Tennessee CTE

Residential & Commercial Construction I

Safety 1

1 Safety Hazards and Rules: Identify safety hazards on a jobsite and demonstrate practices for safe working conditions. Accurately read, interpret, and demonstrate adherence to safety rules, including but not limited to rules pertaining to electrical safety, Occupational Safety and Health Administration (OSHA) guidelines, and state and national code requirements. Be able to distinguish between the rules and explain why certain rules apply. Perform a hazard assessment for a given task such as changing the light bulbs in a classroom. Explain the steps necessary to safely perform the task, outlining procedures to follow in the case of an emergency. 1.1

2 Safety Practices: Maintain safety records and demonstrate adherence to industry standard practices regarding general machine safety, tool safety, equipment safety, electrical safety, and fire safety to protect all personnel and equipment. For example, when operating tools and equipment, regularly inspect and carefully employ the appropriate personal protective equipment (PPE), as recommended by Occupational, Safety & Health Administration (OSHA) regulations. Incorporate safety procedures when operating tools and equipment, such as hand and power tools, ladders, scaffolding, and lifting equipment. Complete safety test with 100 percent accuracy. 1.2

3 Materials Safety: Follow procedures to work safely around materials. Adhere to responsibilities for employees in material safety as outlined by the Hazard Communication Standard (HazCom), such as locating and interpreting material safety data sheets (MSDS). Demonstrate safe procedures to move materials by planning the movement, properly lifting, stacking, and storing materials, and selecting proper materials handling equipment. 1.3

Tools & Equipment 2

1 Tools: For each of the systems covered in this course, identify and select the proper tools and accessories, critique the readiness of the tools, use the tools to accomplish the desired tasks, and then return the tools and accessories to their proper storage locations. For example, demonstrate the ability to safely use a darby or bullfloat to level a concrete surface and effectively clean and store the tool. 2.1

Career Exploration 3

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1 Apprenticeship: Referencing data from U.S. Department of Labor and other ources, research and explain an apprenticeship. Describe the benefits of the pprenticeship approach of on-the-job training paired with related training for

	individuals seeking construction careers. Use a variety of sources to gather data, cite each source, and briefly describe why the chosen source is reliable. 3.1
	2 **Postsecondary Programs: Research and explain postsecondary programs and their institutions (colleges of applied technology, community colleges, and four-year universities) in Tennessee and other states that offer construction-related programs. Identify entry requirements for a specific postsecondary program of study, and the secondary courses that will prepare students to be successful in the program.** 3.2
Construction Industry Principles 4	1 **Zoning Regulations: Investigate and report on the process for determining the zoning regulations for a particular building site. Describe how zone designation and regulations such as setbacks, ground coverage, and maximum height impact the design and placement of a building on a given site, citing findings from the investigation.** 4.1
	2 **Building Codes: Explain inspection procedures used to enforce building codes during the construction of a residential or commercial building, outlining the roles and responsibilities of the building inspector and the contractor and the intervals at which inspections are performed.** 4.2
Site Layout 5	1 **Site Drawings: Describe the basic procedures by which surveyors create site drawings. Read and interpret a site drawing to determine the steps, personnel, equipment, and materials needed to prepare a site for construction. Relate the site features labeled on the plan to the layout and topography on the actual site. Develop a timeline and action steps needed to complete a site layout.** 5.1
	2 **Site Layout: Apply the appropriate mathematical principles, tools, equipment, and procedures to accurately lay out a site, including:** 5.2 a Estimating distances by employing pacing techniques. 5.2.A b Completing precise measurements with manual or electronic equipment, using mathematical concepts as necessary, such as converting decimal feet to feet and inches or applying right triangle rules such as the 3-4-5 rule. For example, in the process of staking the corners of a building using taping procedures, calculate the diagonal of the building by plugging the length and width of the building into the Pythagorean Theorem. Then, use the diagonal value to locate the third corner and check the completed layout for accuracy. 5.2.B c Describing the tools, equipment, and procedures involved in establishing elevations on a site. For example, use a builder's level to determine site and building elevations. 5.2.C d Annotating site layout data using proper field note techniques. 5.2.D
Foundation Systems and Properties of Co	1 **Foundation Systems: Compare and contrast types of foundation systems and footings. Create a written report or visual description outlining the structure and properties of each type. Describe the conditions, costs, and other factors that influence the decision to use each type of system.** 6.1

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	2 **Concrete Composition: Describe the composition of concrete by listing the materials used to make concrete. Analyze the factors that impact the compression strength of concrete, such as the water-cement ratio. Identify additional materials used in concrete construction, such as reinforcement materials and forms. For example, create a comparison chart outlining the materials, forms, and reinforcement used in concrete for a sidewalk versus a bridge.** 6.2
	3 **Concrete Volume: Calculate the total volume of concrete and the specific materials necessary for a given project based on construction drawings and specifications. Use the information to estimate the amount of each material needed to mix concrete for the project.** 6.3
	4 **Concrete Curing: Analyze factors influencing the curing of concrete, such as the weather, moisture, and the use of control joints. Explain the curing of concrete outlining the procedures necessary to ensure concrete cures properly for a given date and location, including procedures to prevent cracking and recommendations for the spacing of control joints.** 6.4
	5 **Place Concrete: Apply the appropriate tools, equipment, and procedures to safely place concrete and cleanup after a concrete project. Work in teams to safely and properly employ tools and personal protective equipment (PPE), and follow procedures to construct a simple concrete form, place concrete into the form, and strike-off (screed), level, smooth, edge, and joint concrete to finish the project.** 6.5
Framing Systems Overview 7	1 **Framing Systems: Distinguish among the basic types of wood framing systems, such as platform frames, balloon frames, and post-and-beam frames. Define and compare the pros and cons of each, citing examples of when each is used.** 7.1
Floor Framing Systems 8	1 **Floor Frame Components: Identify the components which make up a floor frame, analyzing the purpose of and interrelationships among each component and explaining the sequence in which each is constructed.** 8.1
	2 **Floor System Requirements: Read and interpret construction drawings to determine floor system requirements such as the proper girder and joist size for a given span and floor load, and estimate the amount of material needed to frame a floor assembly.** 8.2
	3 **Build a Floor Assembly: Describe the procedures necessary to fasten sills to the foundation and construct a floor assembly. Apply the appropriate tools, equipment, and procedures to build a floor assembly. Work in teams to install girders, lay out and install floor joists, install bridging and blocking, and apply subflooring.** 8.3
Wall and Ceiling Framing Sy	1 **Wall Frame Components: Explain the procedure to lay out a wood frame wall, lefining and describing the components such as plates, studs, partitions, door nd window openings, bracing, and other components.** 9.1

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	2	**Wall and Ceiling Frame Requirements: Read and interpret drawings to determine wall and ceiling frame requirements for a given residential or commercial structure. For example, calculate the length of a stud and estimate the amount of material needed to frame a wall and ceiling assembly.** 9.2
	3	**Build a Wall and Ceiling Frame: Work in teams to construct a wall frame and ceiling assembly by implementing required safety techniques, tools, and equipment. Accurately measure and lay out the frame; accurately level and plumb the walls.** 9.3
	4	**Steel Framing: Compare and contrast the different tools, procedures, and fastening methods used in steel wall framing versus wood wall framing in building construction. Outline the major similarities and differences in each and provide a recommendation to a client for a specific project.** 9.4
Electrical Systems 10	1	**Electrical Safety: Describe how OSHA different levels of electrical shock affect the human body. Research current standards and other regulations specific to electrical systems to identify methods and equipment to reduce the risk of injury due to electrical shock. Drawing on evidence from textbooks and OSHA standards, apply lockout/tagout procedures to ensure safe working conditions. For example, perform a lockout/tagout to prepare to work on an electrical device.** 10.1
	2	**Electrical Circuits: Citing technical data, explain the interrelationships among sources of current, voltage, resistance, and power in electric circuits and the units to quantify each (amperes, volts, ohms and watts). Demonstrate understanding of the operation of electrical circuits (series, parallel, and series-parallel circuits) and relate it to the physical laws, such as Ohm's law and Kirchhoff's law, that govern the behavior of electrical circuits and devices such as the function of resistors in electrical circuits. Accurately apply these physical laws to solve problems. For example, use Ohm's law to calculate the current flow of a circuit for an electric dryer with a given voltage and resistance.** 10.2
Construction Drawings & Specifications 11	1	**Drawings and Specifications: Inspect and interpret a full set of construction drawings and specifications for a construction project including civil, architectural, structural, mechanical, plumbing, electrical, and fire protection drawings and specifications. Read and interpret different drawing types including plan view drawings, elevation view drawings, section drawings, detail drawings, and schedules. Explain the relationship between different types of drawing and the importance of cross-referencing different types of drawings with one another and cross-referencing drawings with specifications. For example, explain how a floor plan, elevation, and detail drawing may all be used to inform the reader about the layout and material of a given building component, such as a cabinet layout or an exterior wall.** 11.1
Business and Project Ma	1	**Management and Communication: Describe strategies used to promote collaboration, trust, and clear communication among internal and external parties on a job site. Practice effective verbal, nonverbal, written, and electronic communication skills for working with colleagues, employers, clients, and other**

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		personnel while demonstrating the ability to: listen attentively, speak courteously and respectfully, resolve obstacles in construction, and respond to criticism. For example, assume the roles of a construction business owner and a potential client, listen to the needs of the potential client, and respond to the potential client by email; explain the services provided by the company and the next steps needed to begin the project. Other role playing could include a construction business owner and a potential subcontractor. 12.1
	2	**Contracts: Describe the components and purpose of a basic contract document for a residential project. Recognize the relationship and responsibilities of various parties to a contract. Write a basic contract for a construction job, such as a carpenter's contract to complete a deck addition for a residential client.** 12.2
	3	**Materials: Interpret construction drawings to determine the correct materials, tools, and equipment needed to complete a construction project. Plan and implement the steps needed to complete the project, adhering to inspection procedures and employing safe practices throughout. Draw from print and electronic examples to create and publish a material list, cost estimation, construction schedule, and inspection checklist for a project, applying the components of the documents to the given project.** 12.3
	4	**Reports: Log daily activities completed during a construction project over an extended period of time. Document important facts concisely in a daily report as would a project manager on a jobsite, including daily progress, equipment and materials used, personnel involved, and other work-related activities. Review and revise as appropriate.** 12.4
Portfolio 13	1	**Portfolio: Update materials from coursework to add to the portfolio started in Fundamentals of Construction. Continually reflect on coursework experiences and revise and refine the career plan generated in the prior course, using technology where appropriate. Include photographs or illustrations and written descriptions of sequential progress in construction projects.** 13.1