

# BI 0012 - ARCHITECTURAL DRAWING III-BIM (BUILDING INFORMATION MODELING)

## Catalog Description

Formerly known as DES 22

Prerequisite: Completion of BI 11 with grade of "C" or better or equivalent as determined by instructor

Hours: 90 (36 lecture; 54 laboratory which may be scheduled TBA)

Description: Continuation of the architectural design started in BI 10 and 11. Students utilize Building Information Modeling (BIM) using REVIT software to develop commercial architectural documentation (including electronic data sets) in adherence to the International Building Code (IBC) and local county and state codes. (CSU)

## Course Student Learning Outcomes

- CSLO #1: Apply appropriate, current and relevant industry standards in preparing technical documentation for the appropriate discipline of their study.
- CSLO #2: Develop 3D Architectural Model and Architectural Drawings according to accepted industry and CAD standards.
- CSLO #3: Demonstrate computer aided drafting practices that conform to business and industry CAD standards.

## Effective Term

Fall 2022

## Course Type

Credit - Degree-applicable

## Contact Hours

90

## Outside of Class Hours

72

## Total Student Learning Hours

162

## Course Objectives

This course requires 36 hours lecture and 54 hours laboratory. In some class sections, the 54 hours of laboratory may be scheduled "to be arranged" or "TBA." The TBA hours and objectives are expected of all students enrolled in the course.

Upon successful completion of the course, the student will:

Lecture Objectives:

I. Legal Documents

1. Describe legal documents used in the Architecture and Construction fields

II. Building Codes and Commercial Design

1. Determine design categories

2. Compare residential and commercial building codes

III. Commercial Construction Materials

1. Compare construction materials used for commercial building

IV. Commercial Drawings

1. Discuss features of site plan, structural, electrical, mechanical, and plumbing drawings

V. Additional Drawings Required For Detailed Information in the Building Process

1. Discuss features of schedules, elevations and detail sheets

VI. Building Information Modeling

1. Discuss the user interface

2. Discuss Revit elements and families

3. Compare and contrast section, elevation and 3D views

4. Discuss proper dimensioning standard and CAD techniques

VII. BIM Site Handling

1. Explain the benefits of linking project sites and importing topographic surfaces

VIII. BIM Data Sets and Architectural Data Handling

1. Explain the use of schedules in a set of Architectural plans and how the builder will use them

2. Explain the proper way to implement revisions

Laboratory Objectives:

I. Legal Documents

1. Utilize legal building requirements on drawings

2. Utilize legal forms

II. Building Codes and Commercial Design

1. Compare residential and commercial building codes

2. Use building codes to calculate allowable floor area and occupant load

III. Commercial Construction Materials

1. Choose appropriate building materials and specifications for designated use

IV. Commercial Drawings

1. Develop (model and drawing documentation) site plans, structural, electrical, mechanical, and plumbing drawings

V. Additional Drawings Required for Detailed Information in the Building Process

1. Develop (model and drawing documentation) schedules, elevations and detail sheets

VI. Building Information Modeling

1. Utilize the user interface

2. Demonstrate the use of Revit elements and families

3. Create and modify levels

4. Utilize grids

5. Add and modify walls, doors, windows, component families, floors, ceilings, roofs, curtain walls

6. Demonstrate how to load additional building components

7. Properly manage views and control object visibility

8. Create and Modify section, elevation and 3D views

9. Properly Place dimensions and tags

10. Apply and remove constraints

VII. BIM Site Handling

1. Utilize site tools and site components

VIII. BIM Data Sets and Architectural Data Handling

1. Create callout views and construction documentation

2. Create and modify schedules, legends and keynotes

IX. Parametrics and Components

1. Utilize parametric components

2. Create, use and modify in-place families and parametric families

X. Presenting the Building Model

1. Create renderings using sun and shadow settings, plans and color schemes

2. Utilize walkthrough techniques

## General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

## Articulation Information

- CSU Transferable

## Methods of Evaluation

- Problem Solving Examinations
  - Example: Q: Use the following architectural sketches and the provided engineering design criteria along with current building codes, to develop a model and documentation for the single story commercial project shown. The instructor will evaluate the produced models and documentation in comparison to current industry standards.
- Projects
  - Example: The student will produce a set of working drawings from the building information model. The drawings are evaluated and graded according to the current building codes and industry standards.
- Skill Demonstrations
  - Example: The student will produce elementary building information model generated from their current floor plan. These models are evaluated and graded according to current building codes and industry standards.

## Repeatable

No

## Methods of Instruction

- Laboratory
- Lecture/Discussion
- Distance Learning

Lab:

1. The instructor will demonstrate and guide students in developing commercial models and Architectural building documentation. Students will coordinate building codes and design intent to model the appropriate solution and develop the construction drawings needed to build the project. (Laboratory Objective 4-1)

Lecture:

1. The instructor will lead group discussion during class session the possible solutions to the weekly assigned problem for accuracy and appropriate use of drafting format. Students will formulate a plan to develop the assigned models and working drawings. (Lecture Objective 4-1)

Distance Learning

1. Students in online classes participate, individually and in groups, in discussion boards and respond to weekly assignments via the Learning Management System. The instructor will provide documented material (including videos) explaining or exploring the course content and provide individual feedback on all assignments.

The instructor lectures students on Commercial design through Revit. Students are lead through an instructor guided discussion for any questions or concerns they may have. Instructor will check and respond to emails throughout the week. (Lecture Objective 6-1)

## Typical Out of Class Assignments Reading Assignments

1. Students will read the chapter on Building Codes and Commercial Design and discuss in groups. 2. Students will read the chapter on Exterior and Interior Wall Development and then utilize the information gained to develop a working 3D computer model of a commercial building.

## Writing, Problem Solving or Performance

Writing: Students will write a paper comparing and contrasting building code requirements for residential and commercial design and development. Problem Solving: Students will utilize engineering and architectural sketches along with design criteria and building codes knowledge to construct 3 dimensional models and architectural drawings, demonstrating the weekly-learned objectives.

## Other (Term projects, research papers, portfolios, etc.)

Develop a portfolio that contains samples of your semester assignments to demonstrate to potential employers the concepts studied.

## Required Materials

- Architectural Drafting and Design
  - Author: Jefferis/Madsen/Madsen
  - Publisher: Thomson
  - Publication Date: 2017
  - Text Edition: 7th
  - Classic Textbook?: No
  - OER Link:
  - OER:

## Other materials and-or supplies required of students that contribute to the cost of the course.