Subject:	ARCH
Course Number:	185
Descriptive Title:	3D Architectural Design Modeling
Division:	Industry and Technology
Department:	Architecture
Course Disciplines:	Architecture
Catalog Description:	This course introduces 3D design modeling specifically tailored for architecture. Students will be taught 3D computer graphics using a freeform surface modeler and rendering software for simulation of the proposed built-form to create a 3D user experience. The course explores the principles of 3D design, visualization techniques, and the integration of sustainable design principles into architectural modeling. Emphasis is placed on the practical application of 3D modeling in architectural projects, design studio, design development, and the development of a professional portfolio.
Prerequisite:	Architecture 119 with a minimum grade of C
Co-requisite:	
Recommended Preparation:	
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:	
Transfer UC:	Yes
Effective Date:	
General Education ECC:	
Term:	
Other:	
CSU GE:	
Term:	
Other:	
IGETC:	
Term:	

Other:	
CalGETC:	
Term:	
Other:	
Student Learning Outcomes:	**SLO 1** – 3D Design Proficiency: Students will demonstrate proficiency in using industry-standard 3D modeling software to create detailed architectural models. **SLO 2 – Visualization Techniques**: Students will apply visualization techniques to effectively present architectural designs, develop design diagrams, and visualize their design explorations. **SLO 3 –Design Integration**: Students will integrate design principles into their 3D models, demonstrating an understanding of spatial impacts, structural principles, and sustainable solutions.
Course Objectives:	1. Develop skills in using 3D modeling software similar to 3D CAD, Rhino, 3DSMax, and Unreal. 2. Apply visualization techniques to enhance the presentation of architectural designs. 3. Integrate sustainable design principles into 3D models. 4. Understand the workflow of architectural modeling from conceptual design to detailed documentation. 5. Analyze design choices through the development of 3D diagrams.
Major Topics:	**I. INSTRUCTIONAL CONTENT (36 hours, lecture)** 1. A. Introduction to 3D Modeling (Lecture, 2 hours) 1. Overview of 3D modeling in architecture and design 2. Introduction to Rhino, Maya, and 3D Studio Max 3. Basic modeling techniques and workflows in CAD programs 1. B. Overview of Freeform Surface Modeling (Lecture, 4 hours) 1. The role of NURBS (Non-Uniform Rational Basis Spline) geometry in surface modeling 2. Understanding basic concepts of modeling 3. Working with other applications 1. C. Visualization and Rendering in 3D Modeling (Lecture, 8 hours) 1. Rendering techniques with a surface modeler 2. Using visualization tools for a variety of visual communications

3. Integrating 3D models with presentation software

1.

D. Transition to Rhino (Lecture, 4 hours)

E. 1. Overview of Rhino and its capabilities
2. Differences and similarities between 3D CAD and Rhino
3. Setting up the Rhino environment

2.

E. Introduction to 3D Modeling with Rhino (Lecture, 2 hours)
1. Basic modeling techniques and workflows in Rhino
2. Creating detailed components in Rhino
3. Utilizing Rhino's unique tools and features

3.

F. Advanced Rhino Techniques (Lecture, 6 hours)
1. Advanced modeling techniques in Rhino
2. Parametric design using Grasshopper
3. Customizing and optimizing 3D models in Rhino

1.

G. Visualization and Rendering in Rhino (Lecture, 6 hours)
1. Rendering techniques in Rhino
2. Using visualization tools in Rhino for effective presentations
3. Integrating Rhino models with presentation software

1.

H. Project Development and Portfolio Building (Lab, 4 hours)
1. Developing a comprehensive 3D modeling project
2. Documenting and presenting the project
3. Building a professional portfolio showcasing skills in AutoCAD and Rhino

II. THE "LEARNING BY DOING PRINCIPLE" (72 hours, Lab)

A. Individual-Centered Focus Tasks

1. Individual project development and evaluation
2. Instructor-to-student and peer-to-peer interactions
3. Instructor desk critiques
4. Exercise engagement based of lecture content
5. Digitally drawing to explore ideas

B. Group Collaboration Activity

1. Small group pin-ups
2. Developing/ testing of design principals
3. Participation in group tasks and projects

Total Lecture Hours:	36

Total Laboratory Hours:	72
Total Hours:	108
A.1. Primary Methods of Evaluation (Part 1 - CCN courses only):	Not Applicable
Primary Method of Evaluation:	2) Problem solving demonstrations (computational or non-computational)
Typical Assignment Using Primary Method of Evaluation:	Create a 3D model of an assigned building or a design studio project using a freeform surface modeler. Submit 3D model to the instructor.
Critical Thinking Assignment 1:	**Parametric Design Exploration:** Using Grasshopper in Rhino, create a parametric design project (e.g., a façade, pavilion, or furniture piece). Submit 3D model to the instructor.
Critical Thinking Assignment 2:	**Sustainable Building Design:** Design a small sustainable building or structure using a freeform surface modeler. Submit 3D model to the instructor.
Other Evaluation Methods:	Class Performance, Completion, Presentation
If Other:	
Instructional Methods:	Demonstration, Discussion, Lab, Lecture, Multimedia presentations
If other:	
Work Outside of Class:	Skill practice
If Other:	
Up-To-Date Representative Texts:	Jinmo Rhee and Eddy Man Kim. DIGITAL MEDIA SERIES: Rhinoceros. 2019. (Discipline Standard)
Alternative Texts:	Handouts prepared by the instructor
Required Supplementary Readings:	
Other Required Materials:	
Requisite	Prerequisite
Category	sequential
Requisite course:	Architecture 119
Requisite and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s).	**Ability to create digital drawing in CAD software.** ARCH 119 - Create architectural construction documnts using the commands in AutoCAD.
Requisite Skill:	
Requisite Skill and Matching skill(s): Bold	

the requisite skill(s). if applicable	
Requisite course:	
Requisite and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s).	
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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:	Marc Yeber
Date:	10/30/2024
Original Board Approval Date:	03/24/2025
Effective Term:	Fall 2025