CAD ARCHITECTURAL DESIGN I (631)

PRECISION EXAMS

DESCRIPTION

The first in a sequence of courses that prepares individuals for careers in Architecture, Engineering, and Consruction (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.

Total Test Questions: 39	Levels: 10-12	Units of Credit: 0.5
Prerequisites: None		

STANDARDS, OBJECTIVES, AND INDICATORS

STANDARD 1 — 2% of Exam Content

- **STUDENTS WILL INVESTIGATE ARCHITECTURE, ENGINEERING, AND CONSTRUCTION (AEC) RELATED CAREER OPPORTUNITIES.**

Objective 1: Identify related occupations within the AEC industry, their pay scales, and the requirements and qualifications to become such a professional.

Objective 2: Identify personality types and potential AEC careers associated with those personalities.

Objective 3: Differentiate between the responsibilities associated with different positions within the AEC industry.

Objective 4: Investigate different forms of occupational training and educational opportunities for career opportunities in the AEC industry.

STANDARD 2 — 12% of Exam Content

- **STUDENTS WILL BE ABLE TO UNDERSTAND, DEMONSTRATE, AND APPLY MATHEMATICS AND MEASURING SKILLS**

Objective 1: Perform basic arithmetic functions using fractions and decimals.

1. Add
2. Subtract
3. Multiply
4. Divide

Objective 2: Accurately and efficiently convert between fractions and decimals.

1. Decimal-Fraction conversion chart

Objective 3: Convert between metric and imperial measurements.

Objective 4: Demonstrate an ability to make and record basic measurements.

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

STANDARD 3 — 18% of Exam Content

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

Objective 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.

Objective 2: Identify the major milestones and tasks within the design, bid, and build process.

Objective 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.

Objective 4: Read and interpret commercial plans that include civil, architectural, structural, electrical, and mechanical drawings.

STANDARD 4 — 16% of Exam Content

- **STUDENTS WILL BE ABLE TO DEMONSTRATE SKETCHING AND CAD DRAWING TECHNIQUES.**

Objective 1: Demonstrate proper sketching techniques.

1. 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.
2. Demonstrate the use of lines as they are drawn according to the alphabet of lines.
3. Use letters and numerals that conform to an architectural style.
4. Understand and demonstrate the use of perspective views.
5. Understand and use accepted dimensioning practices for sketches.

Objective 2: Demonstrate an ability to create CAD architectural drawings to a professional standard.

1. Demonstrate proficiency at navigating a CAD software interface.
2. Demonstrate exactness when producing drawing geometry creating elements which are accurate and drawn to scale.
3. Use and know correct geometric construction techniques.
4. Demonstrate the use of lines as they are drawn according to the alphabet of lines.
5. 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.

STANDARD 5 — 28% of Exam Content

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.

Objective 1: Draw a floor plan using the accepted symbols and techniques in a clear and precise manner which complies with architectural standards.

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

Objective 2: Draw all required elevation plans using the accepted symbols and techniques in a clear and precise manner which complies with architectural standards.

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

Objective 3: Draw a roof plan using the accepted symbols and techniques in a clear and precise manner which complies with architectural standards.

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

STANDARD 6 — 24% of Exam Content

STUDENTS 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.

Objective 1: Identify and construct the components of the following building systems

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