STRANDS AND STANDARDS
RESIDENTIAL CONSTRUCTION 1

Course Description

This course provides comprehensive training in essential construction skills, focusing on safety, tools, equipment, and foundational techniques. Participants will learn to identify and mitigate safety hazards, use and maintain construction tools, accurately measure and mark projects, interpret construction plans, prepare sites, work with concrete and foundations, frame wood structures, and install exterior finishes. The curriculum covers shop safety, tools and equipment, applied math, construction plans, site preparation, concrete, foundation, basic wood framing, and exterior finishes, equipping participants with the knowledge and skills necessary for safe and effective construction practices in various roles within the construction industry.

Intended Grade Level	9-12
Units of Credit	0.5-1.0
Core Code	40.08.00.00.401
Concurrent Enrollment Core Code	40.08.00.13.401
Prerequisite	Construction Trades Foundation
Skill Certification Test Number	512
Skill Certification Cut Score	**N/A**
Test Weight	N/A
License Area of Concentration	CTE and/or Secondary Education 6-12
Required Endorsement(s)	
Endorsement 1	Carpentry
Endorsement 2	Construction Management
Endorsement 2	Residential Construction

Updated: December 2025

STRAND 1: SHOP SAFETY

Students will learn and practice basic construction safety skills.

Standard 1

Identify potential safety hazards in a construction site or shop space.

- Power tools
- Hand tools
- Shop/Site Behavior
- Chemicals

Standard 2

Explain ways to mitigate safety concerns in a construction site or shop space.

- Training
- Procedures
- Cleanliness
- Personal Protective Equipment (PPE)

Performance Skills

- Perform a shop or site safety audit and report recommended solutions to potential hazards.
- Demonstrate safety practices and procedures based on regulations and requirements when working on a site or constructing a project.

STRAND 2: TOOLS & EQUIPMENT

Students will explore classifications of tools and their applications in construction.

Standard 1

Explain the uses of common construction tools and equipment.

- Hand tools
- Portable power tools
- Stationary tools
- Mobile equipment/machinery

Standard 2

List the proper care and maintenance procedures for common construction tools and equipment.

- Hand tools
- Portable power tools
- Stationary tools
- Mobile equipment/machinery

Standard 3

Discuss the types of power sources for tools and equipment.

- Corded
- Battery
- Pneumatic
- Hydraulic
- Combustion
- Powder-Actuated

Performance Skills

- Demonstrate safe and appropriate use of common construction tools and equipment when working on projects.
- Demonstrate proper care and maintenance of tools and equipment when working on projects.
- Pass relevant safety test(s) with 100% accuracy.

STRAND 3: CONSTRUCTION MATH

Students will use various construction measuring devices to accurately measure, calculate, and mark projects.

Standard 1

Demonstrate basic measurements in relation to construction.

- Square footage (flooring, sheetrock, etc.)
- Cubic yards (concrete, dirt, etc.)
- Conversions (feet, yards, inches, scale, etc.)

Standard 2

Demonstrate use of measuring devices and methodologies.

- Traditional measuring tools (tape, optical transit, etc.)
- Electronic measuring tools (laser, GPS, etc.)
- Squaring tools (speed, framing, etc.)
- Leveling tools (bubble, laser, plumbob, etc.)

Performance Skills

- Accurately measure and mark within 1/16”.
- Accurately add, subtract, and divide measurements.
- Accurately convert between inches, feet, and yards.
- Accurately calculate volumes and areas.
- Accurately square a project using various methods.
- Estimate the cost of materials for a given construction project.

STRAND 4: CONSTRUCTION PLANS

Students will explore construction drawings, specifications, and other construction documentation.

Standard 1

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

Standard 2

Describe the purpose of basic construction drawing components.

Standard 3

Explain the importance of specifications.

Standard 4

Interpret items commonly shown on architectural and structural drawings.

Standard 5

Explain the importance of referencing site, foundation, electrical, and floor plans.

Standard 6

Explain the significance of various drawing elements, such as lines of construction, symbols, and grid lines.

Performance Skills

- Read and interpret a construction drawing, specification, or other construction documentation.
- Build a given project to scale from a set of construction plans.

STRAND 5: SITE PREPARATION

Students will show the preliminary steps that must be taken on the site before construction can begin.

Standard 1

Classify the major types of soils.

Standard 2

Discuss how soil can affect design decisions.

Standard 3

Investigate ways to stabilize soils.

Standard 4

Explain the safe operation and use of construction equipment commonly found on a worksite.

- Aerial lifts
- Backhoes
- Compactors
- Compressors
- Forklifts
- Generators
- Skid-steer loaders

Standard 5

Discuss the safety precautions associated with construction equipment.

- Batteries
- Fueling
- Hydraulic systems
- Interlocking systems
- Transporting

Standard 6

Show the procedures for determining elevation and slope.

- Common instruments & tools

Performance Skills

- Use and properly care for tools and equipment associated with leveling.
- Read and interpret a set of construction plans for a job site.

STRAND 6: CONCRETE

Students will explore the methods and materials used in foundation and concrete work.

Standard 1

Explore various concrete ingredients and mixtures.

- Types (self-consolidating, fiber-reinforced, air-entrained, polymer, pervious, etc.)
- Characteristics
- Admixtures
- Aggregates

Standard 2

Investigate how various concrete mixtures are used in construction.

Standard 3

Describe proper curing methods.

Standard 4

Describe the methods and purposes for testing concrete.

- Sampling
- Slump test
- Compression test

Standard 5

Identify various concrete tools.

Performance Skills

- Calculate the proper concrete mix measurements and proportions for a given concrete project.

STRAND 7: FOUNDATION

Students will explore methods and procedures for foundation and concrete flatwork.

Standard 1

Compare traditional and monolithic foundations.

Standard 2

Identify the steps to perform an effective job-site layout.

- Building layout
- Building lines with batter boards
- Excavation and trenching
- Forms (Rebar)

Standard 3

Explain the proper methods for placing concrete into forms (pump, truck, concrete vibrator, etc.).

Standard 4

Identify various types of foundation forms and their proper removal (wood, manufactured, strip, etc.).

Standard 5

Describe how slabs-on-grade are formed and finished (screed, level, finish, cure, joint, seal, etc.).

Performance Skills

- Layout building lines with batter boards.
- Set stakes or string lines to a grade.

STRAND 8: BASIC RESIDENTIAL FRAMING

Students will explore basic framing techniques, practices, uses, and materials.

Standard 1

Discuss how various types of wood imperfections impact construction projects.

- Structural integrity
- Durability
- Aesthetics
- Safety
- Cost efficiency

Standard 2

Identify lumber markings and their meanings.

Standard 3

Identify the safety precautions associated with pressure-treated lumber.

Standard 4

Discuss the uses of various types of framing materials.

- Wood (dimensional lumber, pressure-treated)
- Engineered Wood (LVL, I-joists, laminated beams, etc.)
- Sheet Materials (OSB, plywood, tongue and groove, cement board, etc.)
- Metal

Standard 5

Describe the methods, tools, and processes for fastening components of a framed structure.

- Anchors (anchor bolts, expansion bolts, straps, ties, etc.)
- Fasteners (nails, schedule, staples, etc.)
- Subfloor Adhesive
- Sheer Walls

Standard 6

Label the structural components of a wood frame floor and their functions.

- Joists
- Subfloor
- Sill / bottom plate
- Bridging / blocking
- Beams

Standard 7

Label the structural components of a wood frame wall and their functions.

- Studs (king, trimmer/jack, cripple)
- Plates (bottom/sole, sill, double-top)
- Blocking
- Bracing
- Sheathing
- Corners

Standard 8
Describe the procedure for laying out a framed wall, including plates, corners, door and window openings, bracing, and firestops.

Standard 9
Label the structural components of a wood frame roof and their functions.

- Rafters
- Ridge board / beam
- Collar ties
- Ceiling joists
- Trusses
- Sheathing
- Bracing
- Blocking
- Venting
- Ledgers
- Fascia

Standard 10
Explore various roof shapes and structures (hip, gable, shed, dormer, flat, etc.).

Performance Skills
- Frame a basic wood structure from a set of drawings/specifications (floor, walls, and roof).

STRAND 9: EXTERIOR FINISHES

Students will explore common exterior finishes and related functional components.

Standard 1

Explore common exterior finishes.

- Wall (vinyl, brick, stucco, wood, fiber cement, stone, metal, composite, etc.)
- Roof (asphalt, metal, clay, concrete, slate, wood, synthetic, solar, green, rolled, built-up, etc.)

Standard 2

Illustrate the functional components of a roof.

- Square
- Coverage
- Exposure
- Rake
- Underlayment
- Flashing
- Weather guard
- Vents
- Gutters

Standard 3

Identify methods for the installation of common roofing materials.

- Ice and water shield
- Drip edge
- Starter strip
- Shingles

Common exterior wall finishes

- A window

Standard 4

Compare various types of fixed, sliding, and swinging windows.

Standard 5

Discuss the key differences of interior and exterior doors.

Standard 6

Discuss how geographic location and climate can impact the longevity and durability of exterior finishes.

Performance Skills

- Install a working roof component or finish a roof.
- Install an exterior wall finish.
- Install a prehung exterior door with weather-stripping.
- Install a lockset.
- Install a window.

STRAND 10: CTSOs & DURABLE SKILLS

Students will be encouraged to participate in a relevant CTSO (Career & Technical Student Organization) through the demonstration of construction workplace and career readiness skills. These standards will not appear on state skill certification exams, but should be taught throughout the duration of the course.

Standard 1

Students will display personal skills related to the essential values, personality traits, and personal characteristics for success in the construction profession and life.

- **Integrity** - demonstrate honesty and personal responsibility for actions.
- **Work ethic** - demonstrate tenacity, hard work, excellence, punctuality, meet deadlines; and be self-directed when completing tasks in the construction professional setting.
- **Professionalism** - demonstrate maturity, self-confidence; and a positive image when working with teammates or clients on construction projects.
- **Responsibility** - demonstrate dependability, consistency, and personal well-being when safely completing construction tasks.
- **Adaptability/Flexibility** - Foster creativity, new ideas, and resilience when working to solve problems in construction projects.
- **Self-motivated** - demonstrate a willingness to learn, independence, initiative, and a positive attitude when approaching new information

Standard 2

Students will display workplace skills related to the essential attitudes and abilities for success in the construction profession.

- **Communication** – Demonstrates skills in listening and speaking; communicates professionally with teammates, supervisors, and customers in relation to construction projects.
- **Decision making** – Analyzes key facts, data, and situations to employ reasoning skills for completing construction tasks.
- **Teamwork** – Builds trusting relationships, works cooperatively with others and utilizes individual strengths of team members when completing construction tasks.
- **Planning, organizing, and management** – Designs, prepares, and implements creative tasks within a desired timeframe; Sets priorities and responds to changing priorities.
- **Leadership** – Builds positive relationships and mitigates conflict.

Standard 3

Students will display technical skills that are grounded in design that deliver essential knowledge and competencies for success in the industry.

- **Computer and technology literacy**
- **Job specific skills**
- **Safety and health**
- **Service orientation** – responds to internal and external customers; demonstrates focus and presence; attends to personal matters away from the classroom.
- **Professional development** – demonstrates openness to learn, grow, and change in the construction industry.

Industry 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	9	10		
Residential Construction 1	512												