ARCH230 : Advanced 3D Visualization for Architecture and Interior Design

General Information

Author:	• David D Martin
Course Code (CB01) :	ARCH230
Course Title (CB02) :	Advanced 3D Visualization for Architecture and Interior Design
Department:	ARCH
Proposal Start:	Spring 2025
TOP Code (CB03) :	(0201.00) Architecture and Architectural Technology
CIP Code:	(04.0901) Architectural Technology/Technician.
SAM Code (CB09) :	Clearly Occupational
Distance Education Approved:	No
Will this course be taught asynchronously?:	No
Course Control Number (CB00) :	CCC000525850
Curriculum Committee Approval Date:	05/22/2024
Board of Trustees Approval Date:	07/16/2024
Last Cyclical Review Date:	05/22/2024
Course Description and Course Note:	ARCH 230 teaches advanced features of 3D visualization, augmented realities (AR) and virtual realities (VR) in the architecture and interior design industries. Advanced topics will be explored, such as High Dynamic Range (HDR) scene lighting (lighting sampled from a real environment); global illumination; camera matching, camera tracking; augmented reality publishing. Students will create portfolio-quality visualization projects, including AR and VR immersive components, linking the printed page, the video screen, and the immersive world, into one seamless experience.
Justification:	Mandatory Revision
Academic Career:	• Credit
Author:	

Academic Senate Discipline

Primary Discipline:	• Architecture
Alternate Discipline:	No value
Alternate Discipline:	No value

Course Development

Basic Skill Status (CB08)

Course is not a basic skills course.

☐ Allow Students to Gain Credit by Exam/Challenge

Course Special Class Status (CB13)

Course is not a special class.

Pre-Collegiate Level (CB21)

Not applicable.

Grading Basis

• Grade with Pass / No-Pass Option

Course Support Course Status (CB26)

Course is not a support course

Transferability & Gen. Ed. Options

General Education Status (CB25)

Not Applicable

Transferability

Transferable to CSU only

Transferability Status

Approved

Units and Hours

Summary

Minimum Credit Units (CB07)	3
Maximum Credit Units (CB06)	3
Total Course In-Class (Contact) Hours	108
Total Course Out-of-Class Hours	54
Total Student Learning Hours	162

Credit / Non-Credit Options

Course Type (CB04)

Credit - Degree Applicable

Noncredit Course Category (CB22)

Credit Course.

Noncredit Special Characteristics

No Value

Course Classification Code (CB11)

Credit Course.

Funding Agency Category (CB23)

Not Applicable.

☐ Cooperative Work Experience Education Status (CB10)

☐ Variable Credit Course

Weekly Student Hours

	In Class	Out of Class
Lecture Hours	1.5	3
Laboratory Hours	4.5	0
Studio Hours	0	0

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	54
Course In-Class (Contact) Hours	
Lecture	27
Laboratory	81
Studio	0
Total	108
Course Out-of-Class Hours	
Lecture	54
Laboratory	0
Studio	0
Total	54

Time Commitment Notes for Students

No value

Units and Hours - Weekly Specialty Hours

Activity Name	Type	In Class	Out of Class
No Value	No Value	No Value	No Value

Pre-requisites, Co-requisites, Anti-requisites and Advisories

Prerequisite

ARCH229 - Introduction to 3D Visualization for Architecture and Interior Design (in-development)

Objectives

- Utilize the 3ds Max software.
- Create and modify architectural and interior design models.
- Utilize the Twinmotion software to create real-time animations.
- Produce accurate building walkthroughs, rendering, texturing, and lighting of architectural and interior design projects.
- Utilize augmented reality (AR) software to create augmented and virtual reality immersive environments for architectural and interior design projects

Entry Standards

Entry Standards

Understand the concepts of rendering, texturing, lighting, and animation as it applies to the visualization and presentation of architectural and/or engineering designs.

Utilize the concepts of post production, managing media, and system resources using the 3ds Max software for architecture and engineering visualization projects.

Course Limitations

Cross Listed or Equivalent Course

Specifications

Methods of Instruction

Methods of Instruction	Lecture
Methods of Instruction	Laboratory
Methods of Instruction	Field Activities (Trips)
Methods of Instruction	Guest Speakers

Out of Class Assignments

- Field trip (e.g. tour of architectural offices.)
- Final individual project (e.g. rendering of an architectural structure and/or interior design project)

Methods of Evaluation	Rationale
Exam/Quiz/Test	Midterm examinations
Exam/Quiz/Test	Final examination
Project/Portfolio	Portfolio review and critique. (e.g. this is typically a critique of all the work that the student has accomplished during the course. The work will be evaluated by the instructor.)

Textbook Rationale

No Value

Textbooks

Author	Title	Publisher	Date	ISBN
Cusson, R.	Realistic Architectural Visualization with 3ds Max and Mental Ray	Burlington: Focal Press	2009	978-0240809120
Kelly L. Murdock	Autodesk 3Ds Max 2024 Basics Guide	SDC Publications	2023	978-1-630576141

Other Instructional Materials (i.e. OER, handouts)

No Value

Materials Fee

No value

Learning Outcomes and Objectives

Course Objectives

Use advanced features of the 3ds Max software to perform various architectural and interior design visualization tasks.

Demonstrate advanced concepts of photo-realistic rendering, texturing, lighting, and animation.

Demonstrate techniques of importing drawing geometry for AutoCAD and other computer-aided design software.

SLOs

Utilize advanced modeling techniques to create architectural features. Expected Outcome Performance: 70.0

ILOs Core ILOs	Analyze and solve problems using critical, logical, and creative thinking; ask questions, pursue a line of inquiry, and derive conclusions; cultivate creativity that leads to innovative ideas.
	Demonstrate depth of knowledge in a course, discipline, or vocation by applying practical knowledge, skills, abilities, theories, or methodologies to solve unique problems.

Create interior and exterior lighting solutions to add realism to the student's model. Expected Outcome Performance: 70.0

ILOs Core ILOs	Analyze and solve problems using critical, logical, and creative thinking; ask questions, pursue a line of inquiry, and derive conclusions; cultivate creativity that leads to innovative ideas.
	Demonstrate depth of knowledge in a course, discipline, or vocation by applying practical knowledge, skills, abilities, theories, or methodologies to solve unique problems.

Use advanced animation techniques. Expected Outcome Performance: 70.0

ILOs Core ILOs	Demonstrate depth of knowledge in a course, discipline, or vocation by applying practical knowledge, skills, abilities, theories, or methodologies to solve unique problems.

Additional SLO Information

Does this proposal include revisions that might improve student attainment of course learning outcomes?

No

Is this proposal submitted in response to learning outcomes assessment data?

No

If yes was selected in either of the above questions for learning outcomes, explain and attach evidence of discussions about learning outcomes.

No Value

SLO Evidence

No Value

Course Content

Lecture Content

Preparing AutoCAD Files for Import into 3ds Max (2 Hours)
- Plines
- UCS coordinates
- Navigating 3D models in AutoCad
- Aligning views and creating reference geometry
- Layer management

Importing Geometry (1 Hours)
- Setup work environment
- Unit setup
- Importing models
- Naming and organizing geometry

Advanced Modeling Techniques (2 Hours)
- Terrains
- Vegetation
- Window, door and stair systems

Modeling Modifier (3 Hours)
- Edit poly
- Hair and fur
- Cloth and garment maker

Materials (3 Hours)
- Advanced materials
- Creating advanced materials
- Material library
- Procedural materials
- Glass, translucent and reflective surfaces

Mapping (2 Hours)
- Unwrap UVW modifier
- Map channels and multi/sub-objects

Lighting Advanced (4 Hours)
- Advanced global illumination
- Mental ray light types and uses
- Advanced light parameters
- Mental ray shadows

Exterior Lighting Advanced (2 Hours)
- Mental ray sun
- Mental ray physical sky

Global Illumination (1 Hour)
- Advanced global illumination settings
- Shaders
- Radiosity
- Caustics

Camera Advanced (1 Hour)
- Camera advanced parameters
- Advanced Lenses
- Depth of field and motion blur

Camera Animation Advanced (3 Hours)
- Advanced camera tracking
- Re-scaling time
- Keyframes
- Advanced controllers
- Advanced constraints
- Curve editor and other tools to enhance realism

Rendering (2 Hours)
- Mental ray
- Rendering settings
- Network rendering
- V-Ray, Brazil, Maxwell and other render engines

Post Production (1 Hour)

- Advanced post production
- Particle effects
- Lens effects
- Filters and post-production tools
- Camera matching

Total Hours: 27

Laboratory/Studio Content

Preparing AutoCAD Files for Import into 3ds Max (8 Hours)

- Plines
- UCS coordinates
- Navigating 3D models in AutoCad
- Aligning views and creating reference geometry
- Layer management

Importing Geometry (2 Hours)

- Setup work environment
- Unit setup
- Importing models
- Naming and organizing geometry

Advanced Modeling Techniques (8 Hours)

- Terrains
- Vegetation
- Window, door and stair systems

Modeling Modifier (10 Hours)

- Edit poly
- Hair and fur
- Cloth and garment maker

Materials (10 Hours)

- Advanced materials
- Creating advanced materials
- Material library
- Procedural materials
- Glass, translucent and reflective surfaces

Mapping (8 Hours)

- Unwrap UVW modifier
- Map channels and multi/sub-objects

Lighting Advanced (11 Hours)

- Advanced global illumination
- Mental ray light types and uses
- Advanced light parameters
- Mental ray shadows

Exterior Lighting Advanced (8 Hours)

- Mental ray sun
- Mental ray physical sky

Global Illumination (2 Hours)

- Advanced global illumination settings
- Shaders
- Radiosity
- Caustics

Camera Advanced (2 Hours)

- Camera advanced parameters
- Advanced Lenses
- Depth of field and motion blur

Camera Animation Advanced (4 Hours)

- Advanced camera tracking
- Re-scaling time
- Keyframes
- Advanced controllers
- Advanced constraints
- Curve editor and other tools to enhance realism

Rendering (6 Hours)

- Mental ray
- Rendering settings
- Network rendering
- V-Ray, Brazil, Maxwell and other render engines

Post Production (2 Hours)

- Advanced post production
- Particle effects
- Lens effects
- Filters and post-production tools
- Camera matching

Total Hours: 81 Hours

Additional Information

Is this course proposed for GCC Major or General Education Graduation requirement? If yes, indicate which requirement in the two areas provided below.

No

GCC Major Requirements

No Value

GCC General Education Graduation Requirements

No Value

Repeatability

Not Repeatable

Justification (if repeatable was chosen above)

No Value

Resources

Did you contact your departmental library liaison?

No

If yes, who is your departmental library liason?

No Value

Did you contact the DEIA liaison?

No

Were there any DEIA changes made to this outline?

No Value

If yes, in what areas were these changes made:

No Value

Will any additional resources be needed for this course? (Click all that apply)

No Value

If additional resources are needed, add a brief description and cost in the box provided.

No Value