level Parameters 3-9
Controlling the Visibility of Levels 3-10
Working with Grids 3-10
Creating Grids 3-10
Modifying Grids 3-14
Grid Properties 3-14
Reference Planes 3-16
Work Planes 3-16
Setting a Work Plane 3-16
Controlling the Visibility of Work Planes 3-17
Working with Project Views 3-17
Viewing a Building Envelope 3-17
Overriding the Visibility/Graphic of an Element 3-18
Overriding the Visibility/Graphic of Element Category 3-19
Making Elements Transparent 3-20
Using the Temporary Hide/Isolate Tool 3-21
Plan Views 3-21
Elevation Views 3-23
Section Views 3-25
Using the Scope Box Tool 3-28
Understanding Wall Types 3-29
Exterior Wall Type 3-30
Curtain Wall Type 3-30
Creating Architectural Walls 3-30
Specifying Architectural Wall Properties 3-31
Sketching Walls 3-35
Using Doors in a Building Model 3-39
Adding Doors 3-39
Understanding Door Properties 3-41

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Adding a Door to a Wall 3-43
Adding Windows in a Building Model 3-45
Adding Windows 3-45
Understanding Window Properties 3-45
Adding a Window to a Wall 3-47
Doors and Windows as Wall Openings 3-49
Openings in the Wall 3-49
Creating Architectural Floors 3-49
Sketching the Floor Boundary 3-51
Placing Ceilings 3-52
Creating an Automatic Ceiling 3-53
Sketching a Ceiling 3-53
Using the Pick Walls Method 3-54
Modifying a Ceiling 3-55
Creating Rooms 3-55
Adding Rooms 3-56
Calculating Room Volumes 3-60
Cutting Openings in a Wall, Floor, and Ceiling 3-61
Creating Openings Using the By Face Tool 3-61
Creating Openings Using the Vertical Tool 3-62
Creating Openings Using the Wall Tool 3-62
Creating Openings Using the Dormer Tool 3-62
Creating Openings Using the Shaft Tool 3-63
Tutorial 1 3-63
Tutorial 2 3-77
Self-Evaluation Test 3-89
Review Questions 3-90
Exercise 1 3-91

Chapter 4: Creating Spaces and Zones and Performing System Analysis

Introduction 4-2
Space Modeling for Building Analysis 4-3
Creating Spaces 4-3
Modifying Spaces 4-10
Color Schemes 4-17
Creating and Editing Color Schemes 4-18
Applying a Color Scheme to the Spaces 4-21
Adding Color Scheme Legends 4-21
Modifying a Color Scheme 4-22
Modifying a Color Scheme Legend 4-22
Creating Zones from Spaces 4-22
Adding and Modifying HVAC Zones 4-23
Preforming System Analysis Enhanced 4-26
Setting the Model 4-26
Adding the Analytical System and Defining the System Zone 4-27
Creating the Analytical Model 4-28
Running the System Analysis 4-29

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Tutorial 1 4-30
Tutorial 2 4-42
Tutorial 3 4-46
Tutorial 4 4-54
Self-Evaluation Test 4-57
Review Questions 4-57
Exercise 1 4-58

Chapter 5: Creating an HVAC System

Introduction 5-2
Creating an HVAC System 5-2
Understanding Air Terminals 5-2
Adding Supply Air Terminals 5-3
Adding Air Equipments 5-4
Creating Air Supply System 5-5
Creating Return Air Terminals, Air System, and Air Ductwork 5-8
Inspecting the Duct System 5-8
Checking the Duct System 5-9
Creating Duct Legend 5-9
Different Components of an HVAC System 5-10
Recommended Practices for Creating HVAC Systems 5-13
Generating HVAC System Layouts 5-14
Creating Ducts and Duct Fittings 5-17
Creating Ducts 5-17
Fabrication Details in Revit 5-20
Configuring the Fabrication and Loading Services 5-21
Placing the Fabrication Parts 5-23
Tutorial 1 5-26
Tutorial 2 5-33
Tutorial 3 5-39
Self-Evaluation Test 5-44
Review Questions 5-45
Exercise 1 5-45

Chapter 6: Creating an Electrical System

Introduction 6-2
Adding Electrical Equipment 6-2
Adding Transformers 6-2
Placing Switchboard Components 6-5
Placing the Panel Board or Distribution Board 6-7
Adding Power and System Devices 6-9
Adding Electrical Fixtures 6-9
Adding Lighting Devices 6-11
Adding Communication Devices 6-13
Adding Lighting Fixtures 6-14
Type Properties of a Lighting Fixture 6-16

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Specifying the Electrical Settings 6-18
Setting the Wires 6-19
Setting the Voltage Definition 6-23
Setting the Distribution System 6-24
Setting the Load Calculations 6-25
Setting the Panel Schedules 6-26
Creating Power Distribution System 6-27
Performing Lighting Analysis 6-28
Creating Circuits 6-29
Adding Wires to the Circuit 6-30
Tutorial 1 6-30
Tutorial 2 6-34
Tutorial 3 6-46
Self-Evaluation Test 6-54
Review Questions 6-55
Exercise 1 6-55

Chapter 7: Creating Plumbing Systems

Introduction 7-2
Creating a Plumbing System 7-2
Adding Plumbing Fixtures 7-2
Specifying the Pipe Settings 7-7
Routing Pipes in the Pipe System 7-14
Modifying a Pipe Segment 7-21
Placing Fittings 7-21
Placing Pipe Accessories 7-22
Tutorial 1 7-24
Tutorial 2 7-37
Self-Evaluation Test 7-41
Review Questions 7-42
Exercise 1 7-43

Chapter 8: Creating Fire Protection System

Introduction 8-2
Fire Protection Systems 8-2
Sprinkler Libraries 8-3
Piping Tools 8-3
Wet and Dry Fire Protection Systems 8-4
Designing the Fire Protection System 8-5
Setting Up a Fire Protection System Project 8-5
Creating the Space Schedule 8-9
Placing Sprinkler Heads 8-9
Connecting the Sprinklers 8-11
Tutorial 1 8-12
Tutorial 2 8-21

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Self-Evaluation Test 8-24
Review Questions 8-24
Exercise 1 8-25

Chapter 9: Creating Construction Documents

Introduction 9-2
Dimensioning 9-2
Types of Dimensions 9-2
Using Temporary Dimensions 9-3
Entities in a Dimension 9-4
Adding Permanent Dimensions 9-6
Modifying Dimension Parameters 9-12
Locking Permanent Dimensions 9-14
Converting Temporary Dimensions into Permanent Dimensions 9-15
Text Notes 9-15
Adding Text Notes 9-16
Editing Text Notes 9-18
Adding Tags 9-20
Tagging Elements by Category 9-20
Tagging All Elements in a View 9-23
Callout Views 9-25
Creating a Callout Using the Rectangle Tool 9-25
Creating a Callout Using the Sketch Tool 9-26
Displaying Callout View 9-26
Modifying the Properties of a Callout View 9-26
Creating Details in a Callout View 9-27
Drafting Details 9-28
Creating a Drafting View 9-28
Drafting a Detail 9-29
Duplicating Views 9-29
Creating Duplicate View as Dependent View 9-30
Sheets 9-30
Adding a Drawing Sheet to a Project 9-31
Adding Views to a Drawing Sheet 9-32
Modifying a Building Model in Sheets 9-34
Adding Schedules to a Drawing Sheet 9-35
Adding Guide Grids to a Sheet 9-35
Tutorial 1 9-36
Tutorial 2 9-41
Self-Evaluation Test 9-48
Review Questions 9-49
Exercise 1 9-49

Chapter 10: Creating Families and Worksharing

Introduction to Massing 10-2
Understanding Massing Concepts 10-2
Creating the Massing Geometry 10-3

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Creating a Massing Geometry in the Family Editor 10-4
Editing a Massing Geometry in the Family Editor 10-12
Creating Cuts in a Massing Geometry Using the Family Editor 10-13
Loading Massing Geometry into a Project 10-14
Placing the Massing Geometry in a Project 10-15
Creating the In-Place Mass in a Project 10-16
Massing in Conceptual Design Environment 10-17
Interface of the Conceptual Design Environment 10-17
Creating Masses in the Conceptual Design Environment 10-18
Worksharing Concepts 10-23
Worksharing Using Workset Tools 10-23
Process of Worksharing 10-23
Saving Methodology in Worksharing 10-29
Element Ownership Concepts 10-30
Monitoring the Worksharing Process 10-31
Tutorial 1 10-35
Self-Evaluation Test 10-53
Review Questions 10-54
Exercise 1 10-54

Index **I-1**

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com