STRANDS AND STANDARDS
CONSTRUCTION MANAGEMENT 3

Course Description

This is the third in a sequence of courses that prepares students to enter the construction industry. This course is designed to allow for scaled or virtual model construction with an emphasis on mechanical, electrical, and plumbing systems as well as interior finishes of residential and commercial construction.

Intended Grade Level	9-12
Units of Credit	0.5
Core Code	40.08.00.00.403
Concurrent Enrollment Core Code	N/A
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)	Construction Management, or
	Carpentry, or
	Electrician, or
	Plumbing

STRAND 1

Students will read and understand construction drawings, 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 explain the use of dimensions and various drawing scales.
- Explain the importance of specifications using the Master CSI format (Specifically Divisions 8,9,10,12 & 21-28).
- List items commonly shown on Mechanical, Electrical, Plumbing, and Architectural Detail 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 2

Students will understand the various types of stairs and the common building code requirements related to stairs and railing.

Standard 1

Identify how residential and commercial stairways differ.

Standard 2

Identify terms associated with stair framing.

- Define headroom.
- Define stringer and explain when more than two stringers are used.
- Define treads and risers and explain the importance of uniform tread depths and riser heights.
- List the minimum stairway width requirements for residential and commercial structures.
- Describe the difference between handrails and guardrails.

Standard 3

Describe the procedure used to determine the total rise, number and size of risers, and number and size of treads required for a stairway.

- Explain how to calculate the riser height, tread depth, and total run for a stairway.
- Describe how to calculate stairwell opening sizes.

Standard 4

Describe the procedure to lay out and cut stringers, risers, and treads.

- Explain how to lay out and cut a stringer.
- Summarize how concrete stairs differ from wood framed stairs.

STRAND 3

Students will be able to understand the methods and materials used in Plumbing & Fire Suppression systems.

Standard 1

Understand the types of plumbing systems used in the built environment.

- Identify components of potable water distribution systems.
- Identify components of sanitary piping systems (Drain, Waste, Vent).
- Understand common fixtures used in residential and commercial construction.
- Understand the types of piping, tubing, and fittings used in plumbing systems.

Standard 2

Develop a working knowledge of the various types of fire suppression systems.

- Understand the difference between active and passive fire protection.
- Identify components of a fire suppression system.

Standard 3

Identify the licensing and apprenticeship requirements to become a plumber.

STRAND 4

Students will be able to understand the methods and materials used in Electrical and Low Voltage systems.

Standard 1

Understand the various sources of electrical power and how it is distributed from a generating source.

- State how electrical power is created and distributed.
- Identify general electrical safety practices.
- Describe the OSHA requirements and procedures related to electrical lockout/tagout.
- Specify the types of electrical conductors for various applications.
- Identify components of electrical distribution and lighting in the built environment.

Standard 2

Describe an electric current and the difference between AC and DC current.

- Identify and discuss the various units used to measure, control, and distribute electrical

power within a building.
- Describe the difference between alternating current and direct current.
- Define current.
- Define voltage.
- Define resistance.
- Use Ohm's law to solve for unknown circuit values.

Standard 3

Understand the signal systems used to provide electronic safety and security.

- Identify various fire detection and alarm strategies.
- Describe the various devices used in the design of security systems.
- Understand the principles of intrusion protection.
- Understand the functions of building automation systems.

Standard 4

Identify the licensing and apprenticeship requirements to become an Electrician.

STRAND 5

Students will be able to understand the methods and materials used in HVAC systems.

Standard 1

Identify the most common heating and cooling systems used in residential and commercial buildings.
Describe types of heating systems.

- Describe the types of gas furnaces and how they operate.
- Describe the operation of hydronic heating systems.
- Describe the operation of electric heating equipment.
- Identify common factors to be considered when designing HVAC systems.
- Explain the fundamental concepts of the refrigeration cycle.
- Identify the major components of cooling systems and how they function.

Standard 2

Identify types of ventilation that provide acceptable indoor air quality.

- Define what an acceptable ACH is and how that is accomplished.
- Identify code requirements for natural ventilation vs. mechanical ventilation.

Standard 3

Describe the mechanical equipment and materials used to create air distribution systems.

- Describe various blower types and applications.
- Describe various fan designs and applications.
- Describe common duct materials and fittings.

- Identify the characteristics of common grilles, registers, and dampers.

Standard 4

Identify the licensing and apprenticeship requirements to become an HVAC Technician.

STRAND 6

Students will develop skills related to finding and securing a position in the construction trades.

Standard 1

Describe the opportunities in the construction business and how to enter the construction workforce.

- Describe the construction business and the opportunities offered by the trades.
- Explain how workers can enter the construction workforce.

Standard 2

Explain the importance of critical thinking and how to solve problems.

- Describe critical thinking and barriers to solving problems.
- Describe how to solve problems using critical thinking.
- Describe problems related to planning and scheduling.

Standard 3

Explain the importance of social skills and identify ways good social skills are applied in the construction trade.

- Identify good personal and social skills.
- Explain how to resolve conflicts with co-workers and supervisors.
- Explain how to give and receive constructive criticism.
- Identify and describe various social issues of concern in the workplace.
- Describe how to work in a team environment and how to be an effective leader.

Performance Skills

1. Using a supplied construction document:
   - Identify how many stringers, treads and risers are being called out.
   - Identify 5 components of the Mechanical HVAC systems.
   - Identify 5 components of the Electrical systems.
   - Identify 5 components of the Plumbing systems.
   - Identify how to read a specification for 3 different types of interior finishes.
2. Calculate the total rise, number and size of risers, and number and size of treads required for a stairway.
3. Sketch and label 5 components of a potable water system that you observe on a field trip.
4. Sketch and label 5 components of a sanitary piping system that you observe on a field trip.
5. Sketch and label 5 components of a fire suppression system that you observe on a field trip.
6. Sketch and label 10 components of an electrical distribution system that you observe on a field trip.

7. Using safe practices and a multi-meter, measure current, voltage and resistance of a minimum of 3 electrical components.
8. Present to your peers the home automation system you would select for your dream home of the future.
9. Using safe practices, install and wire-in a breaker in a panel.
10. Using safe practices, build a three-way light switch circuit.
11. Properly join a round duct to a rectangular duct.
12. Conduct an inventory and record personal skills.
    - Find and apply for a construction trades job opening.