

Construction Technology

COURSE OUTLINE

1. Course Title: Construction Core Technology

2. CBEDS Title: Introduction to Construction

3. CBEDS Number: 5501

4. Job Titles:

Carpenters
Concrete Laborers
Construction Managers
Drywall installers
Electricians
Roofers

5. Course Description:

This course will introduce and train students in the basic skills necessary to pursue a career in construction. This course covers safety, hand and power tools, blue print reading, and construction math. Models are constructed in the shop. Upon completion of units in this course, students who successfully pass the NCCER examinations can earn certifications.

Student Outcomes and Objectives:

Students will:

1. Develop technical and job skills related to careers in the construction industry.
2. Develop teamwork and problem solving skills necessary in the construction industry
3. Develop and use proper safe work practices in accordance with OSHA standards for the construction industry.
4. Learn and apply measurement and math applications associated with construction.
5. Recognize the various phases associated with simple residential and commercial construction.
6. Identify and use correctly a wide variety of hand and power tools associated with the construction industry.
7. Understand current construction industry trends and become familiar with standards for quality construction and trends in building technology.
8. Demonstrate proper techniques associated with residential and commercial construction.
9. Identify the type and use of various building materials.
10. Demonstrate skills in basic site layout, preparation, and leveling.
11. Interpret different types of drawings and apply basic terms for construction drawings and symbols.

Integrated throughout the course are career preparation standards, which include basic academic skills, communication, interpersonal skills, problem solving, workplace safety, technology, and employment literacy.

Pathway

Recommended Sequence	Courses
Introductory	Applied Technology or Core Construction
Skill Building	Construction Technology
Advanced Skill	Advanced Construction Technology or Cabinetry and Furniture Making or Construction Technology Coop

6. Hours: *Students receive up to 180 hours of classroom instruction.*

7. Prerequisites: Algebra 1

8. Date (of creation/revision): July 2011

9. Course Outline

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Upon successful completion of this course, students will be able to demonstrate the following skills necessary for entry-level employment.				
Instructional Units and Competencies	Course Hours	Model Curr. Standards	CA Academic Content Standards	CAHSEE
<p>I. CAREER PREPARATION</p> <p>A. Career Planning and Management.</p> <ol style="list-style-type: none"> 1. Know the personal qualifications, interests, aptitudes, knowledge, and skills necessary to succeed in careers. <ol style="list-style-type: none"> a. Students will identify skills needed for job success b. Students will identify the education and experience required for moving along a career ladder. 2. Understand the scope of career opportunities and know the requirements for education, training, and licensure. <ol style="list-style-type: none"> a. Students will describe how to find a job. b. Students will select two jobs in the field and map out a timeline for completing education and/or licensing requirements. 3. Know the main strategies for self-promotion in the hiring process, such as completing job applications, resume writing, interviewing skills, and preparing a portfolio. <ol style="list-style-type: none"> a. Students will write and use word processing software to create a resume, cover letters, thank you letters, and job applications. b. Students will participate in mock job interviews. 4. <i>Develop a career plan that is designed to reflect career interests, pathways, and postsecondary options.</i> <ol style="list-style-type: none"> a. <i>Students will conduct a self—assessment and explain how professional qualifications affect career choices.</i> 5. <i>Understand the role and function of professional organizations, industry associations, and organized labor in a productive society.</i> <ol style="list-style-type: none"> a. <i>Contact two professional organization and identify the steps to become a member.</i> 6. <i>Understand the past, present and future trends that affect careers, such as technological developments and societal trends, and the resulting need for lifelong learning.</i> <ol style="list-style-type: none"> a. <i>Students will describe careers in the business industry sector.</i> b. <i>Students will identify work-related cultural differences to prepare for a global workplace.</i> <p>B. Technology.</p> <ol style="list-style-type: none"> 1. Understand past, present and future technological advances as they relate to a chosen pathway and on selected segments of the economy. 2. Understand the use of technological resources to gain access to, manipulate, and produce information, products and services. 3. Use appropriate technology in the chosen career pathway. <p>C. Problem solving and Critical Thinking.</p> <ol style="list-style-type: none"> 1. Understand the systematic problem-solving models that incorporate input, process, outcome and feedback components, and apply appropriate problem-solving strategies and critical thinking to work-related issues and tasks. 	<p>10</p> <p>Additional hours are integrated throughout the course.</p>	<p>Transportation Industry Sector, Model Curriculum Standards</p> <p>3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0</p>	<p><u>Language Arts</u> (8) R 1.3, 2.6 W1.3, 2.5, LC 1.4,1.5 1.6 LS1.2, 1.3, (9/10) R2.1,2.3,2 W2.5 LC1.4 LS 1.1, 2.3 (11/12) R2.3 W2.5 LC1.2 <u>Math</u> (7) NS1.2, 1.7 MR 1.1,1.3 2.7,2.8, 3.1</p>	<p>Lang. Arts R 8.2.1 (9/10) R 2.1, 2.3 W2.5 Math (7) NS 1.2, 1.3, 1.7 MR 1.1, 2.1, 3.1</p>

<p>2. Use and apply critical thinking and decision making skills to make informed decisions, solve problems, and achieve balance in the multiple roles of personal, home, work and community life.</p> <p>D. Health and Safety.</p> <ol style="list-style-type: none"> 1. Know policies, procedures, and regulations regarding health and safety in the workplace, including employers' and employees' responsibilities. 2. Understand critical elements of health and safety practices related to a variety of business environments. <p>E. Responsibility & Flexibility.</p> <ol style="list-style-type: none"> 1. Understand the qualities and behaviors that constitute a positive and professional work demeanor. 2. Understand the importance of accountability and responsibility in fulfilling personal, community, and workplace roles and how individual actions can affect the larger community. 3. Understand the need to adapt to varied roles and responsibilities. <p>F. Ethics and Legal Responsibilities</p> <ol style="list-style-type: none"> 1. Know the major local, district, state, and federal regulatory agencies and entities that affect the industry and how they enforce laws and regulations. 2. Understand the concept and application of ethical and legal behavior consistent with workplace standards. <ol style="list-style-type: none"> a. <i>Contact a business and obtain a copy of their rules for employment.</i> b. <i>Role play difference ethical scenarios.</i> 3. Understand the role of personal integrity and ethical behavior in the workplace. <p>G. Leadership and Teamwork.</p> <ol style="list-style-type: none"> 1. Understand the characteristics and benefits of teamwork, leadership, citizenship in the school, community, and workplace settings for effective performance and attainment of goals. 2. Understand the ways in which professional associations, such as Skills USA, CITEA and competitive career contribute to promote employability. 3. Know multiple approaches to personal conflict resolution and understand how to interact with others in ways that demonstrate respect for individual and cultural differences and for the attitudes and feelings of others. 				
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Instructional Units and Competencies	Hours	Industry Standards.	CA Academic Standards.	CAHSEE
<p>I. Basic Safety</p> <p>A. Students will explain the idea of a safety culture and its importance to the construction crafts.</p> <p>B. Students will identify causes of accidents and the impact of accident costs.</p> <p>C. Students will explain the role of OSHA in job-site safety.</p> <p>D. Students will explain OSHA’s General Duty Clause and 1926 CFR Subpart C.</p> <p>E. Students will recognize hazard recognition and risk assessment techniques.</p> <p>F. Students will explain fall protection, ladder, stair, and scaffold procedures and requirements.</p> <p>G. Students will identify struck-by hazards and demonstrate safe working procedures and requirements.</p> <p>H. Students will identify caught-in-between hazards and demonstrate safe working procedures and requirements.</p> <p>I. Students will define safe work procedures to use around electrical hazards.</p> <p>J. Students will demonstrate the use and care of appropriate personal protective equipment (PPE).</p> <p>K. Students will explain the importance of hazard communications (HazCom) and Material Safety Data sheets (MSDSs).</p> <p>L. Students will identify other construction hazards on the job site, including hazardous material exposures, environmental elements, welding and cutting hazards, confined spaces, and fires.</p>	10	Residential & Commercial Construction Pathway D5.0	ELA 9-10; R; 2.6; W; 1.7, 1.8, 2.6; WO; 1.4; LS; 1.3, 1.4, 1.6-1.9, 2.2	ELA 9-10; R; 2.1, 2.2, 2.3, 2.5; W; 1.1-1.6, 1.9; WO; 1.1, 1.2, 1.3, 1.5
<p>II. Introduction to Construction Math</p> <p>A. Students will add, subtract, multiple, and divide whole numbers, with and without a calculator.</p> <p>B. Students will use a standard ruler, a metric ruler, and a measuring tape to measure; add, subtract, multiple, and divide fractions</p> <p>C. Students will add, subtract, multiply, and divide decimals with and without a calculator.</p> <p>D. Students will convert decimals to percentages and percentages to decimals.</p> <p>E. Students will convert fractions to decimals and decimals to fractions.</p> <p>F. Students will explain what the metric system is</p>	10	Residential & Commercial Construction Pathway D1.0, 1.2	M. 7; AF; 1.3, 1.4; MG; 3.5; MR; 1.3, 2.2, 2.5, 2.6, 2.8, 3.2 M. 9-12; Alg; 8.0 & 16.0; Geo.; 3.0, 8.0-12.0, 17.0, 21.0	M. 7; NS; 1.2, 1.3, 1.6, 1.7, 2.2; AF; 1.1, 1.2, 2.1, 2.2; MG; 1.1, 1.2, 2.1-2.4; MR; 1.1, 1.2, 2.1, 2.4, 3.1, 3.3

	<p>and how it is important in the construction trade.</p> <p>G. Students will recognize and use metric units of length, weight, volume, and temperature.</p> <p>H. Students will recognize some of the basic shapes used in the construction industry and apply basic geometry to measure them.</p>				
III.	<p>Introduction to Hand Tools</p> <p>A. Students will recognize and identify some of the basic hand tools and their proper uses in the construction trade.</p> <p>B. Students will visually inspect hand tools to determine if they are safe to use.</p> <p>C. Students will safely use hand tools.</p>	10	Residential & Commercial Construction Pathway D2.0, 2.1, 2.2	<p>ELA 9-10; R; 2,6; W; 1.8, 2.6 WO; 1.3, 1.4; LS; 1.3, 1.4, 1.6-1.9.</p>	<p>M. 7; NS; 1.2, 1.3, 1.6, 1.7, ELA 9-10; R; 2.1; W; 1.1, 1.2,</p>
IV.	<p>Introduction to Power Tools</p> <p>A. Students will identify power tools commonly used in the construction trades.</p> <p>B. Students will use power tools safely.</p> <p>C. Students will explain how to maintain power tools properly.</p>	10	Residential & Commercial Construction Pathway D3.0, 3.1, 3.2, 3.3	<p>ELA 9-10; R; 2,6; W; 1.8, 2.6 WO; 1.3, 1.4; LS; 1.3, 1.4, 1.6-1.9.</p>	<p>M. 7; NS; 1.2, 1.3, 1.6, 1.7 ELA 9-10; R; 2.1; W; 1.1, 1.2</p>
V.	<p>Introduction to Construction Drawings</p> <p>A. Students will recognize and identify basic construction drawing terms, components, and symbols.</p> <p>B. Students will relate information on construction drawings to actual locations on the print.</p> <p>C. Students will recognize different classifications of construction drawings.</p> <p>D. Students will interpret and use drawing dimensions.</p>	10	Residential & Commercial Construction Pathway D6.0, 6.1, 6.2	<p>M. 7; AF; 1.3; MG; 3.1; MR; 1.3, 2.5, 2.6, 2.8, 3.2</p> <p>ELA 9-10; R; 2.6; W; 1.8, 2.6; WO; 1.3, 1.4; LS; 1.3, 1.4, 1.7, 1.8, 2.2.</p>	<p>M. 7; NS; 1.2, 1.3, 2.2; AF; 1.2; MG; 1.2, 2.1, 2.3; MR; 1.1, 1.2, 2.4, 3.1, 3.3. ELA 9-10; R; 2.1; W; 1.1, 1.2.</p>
VI.	<p><i>Basic Rigging</i></p> <p>A. <i>Students will identify and describe the use of slings and common rigging hardware.</i></p> <p>B. <i>Students will describe basic inspection techniques and rejection criteria used for slings and hardware.</i></p> <p>C. <i>Students will describe basic hitch configurations and their proper connections.</i></p> <p>D. <i>Students will describe basic load-handling safety practices.</i></p> <p>E. <i>Students will demonstrate proper use of American National Standards Institute (ANSI)</i></p>				

	<i>hand signals.</i>			
VII.	Basic Communications Skills (covered in Career Exploration section) A. Students will interpret information and instruction presented in both verbal and written form. B. Students will communicate effectively in on-the-job situations using verbal and written skills. C. Students will communicate effectively on the job using electronic communication devices.			
VIII.	Basic Employability Skills (covered in Career Exploration section) A. Students will explain the role of an employee in the construction industry. B. Students will demonstrate critical thinking skills and the ability to solve problems using those skills. C. Students will demonstrate knowledge of computer systems and explain common uses for computers in the construction industry. D. Students will define effective relationship skills. E. Students will recognize workplace issues such as sexual harassment, stress, and substance abuse.			
IX.	<i>Introduction to Materials Handling</i> A. <i>Students will define a load.</i> B. <i>Students will establish a pre-task plan prior to moving a load.</i> C. <i>Students will use proper materials-handling equipment for the task.</i> D. <i>Students will recognize hazards and follow safety procedures required for materials handling.</i>		Residential & Commercial Construction Pathway D5.0, 5.2	
X.	Industry Trends Students Research current trends in the construction industry and predict future impacts on the past and future of the construction industry. A. Green Building materials and guidelines: i. ACCA (Air Conditioning Contractors of America). ii. Advanced framing for energy and resource efficiency iii. Green home energy upgrades iv. Positive net energy homes – the passive house concept. v. Solar power basics for residential buildings. vi. Solar water heating systems.	20	Residential & Commercial Construction Pathway D7.0, 7.1, 7.2, 7.3	ELA 9-10; R; 2.6; W; 1.7, 1.8, 2.6; WO; 1.4; LS; 1.3, 1.4, 1.6-1.9, 2.2; HSS 12; 12.2.1-12.2.8, 12.3.1, 12.3.2, 12.4.2-12.4.4.

<p>B. Organizations, associations and certifications:</p> <ul style="list-style-type: none"> i. North American Technician Excellence (NATE) ii. California Building Performance Contractors Assn. (CBPCA) iii. American Institute of Architects (AIA) iv. Build It Green v. National Assn. of the Remodeling Industry (NARI) vi. U. S. Green Building Council (LEEDS certification) vii. California Home Energy Efficiency Raters.(CHEERS) viii. Home Energy Rating System (HERS) <p>C. <i>Creative financing for construction projects.</i></p> <p>D. Environmental regulations and their impact on the construction industry.</p> <p>E. The historical development of construction processes and their impact on the construction industry.</p> <p>F. OSHA regulations and other safety developments.</p>				
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10. Additional recommended/optional items

a. Articulation: None.

b. Academic credit: None

c. Instructional strategies:

Lecture Discussion

Laboratory

Projects

Industry tours

Guest Speakers

d. Instructional materials: Core Curriculum *Introductory Craft Skills, 4th ed.*, NCCER, Pearson, 2009.

e. Certificates: NCCER certificates available upon successfully passing the unit examinations.