ARCH251 : Advanced Revit Architecture

General Information

Author:	• David D Martin
Course Code (CB01) :	ARCH251
Course Title (CB02) :	Advanced Revit Architecture
Department:	ARCH
Proposal Start:	Fall 2024
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) :	CCC000621028
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 251 teaches the advanced features of the Autodesk Revit Architecture design software. Topics include: creating building elements with parametric features, family creation under Imperial Templates, and importing and exporting drawing files.
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	0
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

ARCH250 - Introduction To Autodesk Revit Architecture

Objectives

- Complete a series of architectural drafting problems using the Revit software.
- Explain the relationship between floor plans, elevations, and section views within a parametric environment.
- Create three-dimensional models and construction documents for a residential design project.
- Create photo-realistic renderings of architectural projects.

Entry Standards

Entry Standards

Create three-dimensional models and construction documents for a commercial design project.

Course Limitations

Cross Listed or Equivalent Course

No value

Specifications

Methods of Instruction

Methods of Instruction	Lecture
Methods of Instruction	Laboratory

Methods of Instruction	Multimedia
Methods of Instruction	Tutorial
Methods of Instruction	Field Activities (Trips)
Methods of Instruction	Guest Speakers

Out of Class Assignments

- Individual research projects (e.g. write a description of the advantages of the use of parametric families in an architectural structure and explain how they would be used)
- Group projects (e.g. complete a design project such as parametric parking structure or commercial building.)
- Final individual project (e.g. Project consists of an assembly of the components completed as part of the self-paced tutorials.)

Methods of Evaluation	Rationale
Exam/Quiz/Test	Midterm examination
Project/Portfolio	Portfolio critique. (e.g. Verbal critique by the instructor of the final project. Portions of the portfolio are placed on public display.)
Exam/Quiz/Test	Final examination

Textbook Rationale

No Value

Textbooks

Author	Title	Publisher	Date	ISBN
Ascent, Various Authors	Autodesk Revit 2024: Fundamentals for Structure (Imperial Units)	ASCENT, Center for Technical Knowledge	2023	9781959504641

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

No Value

Materials Fee

No value

Learning Outcomes and Objectives

Course Objectives

Utilize the Revit Architecture program to accomplish advanced tasks such as: family creation/modification, creating worksets and project walkthroughs.

Complete conceptual models using the Revit Architecture program.

Complete projects of a structural nature using the Revit Structure software program.

SLOs

Utilize work planes to accurately place elements. 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 formulas with parameters for changeable elements. 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 custom elements and families and load into the 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.

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

Introduction (1 Hour)

- Course expectations
- Overview of tutorials and projects

Solid and Void Extrusion in a Conceptual Massing Environment (1 Hour)

- Overview of massing studies
- Placing and creating basic mass element
- Applying solid and void extrusion
- Creating conceptual massing
- Setting work planes
- Creating mass forms

Importing Revit Family Files (1 Hour)

- Importing families from massing to building files
- Applying building elements in a conceptual massing model
- Setting work planes
- Creating perspectives
- Creating walkthroughs
- Solar studies

Import AutoCAD Files Into Revit (2 Hour)

- Importing AutoCAD 3D files and layers into Revit project files
- Assign AutoCAD layers to rendering materials and colors
- Perspective and scaling
- Creating and inserting a titleblock

Making a Parametric Straight Angled I-Beam (4 Hours)

- Using generic models
- Using reference planes
- Creating a parametric relationship
- Applying a solid extrusion
- Applying trigonometry to generate parameters
- Creating formulas with parameters
- Creating a dimension clearance driven generic model
- Loading generic models into a Revit project

Making a Line-Based Parametric Canopy Model (1 Hour)

- Using generic line-based models
- Using reference lines and planes
- Creating parametric relationship
- Creating a parametric array system
- Creating family types
- Creating formulas with parameters
- Loading profiles
- Loading generic line-based models into a Revit project

Making a Wall-Based Parametric Canopy Model (1 Hour)

- Using generic wall-based models
- Using reference lines
- Applying solid and void extrusions
- Creating a formula with parameter
- Loading the model into a Revit project

Façade Wall Construction (1 Hour)

- Creating a project file
- Using reference planes and datums
- Creating walls, wall types, and compound walls
- Modifying wall components with molding profiles
- Curtain wall systems
- Creating a molding profile
- Modeling in place
- Using a curtain wall system to cut a solid wall
- Model building canopy system using model in place function

Corner Building Façade Wall Construction (1 Hour)

- Creating a project file
- Using reference planes and datums
- Creating curved walls
- Modifying wall systems
- Modeling in place
- Using profile reveal
- Applying solid blend method to generate shapes
- Using wall opening function

Retail Store Design (2 Hour)

- Loading structural system
- Beam framing system
- Creating a grid line system
- Create angled reference planes
- Modifying the framing and column system
- Importing site objects from the library

Stadium Design (2 Hours)

- Parametric seating arrangement
- Beam framing system
- Modify the framing and column systems
- Creating the wall panel and lighting systems

Parking Structures–Single Helical and Straight Parking Ramp Design (2 Hours)

- Using generic models
- Creating formulas
- Adding and modify parameters
- Using solid extrusion
- Applying trigonometry to generate parameter

Creation of Custom Elements and Families (7 Hours)

- Custom staircase design and modification
- Custom curtain walls
- Custom shell panel design
- Custom mullion design
- Custom lamella roof framing
- Custom curtain panels
- Custom shell panels
- Revit File Linking and Layout of Presentation Board

Revit link building project file into one Revit project file (1 Hour)

- Additional modifications
- Rendering Page layout
- Perspective scaling
- Load title block

Total Hours: 27

Laboratory/Studio Content

Introduction (4 Hours)

- Course expectations
- Overview of tutorials and projects

Solid and Void Extrusion in a Conceptual Massing Environment (3 Hours)

- Overview of massing studies
- Placing and creating basic mass element
- Applying solid and void extrusion
- Creating conceptual massing
- Setting work planes
- Creating mass forms

Importing Revit Family Files (4 Hours)

- Importing families from massing to building files
- Applying building elements in a conceptual massing model
- Setting work planes
- Creating perspectives
- Creating walkthroughs
- Solar studies

Import AutoCAD Files Into Revit (4 Hours)

- Importing AutoCAD 3D files and layers into Revit project files
- Assign AutoCAD layers to rendering materials and colors
- Perspective and scaling
- Creating and inserting a titleblock

Making a Parametric Straight Angled I-Beam (8 Hours)

- Using generic models
- Using reference planes
- Creating a parametric relationship
- Applying a solid extrusion
- Applying trigonometry to generate parameters

- Creating formulas with parameters
- Creating a dimension clearance driven generic model
- Loading generic models into a Revit project

Making a Line-Based Parametric Canopy Model (4 Hours)
- Using generic line-based models
- Using reference lines and planes
- Creating parametric relationship
- Creating a parametric array system
- Creating family types
- Creating formulas with parameters
- Loading profiles
- Loading generic line-based models into a Revit project

Making a Wall-Based Parametric Canopy Model (4 Hours)
- Using generic wall-based models
- Using reference lines
- Applying solid and void extrusions
- Creating a formula with parameter
- Loading the model into a Revit project

Façade Wall Construction (4 Hours)
- Creating a project file
- Using reference planes and datums
- Creating walls, wall types, and compound walls
- Modifying wall components with molding profiles
- Curtain wall systems
- Creating a molding profile
- Modeling in place
- Using a curtain wall system to cut a solid wall
- Model building canopy system using model in place function

Corner Building Façade Wall Construction (4 Hours)
- Creating a project file
- Using reference planes and datums
- Creating curved walls
- Modifying wall systems
- Modeling in place
- Using profile reveal
- Applying solid blend method to generate shapes
- Using wall opening function

Retail Store Design (8 Hours)
- Loading structural system
- Beam framing system
- Creating a grid line system
- Create angled reference planes
- Modifying the framing and column system
- Importing site objects from the library

Stadium Design (8 Hours)
- Parametric seating arrangement
- Beam framing system
- Modify the framing and column systems
- Creating the wall panel and lighting systems

Parking Structures–Single Helical and Straight Parking Ramp Design (8 Hours)
- Using generic models
- Creating formulas
- Adding and modify parameters
- Using solid extrusion
- Applying trigonometry to generate parameter

Creation of Custom Elements and Families (14 Hours)
- Custom staircase design and modification
- Custom curtain walls
- Custom shell panel design
- Custom mullion design
- Custom lamella roof framing
- Custom curtain panels
- Custom shell panels
- Revit File Linking and Layout of Presentation Board

Revit link building project file into one Revit project file (4 Hours)

- Additional modifications
- Rendering Page layout
- Perspective scaling
- Load title block

Total Hours: 81

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