STRANDS AND STANDARDS
CONSTRUCTION MANAGEMENT 2

Learning that works for Utah
CTE®

Course Description

This is the second in a sequence of courses that prepares students to enter the construction industry. This course is designed to allow for scaled model construction with an emphasis on the exterior shell and structure of residential and commercial construction.

Intended Grade Level	9 -12
Units of Credit	0.5
Core Code	40.08.00.00.402
Concurrent Enrollment Core Code	40.08.00.13.402
Prerequisite	N/A
Skill Certification Test Number	N/A
Test Weight	N/A
License Type	CTE and/or Secondary Education 6-12
Required Endorsement(s)	
Endorsement 1	Construction Management, or
	Carpentry, or Electrician, or Plumbing

ADA Compliant: December 2020

STRAND 1

Students will demonstrate basic math skills needed in the construction environment.

Standard 1

Identify whole numbers and demonstrate how to work with them mathematically.

- Identify different whole numbers and their place values.
- Demonstrate the ability to add and subtract whole numbers.
- Demonstrate the ability to multiply and divide whole numbers.

Standard 2

Explain how to work with fractions.

- Define equivalent fractions and show how to find lowest common denominators.
- Describe improper fractions and demonstrate how to change an improper fraction to a mixed number.
- Demonstrate the ability to add and subtract fractions.
- Demonstrate the ability to multiply and divide fractions.

Standard 3

Describe the decimal system and explain how to work with decimals.

- Describe decimals and their place values.
- Demonstrate the ability to add, subtract, multiply, and divide decimals.
- Demonstrate the ability to convert between decimals, fractions, and percentages.

Standard 4

Identify various tools used to measure length and show how they are used.

- Rulers and squares
- Measuring tapes

Standard 5

Identify units of length, weight, volume, and temperature using the imperial system of measurement, including:

- length
- weight
- volume
- temperature

Standard 6

Convert between civil and architectural units.

- sea level
- site elevation
- eighths to/from tenths

Standard 7

Identify basic angles and geometric shapes and explain how to calculate their area and volume.

- Identify various types of angles.
- Identify basic geometric shapes and their characteristics.

- Demonstrate the ability to calculate the area of two-dimensional shapes.
- Demonstrate the ability to calculate the volume of three-dimensional shapes.

STRAND 2

Students will identify, use, and care for tools required for framing/sheathing.

Standard 1

Identify and explain how to use various types of hand tools.

- hammers and demolition tools
- chisels and punches
- screwdrivers
- non-adjustable and adjustable wrenches
- socket and torque wrenches
- pliers and wire cutters

Standard 2

Identify and describe how to use various types of measurement and layout tools.

- measuring tapes, carpenter and tri squares
- levels and layout tools

Standard 3

Identify and explain how to use various types of cutting and shaping tools.

- handsaws
- files and utility knives

Standard 4

Identify and explain how to use various power tools.

- power drill and bits
- circular saw
- reciprocating saw
- pneumatic and powder-actuated fastening tools

Standard 5

Identify and explain how to use other common hand tools.

- shovels and picks
- chain falls and come-alongs
- clamps

STRAND 3

Students will read and understand structural drawings, codes, specifications, and other construction documentation.

Standard 1

Identify and describe various types of construction drawings, including their fundamental components and features.

- Identify various types of construction drawings.

- Identify and describe the purpose of the five basic construction drawing components.
- Identify and explain the use of dimensions and various drawing scales.
- Explain the importance of specifications, including CSI Master format.
- List items commonly shown on architectural drawings.
- Describe information typically shown on structural drawings.
- Explain the importance of referencing mechanical, electrical, and plumbing plans.
- Identify and explain the significance of various drawing elements, such as lines of construction, symbols, and grid lines.

STRAND 4

Students will understand the procedures for laying out and framing walls, including roughing-in door and window openings, constructing corners and partition Ts, bracing walls, and applying sheathing.

Standard 1

Identify the components of a wall system.

- Describe methods used to construct corner posts.
- Describe the process for framing partition intersections.
- Describe the purpose of headers and how they are constructed.
- Describe how metal-framed walls are constructed.

Standard 2

Describe the correct procedure to lay out, assemble, erect, and brace exterior walls for a frame building.

- Describe how to properly lay out a wood frame wall.
- Explain how to lay out wall openings.
- Identify where fire stops are to be installed and explain how they are installed.
- List the four steps involved in erecting a wall.

Standard 3

Describe wall framing techniques used in masonry construction.

Standard 4

Identify alternative wall systems.

- Describe how concrete walls are constructed.
- Explain the difference between standard interior wall systems and alternative interior wall systems.

Standard 5

Describe the correct procedure to estimate the materials required to frame wood or metal walls.

- Explain how to estimate the amount of material required for soleplates and top plates.
- Describe how to estimate the number of studs required.
- Explain how to calculate the amount of material needed for a header.
- Describe how to estimate the amount of diagonal bracing required.

STRAND 5

Students will understand the components of floor and roof systems.

Standard 1

Identify the different types of framing systems.

- Describe the general components of a platform-framed structure.
- List differences between TJI, I-Beam, and other trusses.
- Describe the characteristics of post-and-beam framing.

Standard 2

Identify floor system components.

- Define sill plate and describe its role in floor framing.
- List and recognize different types of beams and girders and supports.
- List and recognize different types of floor joists.
- List and recognize different types of bridging.
- Explain the purposes of subfloor and underlayment.

Standard 3

Describe wall framing techniques used in masonry construction. Describe the construction methods for floor systems and identify floor system materials.

- Describe how to check a foundation for squareness.
- Name the methods used to lay out and fasten sill plates to the foundation.
- Describe the proper procedure for installing a beam or girder.
- Describe how to lay out sill plates and girders for floor joists.
- Describe how to lay out and install floor joists for partitions and floor openings.
- Identify different types of bridging and describe how to properly install each type.
- Describe how to properly install subfloor.
- Explain how to install joists for projections or cantilevered floors.

Standard 4

Estimate the amount of material needed for a floor assembly.

- Describe how to estimate the amount of sill plate, sill sealer, and termite shield.
- Describe how to estimate the amount of beam or girder material.
- Describe how to estimate the amount of lumber needed for joists and joist headers.
- Describe how to estimate the amount of bridging required.
- Describe how to estimate the amount of subfloor material required.

Standard 5

Identify common types of roofs used in residential construction.

- Gable
- Dutch Hip
- Flat
- Shed

Standard 6

Recognize the use of trusses in basic roof framing.

- Identify the various types and components of trusses.
- Identify the basics of truss installation.
- Identify the basics of truss bracing.

Standard 7

Describe how to erect a gable roof.

- Describe how to install rafters.
- Identify the two types of dormers.
- Describe how to use a framing square and a Speed Square™ for roof framing.
- Explain how to frame an opening in a roof.
- Describe the basics of roof sheathing installation.

Standard 8

Identify the components of ceiling framing.

- Describe the correct procedure for laying out ceiling joists.
- Describe how to cut and install ceiling joists on a wood frame building.
- Describe how to estimate the number of ceiling joists required for a building.

Standard 9

Describe how to perform a material takeoff for a roof.

- Determine the materials needed for a gable roof.

Standard 10

- Identify the different roofing system materials and their preferred applications.
- composition
- roll-roofing
- wood shakes and shingles
- tile/slate
- metal
- built-up
- single ply
- fasteners used on roofing projects.

Standard 11

Describe the installation techniques for common roofing systems.

- Describe how to properly prepare a roof deck.
- Explain the purpose of underlayment and waterproof membrane.
- Discuss the purpose of drip edge, flashing, and roof ventilation.
- Explain how to install composition shingles.
- Explain how to install metal roofing.
- Describe how to install roll roofing.

STRAND 6

Students will be able to understand the methods and materials used in the building envelope.

Standard 1

- Demonstrate the proper use of thermal insulation and vapor barriers.
- Describe the requirements for insulation.
- Describe the characteristics of various types of insulation material.
- Calculate the required amounts of insulation for a structure.
- Describe the requirements for moisture control and ventilation.
- Describe various methods of waterproofing.
- Describe air infiltration control requirements.

Standard 2

Demonstrate the proper use of bonding agents, sealers, and sealants.

Standard 3

Identify the various types of cladding systems used in construction.

- Distinguish between extruded and expanded foam insulations.
- Identify trims used in exterior insulation and finish systems (EIFS) and stucco andstate their uses.
- Distinguish between traditional and water management EIFS.
- Distinguish between traditional hard-coat plaster and synthetic finishes.
- Describe how to install synthetic veneer stone.
- Describe building features commonly created with glass fiber reinforcedconcrete (GFRC).

Standard 4

Identify the components of the building envelope.

- Describe various ways that air infiltration can be minimized or prevented.
- Identify various types of fixed, sliding, and swinging windows.
- Identify the common types of exterior doors and explain how they are constructed.

Standard 5

State the requirements for a proper window installation.

- Explain when jamb extensions are used.
- Identify common considerations when framing in glass blocks.

Standard 6

State the requirements for a proper door installation.

- Identify the differences between residential and commercial doors.
- Identify the various types of locksets used on exterior doors and explain how they are installed.

Standard 7

Describe the various types and applications of exterior finish materials.

- Identify the types of wood siding.
- Identify vinyl and metal siding materials and components.
- List applications for fiber-cement siding.
- Discuss the types of veneer finishes.

- List specialty exterior finishes.
- Explain the purpose of flashing.

Standard 8

- Explain how to install exterior finish materials.
- Describe surface preparation that must be performed prior to installing exterior finish materials.
- Discuss the types of furring and insulation that might be applied to exterior walls.
- Explain how to establish a straight reference line.
- Describe how to install wood siding.
- Describe how to install vinyl and metal siding.
- Describe how to install fiber-cement siding.
- Explain how to install cornices.

Standard 9

Describe the estimating procedure for exterior finish projects.

- Explain how to perform a takeoff on panel and board siding.

STRAND 7

Students will demonstrate the skills needed to communicate effectively and clearly and their role on the construction team.

Standard 1

Describe the communication, listening, and speaking processes and their relationship to job performance.

- Describe the communication process and the importance of listening and speaking skills.
- Describe the listening process and identify good listening skills.
- Describe the speaking process and identify good speaking skills.

Standard 2

Describe good reading and writing skills and their relationship to job performance.

- Describe the importance of good reading and writing skills.
- Describe job-related reading requirements and identify good reading skills.
- Describe job-related writing requirements and identify good writing skills.

Standard 3

Understand the importance of teamwork plays in the Building Design & Construction industry.

Standard 4

Understand the project manager's role in the Building Design & Construction industry.

Resource

Recommended to include a list of competencies from NCCER Team Leadership:

- communication styles of men & women
- cultural differences
- sexual harassment
- verbal/non-verbal communication
- written/visual communication

Performance Skills

- Create a cut list for all of the structural members in a wall containing both a door and a window.
- Something identifying the student's ability to convert between civil and architectural units.
- Locate and square the footings for a structure using a 3:4:5 right triangle method and check for squareness by measuring the diagonals.
- Visually inspect to determine if they are safe, and properly use a minimum of five of theabove listed tools.
- Make a straight, square cut in framing lumber using a crosscut saw.
- Using a supplied floor plan:
  - Locate the wall common to both interview rooms.
  - Determine the overall width of the structure studio.
  - Determine the distance from the outside east wall tothe center of the beam in the structure studio.
  - Determine the elevation of the slab.
- Estimate the materials required to frame walls.
- Build a frame wall, including plates, corner posts, door and window openings, partition Ts, bracing, and firestops.
- Correctly install sheathing on a wall.
- Estimate the amount of material to frame a floor assembly from a set of plans.
- Lay out and construct a floor assembly, including a rough opening and subfloor material.
- Estimate the number of ceiling joists required for a building.
- Perform a material takeoff for a roof.
- Install selected vapor barriers.
- Install selected insulation materials.
- Install selected building wraps.
- Prepare a rough opening for proper window installation.
- Prepare a rough opening for proper door installation.
- Install a lockset.
- Install three of the most common siding types in your area.
- Estimate the amount of lap or panel siding required for a structure.
- Perform a given task after listening to oral instructions.
- Fill out a work-related form provided by the instructor.
- Read and interpret a set of instructions for properly donning a safety harness andthen orally instruct another person on how to don the harness.
  - Deliver instructions to a team and have that team perform the task as instructed.

Workplace Skills

- Communication
- Critical Thinking
- Accountability
- Problem Solving
- Teamwork
- Dependability
- Legal Requirements/Expectations