

STRANDS AND STANDARDS

CAD ARCHITECTURAL DESIGN 1



Course Description

The first in a sequence of courses that prepare individuals for careers in the Architecture, Engineering, and Construction (AEC) industry. This course includes instruction in 2D or 3D Computer-Aided Design (CAD) software to draw a small residential home with an emphasis on blueprint reading.

Core Code	38.01.00.00.041
Concurrent Enrollment Core Code	38.01.00.13.041
Units of Credit	0.5
Intended Grade Level	10-12
Prerequisite	None
Skill Certification Test Number	631
Test Weight	0.5
License Type	Secondary Education 6-12
Required Endorsement(s)	Technology & Engineering, or T&E Drafting (CAD)

STRAND 1

Students will investigate Architecture, Engineering, and Construction (AEC) related career opportunities.

Standard 1

Identify related occupations within the AEC industry, their pay scales, and the requirements and qualifications to become such a professional.

Standard 2

Identify personality types and potential AEC careers associated with those personalities.

Standard 3

Differentiate between the responsibilities associated with different positions within the AEC industry.

Standard 4

Investigate different forms of occupational training and educational opportunities for career opportunities in the AEC industry.

STRAND 2

Students will be able to understand, demonstrate, and apply mathematics and measuring skills.

Standard 1

Perform basic arithmetic functions using fractions and decimals.

- Add
- Subtract
- Multiply
- Divide

Standard 2

Accurately and efficiently convert between fractions and decimals.

- Decimal-Fraction conversion chart

Standard 3

Convert between metric and imperial measurements.

Standard 4

Demonstrate an ability to make and record basic measurements.

- Use architect and civil engineer scales, measuring tapes, and other techniques to measure objects represented on paper.

STRAND 3

Students will be able to interpret and create construction documents used in the AEC industry.

Standard 1

Read and interpret residential home plans that include general notes, site, foundation, floor, elevation, floor and roof framing, electrical/ mechanical, cross and wall sections, stair details, and other typical plans.

Standard 2

Identify the major milestones and tasks within the design, bid, and build process.

Standard 3

Recognize which construction documents are used by various stakeholders of the construction team and identify when those documents are used throughout the design, bid, and build process.

Standard 4

Read and interpret commercial plans that include civil, architectural, structural, electrical, and mechanical drawings.

STRAND 4

Students will be able to demonstrate sketching and CAD drawing techniques.

Standard 1

Demonstrate proper sketching techniques.

- Create freehand sketches using paper, pencil, and an eraser (without the benefit of a straight edge, compass, or template) which is neat, clear, and smudge-free.
- Demonstrate the use of lines as they are drawn according to the alphabet of lines.
- Use letters and numerals that conform to an architectural style.
- Understand and demonstrate the use of perspective views.
- Understand and use accepted dimensioning practices for sketches.

Standard 2

Demonstrate an ability to create CAD architectural drawings to a professional standard.

- Demonstrate proficiency at navigating a CAD software interface.
- Demonstrate exactness when producing drawing geometry creating elements which are accurate and drawn to scale.
- Use and know correct geometric construction techniques.
- Demonstrate the use of lines as they are drawn according to the alphabet of lines.
- Know and follow accepted architectural dimensioning standards to annotate drawings.
 - Understand and choose the best location for dimensions.
 - Demonstrate an ability to fully dimension the plan.

- Demonstrate the correct use of leaders and notes using the correct text height and text style.
- Understand the placement and use of title block information.
- Understand the placement and use of general and specific notes.

STRAND 5

Students will be able to lay out a floor plan for a residence that meets Habitat for Humanity specifications for a two-bedroom, slab on grade, 20' x 40' starter home.

Standard 1

Draw a floor plan using the accepted symbols and techniques in a clear and precise manner which complies with architectural standards.

- Demonstrate proper use of wall, room, door, and window types, common floor materials, and construction terminology.

Standard 2

Draw all required elevation plans using the accepted symbols and techniques in a clear and precise manner which complies with architectural standards.

- Demonstrate proper use of elevation terminology to visualize and identify exterior building envelope materials.

Standard 3

Draw a roof plan using the accepted symbols and techniques in a clear and precise manner which complies with architectural standards.

- Identify roof types, common roofing materials, and construction terminology.

STRAND 6

Student will be able to use construction documents to identify components and construct a scaled physical cross section model of a rambler with a basement using readily available materials.

Standard 1

Identify and construct the components of the following building systems:

- Foundation – including footings, stem walls, slab, and porch cap
- Engineered Floor – including sill plate, floor joists, and sub-floor
- Exterior walls – including exterior & interior materials, and building envelope items such as insulation, doors, and windows
- Interior walls
- Stairs – including guardrail and handrail
- Roof – including energy truss, truss, and rafter

Skill Certificate Test Points by Strand

Test Name	Test #	Number of Test Points by Strand						Total Points	Total Questions
		1	2	3	4	5	6		
CAD Architectural Design 1	631	1	6	9	8	14	12	50	39

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/cte/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).