STRAINS 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.

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<tr>
<th>Core Code</th>
<th>38.01.00.00.041</th>
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<tr>
<td>Concurrent Enrollment Core Code</td>
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<td>Units of Credit</td>
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<td>Intended Grade Level</td>
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<tr>
<td>Prerequisite</td>
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<td>Skill Certification Test Number</td>
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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

<table>
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<tr>
<th>Test Name</th>
<th>Test #</th>
<th>Number of Test Points by Strand</th>
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<th>Total Questions</th>
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<td>631</td>
<td>1 6 9 8 14 12</td>
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Performance Skills

1. Create and maintain a portfolio of exemplary work.
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).