Architectural Design 2

Exam Information

Exam number
632

Items
55

Points
59

Prerequisites
Architectural Design 1

Recommended course length
One semester

National Career Cluster
Architecture & Construction
Science, Technology, Engineering & Mathematics

Performance standards
Included (Optional)

Certificate available
Yes

Description

The Architecture Design 2 industry certification exam assesses learners' proficiency in using 3D Computer-Aided Design (CAD) software to design and model a small residential home. The exam focuses on residential methods and materials of construction, building codes, and Building Information Modeling (BIM).

Exam Blueprint

Standard	Percentage of exam
1. Architectural Design and History	8%
2. Cost of Residential Housing	17%
3. Room and Space Planning	20%
4. International Residential Code (IRC)	15%
5. BIM/CAD Modeling Techniques	39%
6. Architecture/Construction Documents	0%

Standard 1

Architectural Design and History.

Objective 1 Identify the historical influences that contributed to current home styles.

Objective 2 Recognize different American architectural styles.

1. Farmhouse
2. Rambler/Ranch
3. Cape Cod/Bungalow
4. Prairie
5. American Colonial
6. Victorian
7. Queen Anne
8. Mid-century Modern
9. Federalist
10. Craftsman

Objective 3 Discuss current trends in architecture.

1. Net-zero housing
2. 3D printed
3. Modular construction
4. Affordable Housing
    a. Apartments
    b. Town homes
    c. Condos
    d. Tiny Homes

Standard 1 Performance Evaluation included below (Optional)

Standard 2

Cost of Residential Housing.

Objective 1 Discuss the cost of building a residential home.

1. Materials Cost
2. Labor Cost
3. Property cost
4. Planning and Permitting
5. Potential added amenities
6. Housing market
7. Maintenance

Objective 2 Compare the initial and ongoing costs associated with different types of construction.

1. Stick Framing
2. Brick Veneer
3. Panel Systems

Standard 2 Performance Evaluation included below (Optional)

Standard 3

Room and Space Planning.

Objective 1 Discuss factors that are important in the design of the following rooms or areas:

1. Living Room
2. Great/Family Room
3. Entry/Foyer
4. Porch
5. Patio or Deck
6. Bedroom
7. Kitchen
8. Bathroom
9. Storage
10. Garage
11. Laundry
12. Mechanical Room

Objective 2 Discuss accessibility requirements for good functional utility.

1. Traffic flow
2. Storage
3. Layout

Objective 3 Identify the areas or zones of a residential floor plan.

1. Common zones in residential homes
    a. Habitable
    b. Non-Habitable
2. Common areas of a residential home
    a. Public
    b. Private
    c. Service or work Areas

Standard 3 Performance Evaluation included below (Optional)

Standard 4

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

Objective 1 Understand basic regulations concerning home design and construction.

1. Discuss International Residential Code (IRC) implications for a residence.
2. Discuss FHA minimum standards for a residence.
3. Understand the existence of local zoning restrictions.
4. Understand the existence of variance and covenants
    a. HOA
    b. CCR

Objective 2 Understand why we have codes and how to apply them to design.

Objective 3 Identify local ordinances relating to site development.

Objective 4 Identify code requirements that deal with health and safety.

1. Fire safety
2. Egress
3. Ventilation
4. Natural Light

Objective 5 Identify code requirements relating to utilities.

1. Electrical
    a. Placement of outlets
    b. Voltage of outlets
    c. Placement of switches
    d. Bathroom fans
2. Plumbing
    a. Size of tub
    b. Water Closet location
3. Energy efficiency
    a. R-value
    b. U-value

Standard 4 Performance Evaluation included below (Optional)

Standard 5

BIM/CAD Modeling Techniques.

Objective 1 Navigate the BIM/CAD software interface.

1. Create and use the different views and how they are navigated
2. Adjust views through view ranges and line styles
3. Define visibility/ graphics overrides and object styles
4. Start a new project and create levels and grids to reference
5. Create walls and adjust their settings
6. Understand wall types and the structure of walls
7. Modify elements
8. Place components such as doors, windows, and components

9. Create floors, ceilings, and roofs
10. Create curtain walls
11. Create stairs
12. Use model/component groups
13. Create room elements such as tags, fill plans, and schedules
14. Use a title block family to create sheets

Standard 5 Performance Evaluation included below (Optional)

Standard 6

Architecture/Construction Documents.

Objective 1 Identify and create commonly used documents used in the Architecture/Construction industry:

1. Cover Sheet with elevation or rendering
2. All four elevations at the correct scale
3. Dimensioned floor plan
    a. Can include electrical or have separate electrical plan
4. Dimensioned foundation and basement plan
    a. Can include electrical or have separate electrical plan
5. Cabinet and millwork elevations
    a. Millwork dimensioning standards
6. Typical wall section
7. Building section
8. Stair detail/section
9. Framing details
10. Dimensiones Site plan
    a. Setbacks
    b. Utilities
    c. etc.
11. General Notes

Standard 6 Performance Evaluation included below (Optional)

Technology & Engineering Workplace Skills

- Exceed the established school attendance policy to establish a consistent record of punctuality and
- dependability.
- Appropriately use personal electronic devices.
- Maintain a high standard of industrial hygiene by:
    - adopting strong habits of professional dress and personal hygiene,
    - wearing the appropriate personal protective equipment,
    - adopting the habit to “clean as you go”, and
    - guarding against foreign object debris (FOD) from contaminating the workspace or product.
- Contribute to a culture of safety by:
    - understanding and complying with established safety procedures,
    - watching for and speaking out when potential hazards and concerns are observed, and

    - actively participating in improving safety conditions.
- Follow established practices and procedures with exactness.
- Work productively as a member of a team with awareness and respect of cultural differences.
- Exhibit initiative and leadership while demonstrating the ability to adapt to changing needs and
- situations.
- Communicate clearly & effectively with others.
- Proficiently use software found in the professional environment, such as MS PowerPoint, MS Excel, and
- MS Word.
- Correctly apply mathematics in areas such as:
    - addition, subtraction, multiplication, division,
    - fraction to decimal as well as decimal to fraction conversions, and
    - using decimal places.
- Understand mathematical concepts such as:
    - ratios and proportions,
    - rounding and tolerance ranges,
    - engineering notation, and
    - metric equivalents.
- Demonstrate an ability to solve problems and develop improvements to products and processes using critical thinking and creativity.
- Read and understand technical documents, such as work orders, specifications, and standard operating procedures.
- Complete assigned tasks in a timely manner and with a high degree of workmanship

Architectural Design 2

Performance assessments may be completed and evaluated at any time during the course. The following performance skills are to be used in connection with the associated standards and exam. To pass the performance standard the student must attain a performance standard average of 8 or higher on the rating scale. Students may be encouraged to repeat the objectives until they average 8 or higher.

Student's Name: _____

Class: _____

Performance standards rating scale

0	Limited skills	2	→	4	Moderate skills	6	→	8	High skills	10

Standard 1 – Architectural Design and History **Score:**

- Student can identify common home styles and use them in an original home design.

Standard 2 – Cost of Residential Housing **Score:**

- Student can estimate the total cost of a small out building (approx. 200 sq ft.).

Standard 3 – Room and Space Planning **Score:**

- Student can create a basic layout of a residential home.

Standard 4 – International Residential Code (IRC) **Score:**

- Student can create a house plan follows local codes and ordinances.

Standard 5 – BIM/CAD Modeling Techniques **Score:**

- Student can navigate and proficiently use a BIM/CAD software to create a model.

Standard 6 – Architecture/Construction Documents **Score:**

- Students can create a complete set of plans for an affordable, single-family dwelling based on your local housing market using BIM software. The home should include a basement and/or second floor.

Performance standard average score:

Evaluator Name: _____

Evaluator Title: _____

Evaluator Signature: _____

Date: _____