

STRANDS AND STANDARDS

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).

Intended Grade Level	10-12
Units of Credit	0.5
Core Code	38.01.00.00.042
Concurrent Enrollment Core Code	38.01.00.13.042
Prerequisite	Architectural Design 1
Skill Certification Test Number	632
Test Weight	0.5
License Area of Concentration	Secondary Education 6-12
Required Endorsement(s)	
Endorsement 1	Technology & E
Endorsement 2	CAD Architectural Design

STRAND 1

Architectural Design and History

Standard 1

Identify the historical influences that contributed to current home styles.

Standard 2

Recognize different American architectural styles

- Farmhouse
- Rambler/Ranch
- Cape Cod/Bungalow
- Prairie
- American Colonial
- Victorian
- Queen Anne
- Mid-century Modern
- Federalist
- Craftsman

Standard 3

Discuss current trends in architecture.

- Net-zero housing
- 3D printed
- Modular construction
- Affordable Housing
 - Apartments
 - Town homes
 - Condos
 - Tiny Homes

Performance Skill

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

STRAND 2

Cost of Residential Housing

Standard 1

Discuss the cost of building a residential home.

- Materials Cost
- Labor Cost
- Property cost
- Planning and Permitting
- Potential added amenities
- Housing market
- Maintenance

Standard 2

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

- Stick Framing

- Brick Veneer
- Panel Systems

Performance Skill

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

STRAND 3

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
- Mechanical Room

Standard 2

Discuss accessibility requirements for good functional utility.

- Traffic flow
- Storage
- Layout

Standard 3

Identify the areas or zones of a residential floor plan.

- Common zones in residential homes
 - Habitable
 - Non-Habitable
- Common areas of a residential home
 - Public
 - Private
 - Service or work Areas

Performance Skill

Student can create a basic layout of a residential home.

STRAND 4

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

Standard 1

Understand basic regulations concerning home design and construction.

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

Standard 2

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

Standard 3

Identify local ordinances relating to site development.

Standard 4

Identify code requirements that deal with health and safety.

- Fire safety
- Egress
- Ventilation
- Natural Light

Standard 5

Identify code requirements relating to utilities.

- Electrical
 - Placement of outlets
 - Voltage of outlets
 - Placement of switches
 - Bathroom fans
- Plumbing
 - Size of tub
 - Water Closet location
- Energy efficiency
 - R-value
 - U-value

Performance Skill

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

STRAND 5

BIM/CAD Modeling Techniques

Standard 1

Navigate the BIM/CAD software interface

- Create and use the different views and how they are navigated
- Adjust views through view ranges and line styles
- Define visibility/ graphics overrides and object styles
- Start a new project and create levels and grids to reference
- Create walls and adjust their settings
- Understand wall types and the structure of walls
- Modify elements

- Place components such as doors, windows, and components
- Create floors, ceilings, and roofs
- Create curtain walls
- Create stairs
- Use model/component groups
- Create room elements such as tags, fill plans, and schedules
- Use a title block family to create sheets

Performance Skill

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

STRAND 6

Architecture/Construction Documents

Standard 1

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

- Cover Sheet with elevation or rendering
- All four elevations at the correct scale
- Dimensioned floor plan
 - Can include electrical or have separate electrical plan
- Dimensioned foundation and basement plan
 - Can include electrical or have separate electrical plan
- Cabinet and millwork elevations
 - Millwork dimensioning standards
- Typical wall section
- Building section
- Stair detail/section
- Framing details
- Dimensioned Site plan
 - Setbacks
 - Utilities
 - etc.
- General Notes

Performance Skill

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.

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

Skill Certification Test Points by Strand

Test Name	Test #	Number of Test Points by Strand								Total Points	Total Questions
		1	2	3	4	5	6	7	8		
CAD Architectural 2	632	5	10	12	9	23	NA	NA	NA	59	