Course Acronym:	ARCH
Course Number:	125
Descriptive Title:	Building Information Modeling (BIM) II
Division:	Industry and Technology
Department:	Architecture
Course Disciplines:	Architecture
Catalog Description:	This course teaches intermediate techniques in Building Information Modeling (BIM) using various architectural BIM software. Topics include computer animation, rendering, design analysis and documentation of buildings. Students will create detailed computer models of buildings and generate conceptual floor plans, building sections, elevations, details and schedules from the model.
Prerequisite:	
Co-requisite:	
Recommended Preparation:	Architecture 119, Architecture 121, and Architecture 251
Enrollment Limitation:	
Hours Lecture (per week):	2
Hours Laboratory (per week):	4
Outside Study Hours:	4
Total Course Hours:	108
Course Units:	3
Grading Method:	Letter Grade only
Credit Status:	Credit, degree applicable
Transfer CSU:	Yes
Effective Date:	03/15/1999
Transfer UC:	No
Effective Date:	
General Education: ECC	
Term:	
Other:	
CSU GE:	
Term:	
Other:	

IGETC:	
Term:	
Other:	
Student Learning Outcomes:	**SLO #1 Advanced Concepts** By the conclusion of the course, students should be able to: • Understand advanced concepts of Revit Architecture 2012 • Create a detailed 3D Revit model with building plans, sections, elevations, RCPs, enlarged plans and 3D views • Understand advanced concepts of detail and schedule creation • Understand advanced concepts of stair and curtain wall creation • Understand advanced concepts of creating parametric families • Understand how Revit and sustainable design/LEED work together • Understand how Revit is used in a professional office setting • Create renderings, shadow studies, and animations • Create parametric Revit families • Create your own BIM with construction documents that can be used in a portfolio **SLO #2 Three-Story Office Building** Students will create, using Revit software, a detailed 3D computer model of a 3-story office building complete with floor plans, RCPs, building sections, interior and exterior elevations, and details as well as photo realistic renderings. Students will also create curtain wall systems, door, window, Revit families, and furniture schedules, 3D animations, and understand the protocol for using Revit in a professional office setting. Students will use Building Information Modeling (BIM) in design, analysis and documentation of their buildings. **SLO #3 3D BIM Modeling** The course requires its students to learn advanced concepts of 3D BIM modeling using Autodesk Revit software and to create details computer models of buildings that can be used to generate building plans, sections, elevations, details, schedules, etc. Students will also learn concepts of stair; curtail wall, and family creation and the responsibilities of a BIM Manager. Once completed with this course, student will be prepared for advanced-level employment with an architecture firm using computer software to manage a BIM.
Course Objectives:	1. Construct a BIM of a building that contains several floors, a curtain wall, a central service core with stairs and a sloped roof. 2. Create three-dimensional (3D) models of buildings that will serve to generate various two-dimensional (2D) plans, sections and elevations.

	3. Assemble door, window and room schedules, create and manage annotations and dimensions of drawings.
	4. Design and modify walls, door and window styles, roofs, column and openings.
	5. Create 3D terrain with site components such as trees, people, cars, etc. Construct solar studies to determine how the sun affects your 3D model.
	6. Formulate a short animated sequence of a fly-around or walk through of a building and transfer it to a video medium.

Major Topics:

I. BIM (6 hours, lecture)

   A. User interface
   B. Software vocabulary
   C. Hierarchy of software elements
   D. Parameters and Values within BIM
   E. Creating a simple multi-story building that contains five floors
   F. Creating a curtain wall, a central service core

II. Categories, families, types, views, and sheets (12 hours, lecture)

   A. Creating plans, elevations, sections and detail views
   B. Modification of tags and other annotation on plans
   C. Setting visibility and graphic controls to category elements
   D. Creating Filters within visibility and graphic controls
   E. Creating new types for building elements, annotation and views
   F. Creating new families
   G. Creating view templates
   H. Production of project sheets that contain project views

III. Annotating and dimensioning (12 hours, lecture)

   A Adding & modifying notes to a BIM model
   B Adding & modifyiing dimensions to a BIM model

IV. Detailing (6 hours, lecture)

   A. Creating standard 2D detail components
   B. Creating details unique to a model
   C. Creating 2D drafting view

V. Creating a multi-story building (12 hours, lab)

   A. Creating walls, floors, and roof using controls model constraints
   B. Creating a floor plan from hand sketch
   C. Creating a 3D BIM model with exterior envelope, floors, and interior partitions

VI. Types & views (15 hours, lab)

   A. Creating dependent views to break up a large project into sections to accommodate plans and elevations that normally would not fit onto one sheet   B. Creating floor plans using custom wall and floor types
   C. Creating floor plans with graphic variations of poche, line weight, line style, and

color
    D. Creating custom views, view templates, filters, and dependent views

VII.   Building masses & curtain systems (9 hours, lab)

    A. Creating massing elements
    B. Creating flat and curved curtain wall systems based on massing elements

VIII. Terrain (6 hours, lab)

    A. Creating a site terrain
    B. Creating components with trees and other entourage

IX. Solar studies (6 hours, lab)

    A. Creating solar studies of a building envelope
    B. Creating shadows, and ambient shadows with control levels of contrast and transparency

X. Sheets & presentation views (15 hours, lab)

    A. Creating a project sheet list for cover, floor plans, elevations, sections, enlarged plans, wall sections, schedules, and details
    B. Creating note legends with typical project sheet notes
    C. Creating 2-D presentation views
    D. Creating 3-D presentation views
    E. Creating and editing a Schematic Construction Document set

XI. Rendered views and walkthroughs (9 hours, lab)

    A. Creating rendered interior and exterior views of a model
    B. Creating an animated walkthrough of a model

Total Lecture Hours:	36
Total Laboratory Hours:	72
Total Hours:	108
Primary Method of Evaluation:	Skills demonstration
Typical Assignment Using Primary Method of Evaluation:	Create a building in a 3D model format and convert that model into schematic construction documents, (plans, sections and elevations.) There should be sufficient information on the drawings so that a contractor would be able to understand the building envelope and structure. Submit drawings electronically to the instructor.
Critical Thinking Assignment 1:	Given a sketch of a building, produce a 3D model using the geometric primitive shapes building tools provided in the 3D software and demonstrate the ability to modify the 3D model with calculated intent. Submit architectural drawings electronically to the instructor.
Critical Thinking Assignment 2:	Given a 3D model of an existing building, create custom variations of generic building elements provided in the BIM software. Create an animated segment of the building's exterior. Submit architectural drawings electronically to the instructor.

Other Evaluation Methods:	Class Performance, Homework Problems, Presentation
Instructional Methods:	Lab, Lecture, Multimedia presentations
If other:	
Work Outside of Class:	Study, skill practice, required reading, problem solving activities
If Other:	
Up-To-Date Representative Textbooks:	Aubin, Paul F. <u>Revit Essentials for Architecture: 2021 and Beyond</u>, G3b Press, 2020 Yori, Robert. Kim, Marcus. Kirby, Lance. <u>Mastering Autodesk Revit 2020,</u> 1st Edition, Sybex, 2019
Alternative Textbooks:	•
Required Supplementary Readings:	
Other Required Materials:	Flash drive, notebook Recommended materials: laptop
Requisite:	
Category:	
Requisite course(s): List both prerequisites and corequisites in this box.	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
Requisite Skill:	
Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable	
Requisite course:	Architecture 119, Architecture 121, Architecture 251
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	**Basic knowledge of BIM architecture.** ARCH 121 - Design 3-D computer models of buildings. **Ability to create Construction Documents that include floor plans, sections, elevations and various schedules for doors, windows, rooms, etc. from the computer models.** ARCH 121 - Delineate renderings, animations and shadow studies of the computer models. ARCH 121 - Use BIM in design, analysis, and documentation of a building.

	Ability to draft floor plans, section and elevation drawings. ARCH 251 - Apply and develop line and lettering techniques. ARCH 251 - Evaluate building and zoning codes and how they affect the design of a building. ARCH 251 - Analyze the names and functions of framing members in wood frame construction. ARCH 251- Create a series of construction documents using hand drafting, CAD and BIM. **Understand basic architectural terminology symbols.** ARCH 251 - Analyze the names and functions of framing members in wood frame construction. ARCH 251 - Create a series of construction documents using hand drafting, CAD and BIM. **Understand the name and function of all Type V building construction.** ARCH 251 - Analyze the names and functions of framing members in wood frame construction. ARCH 251 - Create a series of construction documents using hand drafting, CAD and BIM. **Ability to construct architectural documents using AutoCAD.** ARCH 119 - Create architectural construction documents using the commands in AutoCAD.
Requisite Skill:	
Requisite Skill and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s). If applicable	
Enrollment Limitations and Category:	
Enrollment Limitations Impact:	
Course Created by:	Michael Stallings
Date:	10/28/2014
Original Board Approval Date:	03/15/1999
Last Reviewed and/or Revised by:	Dan Richardson

Date:	05/28/2020
Last Board Approval Date:	1/17/2023