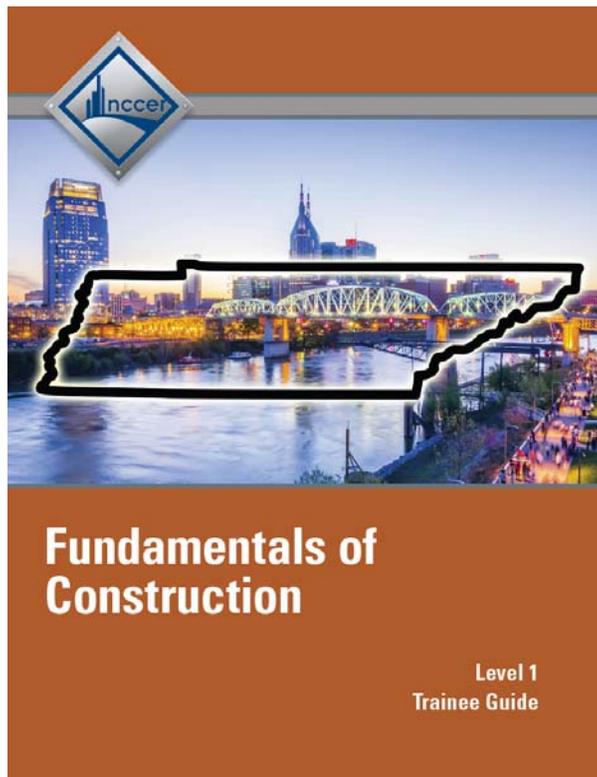


A Correlation and Narrative Brief of

Tennessee Fundamentals of

Construction

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To the

Tennessee Architecture and

Construction Course Standards for

Fundamentals of Construction

TEXTBOOK NARRATIVE FOR THE STATE OF TENNESSEE

**Tennessee Fundamentals of Construction, ©2017
ISBN 978-0-13-4578439**

NEW TO THIS EDITION:

- This custom text contains *Core Curriculum: Introductory Craft Skills, 5E*, as well as additional modules on *Project Management*.
- NCCER has enhanced the text's appeal to an international market, primarily with new features to show how construction impacts countries around the world.
- A revised "Basic Safety (Construction Site Safety Orientation)" module aligns to the Occupational Safety and Health Administration's (OSHA's) 10-hour program. This means that instructors who are OSHA-500 certified are able to issue 10-hour OSHA cards to their students who successfully complete the module. Combined with an NCCER credential, the OSHA 10-hour card will show employers a credible and valuable training record. While aligning to the OSHA-based standards of the United States, this module enhances safety practices and discusses how these can change state-to-state and country-to-country. Also, the successful completion of this module will award a construction Site Safety Orientation credential.
- This edition of the "Introduction to Construction Math" module keeps math "real" for students by emphasizing application over theory-related exercises. By keeping math "real," the language of math is much easier to understand. As a companion piece to this module, a Basic Math Workbook is also available for instructors to use to supplement classroom activities.
- The "Introduction to Basic Rigging" module includes basic safety requirements for working around rigging and cranes, and rigging equipment identification. This module has been reduced in size and hours. It is an elective, and as such is not required for successful completion of the *Core Curriculum*.
- The "Basic Communication Skills" module now includes content on nonverbal communication and explains the importance of electronic messaging in the construction industry.
- The "Introduction to Material Handling" module now presents the basics of knot tying, as knots are critical with any material handling procedure.
- Introduction to Project Management module introduces the roles and responsibilities of project management, including technical and management skills. It presents an overview of the various phases in a construction project and describes alternate project delivery methods.

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NCCERconnect for *Core: Introductory Craft Skills, 5E*, is also available.

- NCCERconnect – eLearning Series is a new and improved online supplement in XL platform. This unique online course supplement in the form of an electronic book and essential course management tools is delivered through an exceptional user-friendly interface, www.nccerconnect.com. NCCERconnect provides a range of visual, auditory, and interactive elements to enhance student learning and instructor delivery of craft training.
- The realistic ebook experience consists of the actual print book and integrated tools such as highlighting, notes, zoom, bookmarks, search capability, and more! The etext contains links to active figures.
- Prebuilt homework assignments enable students to work at any time, and they incorporate a scores report to gradebook. Homework assignments contain module reading, concept checks, and drag-and-drop Trade Term questions.
- Quiz assignments contain Review Questions in multiple choice, and they incorporate scores report back to gradebook.
- Multimedia library is searchable by modules and contains PPTs and resources.
- Student Support Page includes a written learning pathway for students so they know what is found within the course and how to use the resource. The page also includes technical support resources.

SUPPLEMENTS:

A printed Teacher Edition (ISBN 978-0-13-457846-0) contains an instructor’s copy of the Trainee Guide, Lesson Plans, and Basic Math Workbook. The Basic Math Workbook is intended for instructors to use as an additional learning aid for students in the classroom to improve math skills.

It also includes an access code to the NCCER Instructor Resource Center, which contains the following digital resources:

- Lesson Plans
- Module PowerPoints
- Performance Profile Sheet

Instructor access to NCCERConnect also provides all the standard XL instructor tools:

- Course Home Manager
- Assignment Manager
- Gradebook displays students’ results of Concept Checks, Review Questions, and any additional quizzes/tests added to your course.
- Roster/Course Details
- Course Settings
- Multimedia Library
- Instructor Toolkit provides easy access to lesson plans and lecture slide presentations.
- Customization of your course is easy and allows for maximum flexibility. Move existing folders or create new ones. Add/upload your own content or create additional tests/quizzes. It’s all here!
- Instructor Support Page includes a written summary of what is found within the course. The page also includes technical support resources.

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Tennessee Course Standards for Fundamentals of Construction	Tennessee Fundamentals of Construction
Fundamentals of Construction	
Course Standards	
Safety	
1) 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. (TN Reading 3, 4, 6; NCCER 00101-09)	SE/TE: M1.3-6, M1.9, M1.16-38, M1.40-48, M1.50-57, M1-67-87
2) Define 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. (TN Reading 3, 4; NCCER 00101-09)	SE/TE: M1.2, M1.29-38, M1.42, M1.46-47, M1.50-57, M1.58-66, M1.74-84, M9.14-24
3) 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. (TN Reading 3, 4; NCCER 00101-09, 00109-09)	SE/TE: M1.10-15, M1.67-71, M9.1-12, M9.14-24

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History of Architecture & Construction	
4) Investigate the evolution of architecture and construction across a variety of civilizations throughout history. Identify major architectural innovations, such as technological advances in materials or construction processes. Create an annotated timeline or visual graphic illustrating significant time periods in the development of construction. (TN Reading 2, 4, 7; TN Writing 2, 9)	This standard falls outside of the program curriculum.
Introduction to the Construction Industry	
5) Drawing on resources from textbooks, websites, and research centers such as the National Center for Construction Education and Research (NCCER), analyze the organization of the modern construction industry. Distinguish among the various personnel involved in the industry and explain the roles of each in the construction process, including but not limited to the owner, developer, architects, engineers, building officials, contractors, suppliers, unions, and professional craftsmen. For example, create a written report or infographic describing the basic steps of traditional building delivery for a construction project (from pre-design to post-construction), outlining who and what is involved in each step. (TN Reading 1, 2, 4, 5, 7; TN Writing 2; NCCER 44101-08)	Module 44101-08 Introduction to Project Management: 1.2-14
6) Research basic regulations affecting today's construction industry.	
a. Investigate and report on the process for securing a building permit for a selected location in the community. (TN Reading 2, 3, 4; TN Writing 2)	This standard falls outside of the program curriculum.
b. Explain what a building code is and where to find published local building codes. Write persuasively to defend why a particular building code is necessary. (TN Reading 2, 3, 4; TN Writing 1)	This standard falls outside of the program curriculum.

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7) Investigate the social, economic, and environmental impact of construction work at the local, national, and global levels. Analyze current and emerging trends in the construction industry such as LEED certification and green building design, critically examining each source consulted for its validity and reasoning. Integrate findings into a written summary; for example, write an informative essay on how the implementation of green construction practices (such as preventing waste and recycling waste) affects the environment and cost of a project. (TN Reading 2, 4, 8; TN Writing 2, 8, 9)	SE/TE: M8.5 Optional Supplement- Your Role in the Green Environment 70101-15: 22-65, 67-90
Career Exploration	
8) Research the major professions and trades within construction, such as electrician, carpenter, mason, plumber, HVAC technician, cost estimator, and construction manager. Produce a chart or other graphic detailing the aptitudes and training needed for at least three careers of interest. For example, outline the typical steps needed to become a journeyman electrician, such as completing postsecondary training and obtaining on-the-job training through an apprenticeship, and devise a tentative career plan to reach employment goals. (TN Reading 1, 2, 4, 7; TN Writing 2, 9)	SE/TE: M8.1-6
9) Evaluate jobs data and employment projections in the construction industry from sources such as O*Net OnLine, synthesizing findings from each source. Determine areas of largest growth and discuss the significance of construction to the national and global economy. Articulate why construction is considered a STEM field, citing the specific knowledge, skills, and abilities required to be successful in a variety of construction occupations. (TN Reading 1, 2, 4, 7; TN Writing 7, 9; TN Math S-ID)	This standard falls outside of the program curriculum.

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Introduction to Measurement	
10) Use physical measurement devices typically employed in construction to complete accurate field measurements. Determine the appropriate units and record accurate measurements of lengths and angles. Tools should include, but are not limited to: fractional rule, metric rule, measuring tape, architect's scale, engineer's scale, dial caliper, micrometer, protractor, and square. (TN Reading 3; TN Math N-Q; NCCER 00102-09)	SE/TE: M2.30-36, M5.41-44
11) Interpret given linear and angular dimensions to accurately set up layouts to complete a project. For example, use an architect's scale to measure distance on a construction drawing, and then use a measuring tape to lay out cuts in dimensional lumber to an accuracy of 1/16 inch. (TN Reading 2, 3; TN Math N-Q; NCCER 00102-09)	SE/TE: M2.30-36, M5.41-44
Construction Math	
12) Apply mathematics concepts to solve construction problems, distinguishing which principles apply to a given construction problem. Concepts should include, but are not limited to:	
a. Operating with whole numbers, fractions, and decimals. (TN Math N-Q; NCCER 00102-09)	SE/TE: M2.2-8, M2.14-16, M2.19-M2.23 TE: Basic Construction Math Workbook, pp 2-22
b. Performing conversions between fractions, decimals, and percent. For example, convert a decimal to a fraction to prepare a unit for measurement on a fractional scale to the precision of 1/16 of an inch. (TN Math N-Q; NCCER 00102-09)	SE/TE: M2.23-29 TE: Basic Construction Math Workbook, pp 2-22
c. Working with units such as feet, inches, meters, centimeters, and millimeters, and determining appropriate units for a given construction task. For example, determine how many pieces of 2 ft. 4 in. PVC pipe may be cut from a 10 ft. piece and how much pipe will be left over. (TN Math N-Q; NCCER 00102-09)	SE/TE: M2.26-28, M2.30-36, M2.37-40 TE: Basic Construction Math Workbook, pp 2-22

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d. Calculating the area of two-dimensional spaces. Calculating surface area and volume for three-dimensional objects employing related geometric terminology. (TN Math G-GMD, G-MG; NCCER 00102-09)	SE/TE: M2.52, M2.53-57 TE: Basic Construction Math Workbook, pp 2-22
e. Performing proportionate reasoning to estimate quantities. (TN Math N-Q)	TE: Basic Construction Math Workbook, pp 2-22
f. Using basic rules of right triangles, such as the Pythagorean Theorem, to find missing lengths. (TN Math G-SRT)	SE/TE: M2.55 TE: Basic Construction Math Workbook, pp 2-22
Tools & Equipment	
13) Accurately identify a wide range of hand and power tools used in the construction trades, such as striking tools, cutting tools, torque producing tools, leveling and squaring tools, grinding and shaping tools, clamping tools, and pulling and lifting tools. Explain when each is used and describe the characteristics that make each appropriate for a given task. (TN Reading 2, 3, 4)	SE/TE: M3.1-18, M3.29-35, M3.39-41, M4.1-14, M4.15-23, M4.24-30, M4.31-37
14) Assess a variety of situations requiring the use of hand tools, power tools, and equipment. Select the proper tool and accessories, critique the readiness of the tool, use the tool to accomplish the desired task, and then return the tool and accessories to their proper storage. For example, demonstrate the ability to safely use a crosscut saw to cut a straight square to specified dimensions on dimensional lumber. (TN Reading 3; TN Math N-Q; NCCER 00103-09, 00104-09)	SE/TE: M3.3-4, M3.5, M3.8, M3.9, M3.12-13, M3.15, M3.17, M3.31, M3.32-33, M3.40-41, M4.4-10, M4.12-14, M4.16-18, M4.19-21, M4.22, M4.23, M4.25-28, M4.30, M4.33-37

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Tennessee Course Standards for Fundamentals of Construction	Tennessee Fundamentals of Construction
Introduction to Building Systems and Materials	
15) Compare and contrast the properties and uses of basic construction materials employed in building construction processes, such as aggregates, asphalt, concrete, steel, wood, and masonry materials. (TN Reading 4)	Module 27102-13 Building Materials, Fasteners and Adhesives SE/TE: 2.1-24
16) Distinguish between the various types of fasteners commonly used in construction, such as nails, screws, and bolts, by creating a visual display outlining the properties and uses of each type. Demonstrate the ability to accurately select and install the appropriate fastener in a variety of situations. (TN Reading 2, 3, 4, 7; TN Writing 2; NCCER 27102-13)	Module 27102-13 Building Materials, Fasteners and Adhesives SE/TE: 2.37-56
17) Using graphic illustrations and supporting text, identify and describe major building systems (i.e. foundation, structural, mechanical, electrical, and plumbing systems) to establish a basic knowledge of their purpose, structure, and function. Discriminate between the different types of construction drawings related to these systems, analyze how those drawings are organized, and interpret the common symbols used in each. (TN Reading 2, 4, 5, 7, 9; NCCER 00105-09)	SE/TE: M5.2-27, M5.27-31

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Tennessee Course Standards for Fundamentals of Construction	Tennessee Fundamentals of Construction
Construction Drawings & Specifications	
18) Inspect and interpret construction drawings, diagrams, and written specifications for construction projects. Explain how pictorial representations relate to a physical layout. Use an architect's scale and the given dimensions on a construction document to determine an unknown dimension. For example, interpret electrical schedules and single-pole or three-way light switch symbols in electrical plans to determine the types, quantities, and exact physical locations of the light switches to be installed in a construction project. (TN Reading 1, 2, 4, 6, 7; NCCER 00105-09)	SE/TE: M5.2-27, M5.27-31, M5.31-34, M5.36-39, M5.41-42, MP.2-MP.5
19) Describe the purpose of specifications in a construction document set. Examine how specifications are organized according to the Construction Specifications Institute's (CSI) <i>Master Format</i> . Select an assortment of building products and classify them according to <i>Master Format</i> . Analyze actual specifications and create a list of items commonly included in a specification. Following CSI models and format, write a specification for a given component of a building project. (TN Reading 1, 3, 4, 5, 6; TN Writing 2, 4, 8, 9; NCCER 44105-08)	Module 44101-08 Introduction to Project Management: 1.2-6, 1.12-14
20) Create two-dimensional scale drawings using accepted dimensioning rules and measurement systems. For example, as part of a project to build a simple structure, develop the complete drawings that specify the dimensional details for each step of the construction process, annotating all drawings such that another person could replicate the work. (TN Reading 3, 4; TN Math N-Q, G-MG)	SE/TE: M5.31, M5.33, M5.40-43

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Tennessee Course Standards for Fundamentals of Construction	Tennessee Fundamentals of Construction
Course Project	
21) Interpret construction drawings to determine the correct materials, tools, and equipment needed to complete a basic construction project. Plan and implement the steps needed to complete the project, attending to precise details and employing safe practices throughout. For example, read and interpret a technical document to build a simple tool box. (TN Reading 1, 3, 7; NCCER 00105-09)	SE/TE: M5.2-27, M5.27-31, M5.31-34, M5.36-39, M5.41-42, MP.2-MP.5
Portfolio	
22) Compile important artifacts to create a portfolio connecting personal career preparation to concepts learned in this course. Continually update and reflect upon artifacts produced, including written products, to strengthen work samples over time, using technology where appropriate. (TN Writing 4, 5, 6)	This standard falls outside of the program curriculum.