

STRANDS AND STANDARDS

CAD ARCHITECTURAL DESIGN 2



Course Description

The second in a sequence of courses that prepare individuals for careers in the Architecture, Engineering, and Construction (AEC) industry. This course includes instruction in 3D Computer-Aided Design (CAD) software to design and model a small residential home with an emphasis on residential methods and materials of construction, codes, and Building Information Modeling (BIM).

| | |
|---------------------------------|--------------------------|
| Core Code | 38.01.00.00.042 |
| Concurrent Enrollment Core Code | 38.01.00.13.042 |
| Units of Credit | 0.5 |
| Intended Grade Level | 10-12 |
| Prerequisite | None |
| Skill Certification Test Number | 632 |
| Test Weight | 0.5 |
| License Type | Secondary Education 6-12 |
| Required Endorsement(s) | T&E Drafting (CAD) |

STRAND 1

Students will be able to understand architectural design fundamentals.

Standard 1

Identify the historical influences that contributed to current home styles.

- Recognize and describe the design elements of various architectural styles.
- Discuss current trends in architecture.

Standard 2

List family needs that should be considered when planning a dwelling.

Standard 3

Discuss cost per type of construction, affordability, and the cost of amenities.

- Discuss home construction costs using the cost per square foot.

Standard 4

Discuss accessibility requirements for good functional utility.

STRAND 2

Students will be able to understand room and space planning.

Standard 1

Discuss factors that are important in the design of the following rooms or areas:

- Living Room
- Great/Family Room
- Entry/Foyer
- Porch
- Patio or Deck
- Bedroom
- Kitchen
- Bathroom
- Storage
- Garage
- Laundry

Standard 2

Identify the areas or zones of a residential floor plan and the code implications.

- Habitable
- Non-Habitable
- Public
- Private
- Living
- Sleeping
- Service or work Areas

- Storage and utility

Standard 3

Understand basic regulations concerning home design and construction.

- Discuss International Residential Code (IRC) implications for a residence.
- Discuss FHA minimum standards for a residence.
- Discuss local zoning restrictions for a residence.

STRAND 3

Students will identify the basic considerations in using the International Residential Code (IRC).

Standard 1

Understand the history of codes, how codes are developed, the scope and limitations, and how to use the code.

Standard 2

Understand a code versus a standard, code authority, permits, and inspections.

Standard 3

Identify code requirements relating to site development.

Standard 4

Identify code requirements to provide structural safety.

- Structural Design Criteria
- Foundations
- Framing

Standard 5

Identify code requirement relating to interior and exterior finishes as well as weather protection.

Standard 6

Identify code requirements to provide health and safety.

- Home safety
- Fire safety
- Healthy living environment
- Chimneys and Fireplaces

Standard 7

Identify code requirements relating to utilities and energy usage.

- Electrical
- HVAC
- Plumbing
- Energy efficiency

STRAND 4

Modeling (BIM) techniques to create BIM architectural drawings to a professional standard.

Standard 1

Demonstrate proficiency completing the following concepts:

- Navigating the BIM software interface
- Creating and using the different views and how they are navigated
- Adjusting views through view ranges and line styles
- Defining visibility/ graphics overrides and object styles
- Starting a new project and creating levels and grids to reference
- Creating walls and adjusting their settings
- Understanding wall types and the structure of walls
- Modifying elements
- Placing components such as doors, windows, and components
- Creating floors, ceilings, and roofs
- Creating curtain walls
- Creating stairs
- Using model groups
- Adjusting Visual Properties
- Creating room elements such as tags, fill plans, and schedules
- Using a title block family to create sheets

STRAND 5

Students will create a complete set of plans for a rambler style residence, with a basement, while maintaining less than 1000 square feet on the main floor.

Standard 1

Provide for all the essential elements of a living structure while optimizing the use of space within the prescribed footprint.

Standard 2

Draw a complete set of construction documents using the accepted symbols and techniques in a clear and precise manner which complies with architectural standards and includes the following:

- Cover Sheet
- General Notes
- Site or Plot Plan
- Foundation Plan
- Basement Plan
- Main Floor Plan
- Floor Framing Plan
- Roof Plan
- Cross Section

- Typical Wall Section
- Stair Detail Plan
- Electrical/HVAC Plan

Skill Certificate Test Points by Strand

Example table below. Refer to instructions for specifics.

| Test Name | Test # | Number of Test Points by Strand | | | | | Total Points | Total Questions |
|-----------------------------------|--------|---------------------------------|----|----|---|----|--------------|-----------------|
| | | 1 | 2 | 3 | 4 | 5 | | |
| CAD Architectural Design 2 | 632 | 5 | 10 | 12 | 9 | 23 | 59 | 55 |

Performance Skills

1. Create and maintain a portfolio of exemplary work.
2. Demonstrate practice of the *Technology & Engineering Professional Workplace Skills*.
<https://schools.utah.gov/engineering/resources>
3. Participate in a significant activity that provides each student with an opportunity to render service to others, employ leadership skills, or demonstrate skills they have learned through this course, preferably through participation in a Career & Technical Student Organization (CTSO) such as the Technology Student Association (TSA).