

# Instructor's Guide for Advanced 3D Modeling for Architectural Design

This instructor guide is a comprehensive tool for facilitating this content in the classroom. Prepare to teach this course by thoroughly reviewing this document, as well as all related course materials and resources. We suggest some knowledge of building design and construction terminology would help to teach this course.

The overall course contains the following resources:

- 5 1/2 hours of video lessons covering all the topics in the course.
- Over 80 dataset files for use when following the video lessons.
- Quiz questions with timecodes for remedial knowledge check.
- Exam-style questions at the conclusion of the course.
- 7 practice exercises with exercise files and solution videos.
- 4 challenge assignments with recommended assessment criteria.
- 1 end-of-course challenge assignment with recommended assessment criteria.

## **Pre-requisites:**

This course covers advanced modeling design principles in Revit and is intended for students who already have a basic knowledge of modeling in Revit. Some knowledge of building design and construction terminology and general computer literacy is recommended.

## **Structure of the course:**

The course is split into nine lessons and is designed to cover the advanced skills required to start creating 3D BIM models and designing buildings using Revit.

## **Video lessons:**

Each video lesson is between 6 and 12 minutes long. They all begin with a list of Learning Objectives covered in the video. The dataset mentioned throughout all the videos are available if students wish to follow along or practice after the video.

All the videos will take 5 1/2 hours to watch, although if you are using the datasets and following along this will increase the time.

### Practice exercises:

There are 7 practice exercises included, each exploring a different set of topics. The practice exercises are designed to give students an opportunity to test their knowledge and apply what they have learned. Each practice exercise is accompanied by a video solution. The practice exercises are shown below along with recommended durations:

Practice Exercise Schedule	
Title	Duration
Practice Exercise: Embed walls	20 Mins
Practice Exercise: Create ceilings	20 Mins
Practice Exercise: Floor shape editing	15 Mins
Practice Exercise: Create a mansard roof	15 Mins
Practice Exercise: Hosted railings	25 Mins
Practice Exercise: Create areas	15 Mins
Practice Exercise: Create and assign materials	15 Mins

### Challenge assignments:

There are 4 challenge assignments included, each one focusing on a set of topics covered in the course. Students are presented a challenge in an applicable real-world situation, and they apply their skills and the techniques learned to solve the challenge. Additionally, there is an end-of course challenge that encompasses multiple sections of the course. A grading rubric is provided for the instructor, giving guidelines on assessment criteria and suggested mark weighting for specific tools and processes that may have been used. The challenge assignment exercises are shown with the relevant lesson. You can also encourage students to work in small groups, first discussing the desired outputs from the model and working collectively to derive the best process and execution in Revit.

Challenge Assignment Schedule	
Title	Duration
Challenge Assignment: Create an atrium	25 Mins
Challenge Assignment: Create site topography	30 Mins
Challenge Assignment: Model by face	30 Mins
Challenge Assignment: Create a glazed roof and use room data	40 Mins
Course Challenge: Finish the model	50 Mins

### Quiz questions:

Quiz questions are included with each video of the course and the timecodes are included so that students can review the related sections in the video for questions they have answered incorrectly.

### Exam-style questions:

Exam-style questions are included at the conclusion of the video course for students to measure what they have learned against realistic multiple-choice questions.

## Teaching the Course Contents in a Class

Each lesson is listed below along with suggested time allocations for instruction. The referenced demonstrations are based on the video instruction included in the course. Review the video tutorials for the detailed instruction in each lesson.

### Lesson 01: Wall modeling

Total Time In-Class Required for Lesson: 65 minutes

Discuss Objectives: 5 Minutes

Demonstrate: 35 Minutes

#### Discussion Prompts:

- What are the various wall types to be considered for design?

#### Learning Objectives

- Create a wall type.
- Create a vertical compound wall.
- Perform wall clean up and joins.
- Embed walls.
- Attach walls and edit a wall profile.
- Use wall sweeps and reveals.

Review Objectives: 5 Minutes

Practice exercise: Embed walls (20 Minutes)

Assessment: quiz questions are available with each video.

## Lesson 02: Curtain wall modeling

Total Time In-Class Required for Lesson: 55 minutes

Discuss Objectives: 5 Minutes

Demonstrate: 35 Minutes

#### Discussion Prompts:

- How does a curtain wall differ from a standard wall?

#### Learning Objectives

- Create new curtain walls.
- Edit curtain wall type properties.
- Modify curtain grids.
- Create and place curtain panel types.
- Place doors in curtain walls.

Review Objectives: 5 Minutes

Challenge assignment: Create an atrium (20 Minutes)

Assessment: quiz questions are available with each video.

## Lesson 03: Floors and ceiling modeling

Total Time In-Class Required for Lesson: 90 minutes

Discuss Objectives: 5 Minutes

Demonstrate: 45 Minutes

Discussion Prompts:

- What are important design considerations for floors?
- What is an important feature of ceilings and their function?

Learning Objectives

- Create new ceilings.
- Edit ceiling types and ceiling grids.
- Place ceiling hosted components.
- Create an upstand on a floor using slab edge tools.
- Use shape editing to create sloping floors.
- Assign variable thickness layers to floor types.

Review Objectives: 5 Minutes

Practice exercise: Create ceilings (20 Minutes)

Practice exercise: Floor shape editing (15 Minutes)

Assessment: quiz questions are available with each video.

## Lesson 04: Roof modeling

Total Time In-Class Required for Lesson: 55 minutes

Discuss Objectives: 5 Minutes

Demonstrate: 30 Minutes

Discussion Prompts:

- What is the purpose of roofs?
- Describe different roof shapes and their names.
- What is the roof's structure – materials and layers?
- What is the purpose of fascias and gutters?

## Learning Objectives

- Create glazed roofs.
- Create mansard roofs.
- Create dormer windows.
- Create and assign roof types.
- Create a roof fascia and place gutters.

Review Objectives: 5 Minutes

Practice Exercise: Create a mansard roof (15 Minutes)

Assessment: quiz questions are available with each video.

## Lesson 05: Stairs and rails modeling

Total Time In-Class Required for Lesson: 80 minutes

Discuss Objectives: 5 Minutes

Demonstrate: 45 Minutes

### Discussion Prompts:

- What is the construction of stairs?– treads, risers, landings, etc.
- Describe the stair layout and when to incorporate landings.
- What are some railing requirements, handrail heights, etc., used to meet building code.

## Learning Objectives

- Create multi-level stairs.
- Place a shaft opening to create a stairwell.
- Modify stair elements.
- Add and modify railings.
- Place hosted railings to floors, roofs, and walls.

Review Objectives: 5 Minutes

Practice Exercise: Create hosted railings (25 Minutes)

Assessment: quiz questions are available with each video.

## Lesson 06: Site and typography modeling

Total Time In-Class Required for Lesson: 80 minutes

Discuss Objectives: 5 Minutes

Demonstrate: 40 Minutes

Discussion Prompts:

- What does a topographical map show?
- What materials are used for toposurfaces?
- What is a building pad used for?

Learning Objectives

- Create a toposurface from a CAD file.
- Edit toposurfaces.
- Create building pads and add site components.

Review Objectives: 5 Minutes

Challenge Assignment: Create site typography (30 Minutes)

Assessment: quiz questions are available with each video.

## Lesson 07: Mass modeling

Total Time In-Class Required for Lesson: 60 minutes

Discuss Objectives: 5 Minutes

Demonstrate: 20 Minutes

Discussion Prompts:

- What are the benefits of using mass modeling?

Learning Objectives

- Create mass families.
- Edit mass families.
- Apply model by face tools.

Review Objectives: 5 Minutes

Challenge Assignment: Model by face (30 Minutes)

Assessment: quiz questions are available with each video.

## Lesson 08: Room and areas modeling

Total Time In-Class Required for Lesson: 65 minutes

Discuss Objectives: 5 Minutes

Demonstrate: 40 Minutes

Discussion Prompts:

- Discuss the role of a room.
- What components are included in a room?

Learning Objectives

- Create areas.
- Create room data schedules.

Review Objectives: 5 Minutes

Practice Exercise: Create areas (15 Minutes)

Assessment: quiz questions are available with each video.

## Lesson 09: Materials modeling

Total Time In-Class Required for Lesson: 85 minutes

Discuss Objectives: 5 Minutes

Demonstrate: 20 Minutes

Discussion Prompts:

- What are different types of materials used in architecture projects?



## Learning Objectives

- Create and assign new material.
- Apply material to objects.

Review Objectives: 5 Minutes

Practice Exercise: Create and assign materials (15 Minutes)

Challenge Assignment: Create a glazed roof and use room data (40 Minutes)

Optional: Course challenge: Finish the model (50 Minutes)

Assessment: quiz questions are available with each video.