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# Building Information Modeling: Revit Fundamentals

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**ARCH 51312/71301****BUILDING INFORMATION MODELING: REVIT FUNDAMENTALS**

Location: **CadLAB-A Rm127**  
Instructor: **Prof. M.T.Chang, Phd.**  
Office: **By appointment**

**COURSE DESCRIPTION**

Building Information Modeling (BIM) is transforming architectural design and construction practice by combining 3D geometry with building component data. Representing the building spaces, systems, materials and costs in one integrated database allows more seamless collaboration throughout the building life-cycle. Enabling clients, designers, engineers and builders to see how building systems come together improves efficiency, reduces errors and allows control of greater complexity.

**COURSE OBJECTIVES**

This course will introduce students to using BIM for architectural design exploration, communication, and construction. The class will introduce essential software concepts and hands-on operations with Revit Architecture 2013. Hands-on exercises will lead students through the software interface, standard construction systems, creating parametric families and preparing construction documents.

**COURSE FORMAT**

This course will meet once a week with lectures, exercises, and homework assignments. Some lectures will be presented in each class. Selected guest speakers from prominent firms will present their use of the program in youtube. As an option, students can creatively use this class as an opportunity to integrate their own projects; however, this course's main focus is to introduce a software as a tool.

**SOFTWARE AND HARDWARE**

The course is held in a computer lab, which will allow you to have access to the program. However, it is also highly recommended you install Autodesk Revit 2015 (FREE for students from the Autodesk website) on to your personal computers. MAC users: please install Windows using Bootcamp (It is highly recommended to not use Parallels, VMware and other dual operating systems due to Revit's intensive utilizations of system resources.)

**EVALUATION**

This is a three credit course that will take up roughly 40 hours in this term in class. Please keep this in mind as the required commitment from you for this course.

## Assignments

Assignments will be graded based on how well they show understanding of the specific learning objectives; thoroughness, completeness, and care in completing the exercise; graphic and aesthetic quality; seeking out help when necessary.

On most assignments it will be possible to go beyond the minimum requirements, explore additional features of the software, and take the assignment further. This is recommended, and will be considered in grading. There will be a limited number of extra credit assignments.

The assignment for the entire term will be to create a small house or building that you will develop further each week. Student building Revit files will be submitted each week for review and should clearly demonstrate understanding and practice of the topics discussed the previous week. At the end of the term all the buildings will be brought together in one class site model to show how to use collaboration in the program.

## Class Information

The class has a network folder in school that will be shared with the students' U of O email accounts. The share folder will be where all homework Revit files will be submitted for the weekly assignments.

## Participation

Participation is based on regular attendance, evidence of preparation for class, frequency and quality of contributions to discussions, asking clear & concise questions whenever necessary, and being on-task during tutorial sessions.

## Grade Breakdown

See Grading Policy.

(Note: Late assignments may be accepted at the instructor's discretion, for a reduced score.)

**Academic Misconduct:** The University Student Conduct Code ([available at conduct.uoregon.edu](http://conduct.uoregon.edu)) defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. By way of example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources of information (e.g. quotations, paraphrases, ideas) and use only the sources and resources authorized by the instructor. If there is any question about whether an act constitutes academic misconduct, it is the students' obligation to clarify the question with the instructor before committing or attempting to commit the act.

**COURSE SCHEDULE:** *(the schedule is subject to change to respond to the class need and pace)*

**Week One: Course Introduction.**

**Week02: Lesson 1**

The Revit Interface

Exercise 1-1

Using the Steering Wheel & ViewCube 1-8

Exercise 1-2

Changing the View Background 1-15

Exercise 1-3

Closing and Opening the Project Browser and Properties Palette 1-17

Exercise 1-4

Changing the Ribbon Display 1-18

Exercise 1-5

Temporary, Permanent, and Listening

Dimensions 1-20

Exercise 1-6

Setting File Locations 1-46

Exercise 1-7

Adding the Default Template to Recent Files 1-47

Quiz 1 Q1-1

**Week03: Lesson 2**

Mass Elements

Exercise 2-1

Shapes 2-2

Exercise 2-2

Create a Conceptual Model 2-9

Exercise 2-3

Adding an In-Place Mass 2-12

Exercise 2-4

Modifying Mass Elements 2-15

Exercise 2-5

Create Wall By Face 2-22

Exercise 2-6

Adding Doors and Windows 2-27

Exercise 2-7

Creating a Conceptual Mass 2-32

Exercise 2-8

Using a Conceptual Mass in a Project 2-40

Additional Projects AP2-1

Quiz 2

**Week04: Lesson 3**

Floor Plans

Exercise 3-1

Placing a Grid 3-2

Exercise 3-2

Placing Walls 3-5

Exercise 3-3

Converting an AutoCAD Floor plan 3-13

Exercise 3-4

Wall Properties 3-19

Exercise 3-5

Add Level 1 Interior Walls 3-26

Exercise 3-6

Add Level 2 Interior Walls 3-29

Exercise 3-7

Add Doors 3-33

Exercise 3-8

Adding Stairs 3-35

Exercise 3-9

Creating a Handrail on a Wall 3-41

Exercise 3-10

Modifying the Floor Plan – Skills Review 3-46

Exercise 3-11

Defining a 2-hr Wall 3-49

Exercise 3-12

Adding an Elevator 3-50

Exercise 3-13

Load Family 3-57

Exercise 3-14

Mirror Components 3-62

Exercise 3-15

Create a 3D View 3-65

Exercise 3-16

Copying Lavatory Layouts 3-38

Exercise 3-17

Add a Door to a Curtain Wall 3-71

Exercise 3-18

Modifying a Curtain Wall 3-77

Exercise 3-19

Curtain Wall with Spiders 3-81

Exercise 3-20

Adding Windows 3-85

Exercise 3-21

Floor Plan Layout

**Week05: Lesson 4**

Materials

Exercise 4-1

Modifying the Material Browser Interface 4-3

Exercise 4-2

Copy a Material from a Library to a Project 4-10

Exercise 4-3

Create a Custom Material Library 4-14

Exercise 4-4

Create Paint Materials 4-15

Exercise 4-5  
 Add Categories and Materials to a Custom Library  
 4-20  
 Exercise 4-6  
 Defining Wallpaper Materials 4-22  
 Exercise 4-7  
 Defining Vinyl Composition Tile (VCT) 4-26  
 Exercise 4-8  
 Define a Glass Material 4-33  
 Exercise 4-9  
 Defining Wood Materials 4-38  
 Exercise 4-10  
 Defining Site Materials 4-40  
 Exercise 4-11  
 Defining Masonry Materials 4-44  
 Exercise 4-12  
 Assigning Materials to Stairs 4-47  
 Additional Projects AP4-1  
 Quiz 4

**Week06: Lesson 5**

Floors and Ceilings  
 Exercise 5-1  
 Creating Floors 5-1  
 Exercise 5-2  
 Copying Floors 5-5  
 Exercise 5-3  
 Creating a Shaft Opening 5-7  
 Exercise 5-4  
 Adding an Opening to a Floor 5-10  
 Exercise 5-5  
 Creating Parts 5-13  
 Exercise 5-6  
 Viewing Parts in a Floor Plan View 5-18  
 Exercise 5-7  
 Adding a Railing 5-21  
 Exercise 5-8  
 Creating Ceilings 5-24

**Week07: Lesson 6**

Schedules  
 Exercise 6-1  
 Adding Door Tags 6-2  
 Exercise 6-2  
 Creating a Door Schedule 6-4  
 Exercise 6-3  
 Modifying Family Parameters 6-9  
 Exercise 6-4  
 Creating Shared Parameters 6-16  
 Exercise 6-5  
 Adding Shared Parameters to a Schedule 6-20  
 Exercise 6-6

Adding Shared Parameters to Families 6-25  
 Exercise 6-7  
 Creating a Custom Window Schedule 6-33  
 Exercise 6-8  
 Create a Finish Schedule 6-38  
 Exercise 6-9  
 Adding Schedules and Tables to Sheets 6-43  
 Exercise 6-10  
 Using Keynotes 6-45  
 Exercise 6-11  
 Create a Building Elevation with Keynotes 6-49  
 Exercise 6-12  
 Find and Replace Families 6-55  
 Exercise 6-13  
 Modifying Family Types in a Schedule 6-56  
 Exercise 6-14  
 Export a Schedule 6-58  
 Exercise 6-15  
 Assigning Fonts to a Schedule 6-61  
 Exercise 6-16  
 Using a View Template for a Schedule 6-63  
 Additional Projects AP6-1  
 Quiz 6

**Week08: Lesson 7**

Roofs  
 Exercise 7-1  
 Creating a Roof Using Footprint 7-1  
 Exercise 7-2  
 Modifying a Roof 7-5  
 Exercise 7-3  
 Modifying a Roof Form 7-12  
 Exercise 7-4  
 Adding Roof Drains 7-14  
 Exercise 7-5  
 Adding a Dormer by Modifying a Roof Sketch 7-15  
 Additional Projects AP7-1  
 Quiz 7

**Week09: Lesson 8**

Elevations, Details & Plans  
 Exercise 8-1  
 Creating Elevation Documents 8-1  
 Exercise 8-2  
 Using Line Work 8-4  
 Exercise 8-3  
 Creating a Section View 8-7  
 Exercise 8-4  
 Modifying Keynote Styles 8-17  
 Exercise 8-5  
 Adding Window Tags 8-23  
 Exercise 8-6

Changing Window Tags from Type to Instance 8-24  
 Exercise 8-7  
 Creating a Plan Region View 8-27  
 Exercise 8-8  
 Creating a Detail View 8-31  
 Exercise 8-9  
 Adding a Callout 8-37  
 Exercise 8-10  
 Adding a Detail to a Sheet 8-39  
 Exercise 8-11  
 Importing a Detail View 8-42  
 Exercise 8-12  
 Reassigning a Callout to a new Drafting View 8-46  
 Exercise 8-13  
 Using a Matchline 8-48  
 Exercise 8-14  
 Modifying a Crop Region 8-53  
 Exercise 8-15  
 Updating a Schedule using Shared Parameters 8-55  
 Exercise 8-16  
 Create a Sheet List 8-56  
 Exercise 8-17  
 Create a PDF Document Set 8-59  
 Additional Projects  
 AP8-1  
 Quiz 8

### **Week10: Lesson 9**

Rendering  
 Exercise 9-1  
 Create a Toposurface 9-1  
 Exercise 9-2  
 Create a Split Region 9-3  
 Exercise 9-3  
 Create a Building Pad 9-6  
 Exercise 9-4  
 Add Site Components 9-9  
 Exercise 9-5  
 Defining Camera Views 9-12  
 Exercise 9-6  
 Ray Trace 9-15  
 Exercise 9-7  
 Rendering Settings 9-17  
 Exercise 9-8  
 Space Planning 9-20  
 Exercise 9-9  
 Building Sections 9-23  
 Exercise 9-10  
 Decals 9-25

Exercise 9-11  
 Creating a 3D Camera View (Reprised) 9-27  
 Exercise 9-12  
 Rendering Using Autodesk 360 9-31  
 Exercise 9-13  
 Placing a Rendering on a Sheet 9-34  
 Exercise 9-14  
 Placing a Path for a Walkthrough 9-38  
 Exercise 9-15  
 Playing the Walkthrough 9-40  
 Exercise 9-16  
 Editing the Walkthrough Path 9-41  
 Exercise 9-17  
 Creating an Animation 9-43  
 Additional Projects AP9-1  
 Quiz 9 Q9-1

### **Week 11: Lesson 10**

Customizing Revit  
 Exercise 10-1  
 Creating an Annotation Symbol 10-1  
 Exercise 10-2  
 Creating a Custom Title Block 10-5  
 Exercise 10-3  
 Using a Custom Title Block 10-15  
 Exercise 10-4  
 Creating a Line Style 10-17  
 Exercise 10-5  
 Defining Keyboard Shortcuts 10-19  
 Exercise 10-6  
 Creating a Furniture Family 10-22  
 Exercise 10-7  
 Modifying a Family 10-44  
 Exercise 10-8  
 Adding a Shared Parameter to a View Label 10-45  
 Exercise 10-9  
 Managing Family Subcategories 10-55  
 Quiz 10

### **Week12 & 13**

#### **Families**

Special Walls such as Vertically Compound Wall, Stacked Walls, Embedded Walls, and Curtain Walls. Structural Elements, and Circulation Elements We will have another session about families in Revit, if time permits.

Wednesday: To Be Announced. See Final Assignments for requirements. Location T.B.A.