

Course Outline

Building and Construction Trades

REVISED: April/2018

Job Title

Construction Worker

Career Pathway:

Residential and Commercial Construction

Industry Sector:

Building and Construction Trades

O*NET-SOC CODE:

47-2061.00

CBEDS Title:

Introduction to Building and Construction Trades

CBEDS No.:

5501

79-15-89

**Construction Worker:
Apprenticeship Preparation-MC3**

Credits: 20

Hours: 240

Course Description:

This 240 hour pre-apprenticeship course includes the North America's Building Trade Unions' sponsored Multi-Craft Core Curriculum (MC3) as well as trade union involvement and field-trips. This course is designed for students to find employment as indentured apprentices in the construction industry. The MC3 will cover Orientation and Safety, OSHA 10 (Construction), First Aid/CPR/AED, Labor History, Trade Math, Apprenticeship Preparation, Basic Blueprint & Estimating, Hand Tools, Power Tools, Building Codes & Green Codes, Concrete & Masonry, Basic Framing, Plumbing, Electrical & Lighting, Heating, Ventilation & Air Conditioning (HVAC), Doors, Windows & Finish Carpentry, Drywall Finishing, Painting: Commercial & Industrial, Roof Covering, Floor & Tiling, Job Readiness/Soft Skills and Trade Math Practice . The competencies in this course are aligned with the California High School Academic Content Standards.

Prerequisites:

Enrollment requires student to be at least 18 years of age, possess a valid California Driver's License, have reliable transportation, possess a valid Social Security Card and be willing to submit to a drug screening test.

NOTE: Contact Central Office CTE Unit before enrolling students. For Perkins purposes this course has been designated as a **introductory/concentrator/capstone** course.

This course cannot be repeated once a student receives a Certificate of Completion.



COURSE OUTLINE COMPETENCY-BASED COMPONENTS

A course outline reflects the essential intent and content of the course described. Acceptable course outlines have six components. (Education Code Section 52506). Course outlines for all apportionment classes, including those in jails, state hospitals, and convalescent hospitals, contain the six required elements:

(EC 52504; 5CCR 10508 [b]; Adult Education Handbook for California [1977], Section 100)

COURSE OUTLINE COMPONENTS

Location

GOALS AND PURPOSES

Cover

The educational goals or purposes of every course are clearly stated and the class periods are devoted to instruction. The course should be broad enough in scope and should have sufficient educational worth to justify the expenditure of public funds.

The goals and purpose of a course are stated in the COURSE DESCRIPTION. Course descriptions state the major emphasis and content of a course, and are written to be understandable by a prospective student.

PERFORMANCE OBJECTIVES OR COMPETENCIES

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Objectives should be delineated and described in terms of measurable results for the student and include the possible ways in which the objectives contribute to the student's acquisition of skills and competencies.

Performance Objectives are sequentially listed in the COMPETENCY-BASED COMPONENTS section of the course outline. Competency Areas are units of instruction based on related competencies. Competency Statements are competency area goals that together define the framework and purpose of a course. Competencies fall on a continuum between goals and performance objectives and denote the outcome of instruction.

Competency-based instruction tells a student before instruction what skills or knowledge they will demonstrate after instruction. Competency-based education provides instruction which enables each student to attain individual goals as measured against pre-stated standards.

Competency-based instruction provides immediate and continual repetition and In competency-based education the curriculum, instruction, and assessment share common characteristics based on clearly stated competencies. Curriculum, instruction and assessment in competency-based education are: explicit, known, agreed upon, integrated, performance oriented, and adaptive.

COURSE OUTLINE COMPETENCY-BASED COMPONENTS
(continued)

COURSE OUTLINE COMPONENTS

Location

INSTRUCTIONAL STRATEGIES

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Instructional techniques or methods could include laboratory techniques, lecture method, small-group discussion, grouping plans, and other strategies used in the classroom.

Instructional strategies for this course are listed in the TEACHING STRATEGIES AND EVALUATION section of the course outline. Instructional strategies and activities for a course should be selected so that the overall teaching approach takes into account the instructional standards of a particular program, i.e., English as a Second Language, Programs for Adults with Disabilities.

UNITS OF STUDY, WITH APPROXIMATE HOURS ALLOTTED FOR EACH UNIT

Cover

The approximate time devoted to each instructional unit within the course, as well as the total hours for the course, is indicated. The time in class is consistent with the needs of the student, and the length of the class should be that it ensures the student will learn at an optimum level.

pp. 7-22

Units of study, with approximate hours allotted for each unit are listed in the COMPETENCY AREA STATEMENT(S) of the course outline. The total hours of the course, including work-based learning hours (community classroom and cooperative vocational education) is listed on the cover of every CBE course outline. Each Competency Area listed within a CBE outline is assigned hours of instruction per unit.

EVALUATION PROCEDURES

p. 25-26

The evaluation describes measurable evaluation criteria clearly within the reach of the student. The evaluation indicates anticipated improvement in performances as well as anticipated skills and competencies to be achieved.

Evaluation procedures are detailed in the TEACHING STRATEGIES AND EVALUATION section of the course outline. Instructors monitor students' progress on a continuing basis, assessing students on attainment of objectives identified in the course outline through a variety of formal and informal tests (applied performance procedures, observations, and simulations), paper and pencil exams, and standardized tests.

REPETITION POLICY THAT PREVENTS PERPETUATION OF STUDENT ENROLLMENT

Cover

After a student has completed all the objectives of the course, he or she should not be allowed to reenroll in the course. There is, therefore, a need for a statement about the conditions for possible repetition of a course to prevent perpetuation of students in a particular program for an indefinite period of time.

ACKNOWLEDGMENTS

Thanks to RAY WILCOX for developing and editing this course outline. Acknowledgment is also given to PAUL PIDOUX for editing this curriculum and to ERICA ROSARIO for designing the original artwork for the course covers. Thanks to ROSARIO GALVAN for providing the leadership in implementing the course sequences.

ANA MARTINEZ
Specialist
Career Technical Education

ROSARIO GALVAN
Administrator
Division of Adult and Career Education

APPROVED:

JOSEPH STARK
Executive Director
Division of Adult and Career Education

CALIFORNIA CAREER TECHNICAL EDUCATION MODEL CURRICULUM STANDARDS

Building and Construction Trades Industry Sector

Knowledge and Performance Anchor Standards

1.0 Academics

Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to postsecondary education and employment. Refer to the Building and Construction Trades academic alignment matrix for identification of standards.

2.0 Communications

Acquire and accurately use Building and Construction Trades sector terminology and protocols at the career and college readiness level for communicating effectively in oral, written, and multimedia formats.

3.0 Career Planning and Management

Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans.

4.0 Technology

Use existing and emerging technology to investigate, research, and produce products and services, including new information, as required in the Building and Construction Trades sector workplace environment.

5.0 Problem Solving and Critical Thinking

Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the Building and Construction Trades sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques.

6.0 Health and Safety

Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to the Building and Construction Trades sector workplace environment.

7.0 Responsibility and Flexibility

Initiate, and participate in, a range of collaborations demonstrating behaviors that reflect personal and professional responsibility, flexibility, and respect in the Building and Construction Trades sector workplace environment and community settings.

8.0 Ethics and Legal Responsibilities

Practice professional, ethical, and legal behavior, responding thoughtfully to diverse perspectives and resolving contradictions when possible, consistent with applicable laws, regulations, and organizational norms.

9.0 Leadership and Teamwork

Work with peers to promote divergent and creative perspectives, effective leadership, group dynamics, team and individual decision making, benefits of workforce diversity, and conflict resolution as practiced in the SkillsUSA career technical student organization.

10.0 Technical Knowledge and Skills

Apply essential technical knowledge and skills common to all pathways in the Building and Construction Trades sector, following procedures when carrying out experiments or performing technical tasks.

11.0 Demonstration and Application

Demonstrate and apply the knowledge and skills contained in the Building and Construction Trades anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings, and through the SkillsUSA career technical student organizations.

Building and Construction Trades Pathway Standards

D. Residential and Commercial Construction Pathway

The Residential and Commercial Construction pathway provides learning opportunities for students interested in preparing for careers in construction and building design, performance, and sustainability. The standards focus on the manner in which residential and commercial structures are designed and built. The pathway includes instruction in the way in which these structures are built (Class B California License).

Sample occupations associated with this pathway:

- ◆ Plumber
- ◆ Electrician
- ◆ Building Inspector
- ◆ Estimator
- ◆ Carpenter

- D1.0 Recognize the impact of financial, technical, environmental, and labor trends on the past and future of the construction industry.
- D2.0 Apply the appropriate mathematical calculations used in the construction trades.
- D3.0 Interpret and apply information from technical drawings, schedules, and specifications used in the construction trades.
- D4.0 Demonstrate techniques for proper site preparation.
- D5.0 Demonstrate foundation layout techniques to include setting forms, placing reinforcements, and placing concrete according to construction drawings, specifications, and building codes.
- D6.0 Demonstrate carpentry techniques for the construction of a single-family residence.
- D7.0 Demonstrate proper installation techniques of interior finish materials and protective finishes.
- D8.0 Demonstrate the application of exterior finish materials and protective finishes in building construction.
- D9.0 Understand, integrate, and employ sustainable construction practices in the building trades.
- D10.0 Demonstrate skills necessary to complete a plumbing system in a single-family residence in accordance with accepted industry standards.
- D11.0 Demonstrate skills necessary to complete an electrical system in a single-family residence in accordance with accepted industry standards.

CBE
Competency-Based Education

COMPETENCY-BASED COMPONENTS
Construction: Apprenticeship Preparation Course

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
<p>A. ORIENTATION & CLASSROOM SAFETY</p> <p>Understand, apply, and evaluate classroom and workplace policies, procedures, used in accordance with federal, state, and local safety and environmental regulations.</p> <p><i>This section contains the following MC3 Topics:</i></p> <p><i>Orientation and Industry Awareness</i></p> <p><i>Diversity in the Construction Industry</i></p> <p><i>Financial Responsibilities</i></p> <p><i>Construction Health and Safety</i></p> <p><i>-Health and Safety Issues for Women</i></p> <p>(28 hours)</p>	<ol style="list-style-type: none"> 1. Describe the scope and purpose of this course. 2. Describe the linked learning initiative as it relates to this course. 3. Describe classroom policies and procedures. 4. Explain the importance of frequent testing in class and life. 5. Discuss sexual harassment and class/workplace intimidation. 6. Explain the reasons for discrepancies in gender representation in the building & construction trades and general industry. 7. Explain the Importance of diversity awareness in the construction trades and general industry. 8. Discuss health and safety issues for women. 9. Identify classroom and workplace first aid and emergency procedures/protocol. 10. Describe the different occupations in the building trades and construction sector. 11. Discuss building & construction trades' wages and application requirements. 12. Discuss the future of construction. 13. Explain financial literacy in the construction trades. 14. Discuss safe working rules for class and worksite. 15. Explain the importance of having and keeping a driver's license. 16. Identify and cover the uses of Personal Protection Equipment (PPE). 17. Introduce the concepts of Occupation Safety and Health Administration (OSHA). 18. Describe and demonstrate the use of the Safety Data Sheet (SDS) as it applies to construction. 19. Describe the advantages and importance of the following in the workplace: <ol style="list-style-type: none"> a. Time Management b. Planning & Preparation c. Routine & Sequences d. Effective Communication e. Teamwork f. Respect g. Ethics h. Conflict Resolution i. Punctuality 20. Pass the safety exam with 100%. 	<p>Career Ready Practice: 2, 3, 6, 7</p> <p>CTE Anchor: Communications: 2.1, 2.2, 2.3 Career Planning and Management: 3.4, 3.5, 3.6 Health and Safety: 6.3, 6.6 Ethics and Legal Responsibilities: 8.3 Leadership and Teamwork: 9.4</p> <p>CTE Pathway: D1.1</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
<p>B. OSHA 10 (Construction)</p> <p>Learn and understand basic safety in the construction industry.</p> <p><i>This section contains the following MC3 Topics:</i></p> <p><i>-OSHA 10</i></p> <p>(10 hours)</p>	<ol style="list-style-type: none"> 1. Describe OSHA’s role. 2. Describe employee’s rights through OSHA. 3. Describe employer’s responsibilities. 4. Describe the Focus Four. 5. Describe the best method to manage safety and health. 6. Identify hazards on a construction site. 7. Describe proper personal protective equipment per scope of work. 8. Discuss health hazard awareness. 9. Describe best safety practices when on stairways and ladders. 10. Discuss fire protection and prevention. 11. Describe the safety issues when excavation/shoring. 	<p>Career Ready Practice: 1, 2, 6, 7</p> <p>CTE Anchor: Communication: 2.3, 2.5 Health and Safety: 6.1, 6.2, 6.3, 6.4, 6.6, 6.7, 6.8, 6.10 Ethics and Legal Responsibilities: 8.2, 8.3</p> <p>CTE Pathway: D1.1, D1.2</p>
<p>C. FIRST AID/CPR/AED</p> <p>Learn and understand lifesaving procedures and treatment of wounds and breaks.</p> <p><i>This section contains the following MC3 Topics:</i></p> <p><i>-First Aid/CPR/AED</i></p> <p>(8 hours)</p>	<ol style="list-style-type: none"> 1. Recognize the type of medical emergency. 2. Handle breathing and cardiac emergencies. 3. Act appropriately and effectively and sustain life until professional help arrives. 4. Prevent disease transmission. 	<p>Career Ready Practice: 1, 2, 6, 7</p> <p>CTE Anchor: Communication: 2.3, 2.5 Health and Safety: 6.4, 6.5</p> <p>CTE Pathway: D1.1</p>
<p>D. HERITAGE OF THE AMERICAN WORKER</p> <p>Understand the importance of labor history with unionism and construction industry.</p> <p><i>This section contains the above MC3 Topics:</i></p> <p><i>-Heritage of the American Worker</i></p> <p>(7 hours)</p>	<ol style="list-style-type: none"> 1. Discuss the importance of the guild tradition. 2. Explain the modern development of the building trades in 19th and 20th centuries. 3. Describe the context surrounding the Davis Bacon Act and prevailing wage. 4. Explain the major tenants of the Fitzgerald Act and its impact on registered apprenticeships. 5. Discuss the changing demographics in the labor movement. 6. Explain the importance of project labor and community agreements. 7. Discuss additional labor/community workforce agreements. 	<p>Career Ready Practice: 1, 7</p> <p>CTE Anchor: Communication: 2.3, 2.5 Leadership and Teamwork 9.4, 9.5, 9.6</p> <p>CTE Pathway: D1.1</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
<p>E. TRADE MATH, MEASUREMENTS & MEASURING TAPE</p> <p>Understand, apply, and evaluate the mathematical requirements used in construction. Learn measurements and the measuring tape.</p> <p><i>This section contains the following MC3 Topics:</i></p> <p><i>Basic Math for Construction</i></p> <p>(32 hours)</p>	<ol style="list-style-type: none"> 1. Identify the practical applications of math in construction and maintenance. 2. Describe and demonstrate problem-solving techniques involving whole number problems, using addition, subtraction, multiplication, and division. 3. Describe and demonstrate problem-solving techniques involving various fraction problems, using arithmetic operations (addition, subtraction, multiplication, and division). 4. Describe and demonstrate problem-solving techniques involving various decimal problems, using arithmetic operations. 5. Describe and demonstrate techniques for changing fractions to decimals. 6. Describe and demonstrate techniques for changing decimals to fractions. 7. Discuss the units of English linear measurements. 8. Demonstrate and practice usage of measuring tapes. 9. Pass measuring tape test. 10. Explain the fractionalization of the inch. 11. Describe the English system of measuring length. 12. Describe the English system of measuring area. 13. Describe the English system of cubic measurements/volume. 14. Describe the relationships between various English system linear units of measurement, such as inches, feet, yards, and miles. 15. Describe and demonstrate problem-solving techniques for various English system measuring problems, using arithmetic operations. 16. Cover the basics on the metric system. 17. Discuss various standard units for different construction trades. 18. Review each trade's specific math sections. 19. Pass math quizzes. 	<p>Career Ready Practice: 1, 5</p> <p>CTE Anchor: Communication: 2.1, 2.2, 2.3 Problem Solving and Critical Thinking: 5.4</p> <p>CTE Pathway: D1.1</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
<p>F. APPRENTICESHIP PREPARATION</p> <p>Understand the goals of apprenticeship training preparation and recognize the qualifications required for entry into an apprenticeship career.</p> <p><i>This section contains the following MC3 Topics:</i></p> <p><i>Construction Trade Awareness</i></p> <p>(7 hours)</p>	<ol style="list-style-type: none"> 1. Define apprenticeship. 2. Describe apprenticeship employment issues and myths. 3. Explain the application process and criteria for entry into various apprenticeship trades. 4. List various training opportunities in apprenticeship trades. 5. Describe different qualifications and requirements for various apprenticeship trades. 6. Identify different building trade organizations. 7. Inventory individual knowledge, skills, and abilities as they relate to building trades. 8. Emphasize the importance of attendance and punctuality. 9. Participate in apprenticeship trade analysis exercise. 10. Identify apprenticeship worker qualities. 11. Differentiate between job duties for apprentices and journeymen. 12. List various places where training for apprenticeship is available. 13. Juxtapose the difference between union and non-union employment. 14. Visit at least 8 union training centers. 15. Apply to different trades that students are interested as a career. 16. Design sample résumés and cover letters. 17. Explain the importance of filling out a job application legibly, with accurate and complete information. 18. Describe the common mistakes that are made on job applications. 19. Complete sample job application forms correctly. 20. State the importance of enthusiasm in the interview and on a job. 21. State the importance of appropriate appearance in the interview and on a job. 	<p>Career Ready Practice: 1, 3, 7</p> <p>CTE Anchor: Communication: 2.1, 2.2, 2.3 Career Planning and Critical Thinking: 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.9 Responsibility and Flexibility: 7.3, 7.7 Ethics and Legal Responsibilities: 8.4, 8.5 Leadership and Teamwork: 9.3, 9.4 Technical Knowledge and Skills: 10.1</p> <p>CTE Pathway: D1.1</p>
<p>G. BASIC BLUEPRINTS & ESTIMATING.</p> <p>Understanding the fundamentals of blueprints and how they are used in construction. Use blueprints to find dimensions and for estimation.</p> <p><i>This section contains the following MC3 Topics:</i></p> <p><i>Blueprint Reading</i></p>	<ol style="list-style-type: none"> 1. Review engineer and architecture scales. 2. Explain the process that blueprints are submitted to city building department for approvals and changes. 3. Differentiate between architectural and structural plans. 4. Provide each student an ANSI A scale set of plans. 5. Identify and define various parts of a set of plans. 6. Explain each part of the plans that the trades would use. 7. Explain how to cross reference various parts of plans. 8. Discuss the extreme importance in the notes. 9. Demonstrate the process to calculate and find dimensions on plans. 10. Pass math test based on student's copy of plans. 11. Pass test on details from plans. 12. Draw a set of plans from a class structure. 	<p>Career Ready Practice: 1, 3, 5, 11</p> <p>CTE Anchor: Communication: 2.3, 2.4, Problem Solving and Critical Thinking: 5.3, 5.4 Responsibility and Flexibility: 7.5 Technical Knowledge and Skills: 10.1</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(15 hours)		CTE Pathway: D1.1, D3.1, D3.2, D3.4, D3.5, D3.6, D5.2, D5
<p>H. TYPICAL HAND TOOLS</p> <p>Identify hand tools, their purpose, the trades that use them and demonstrate their safe operations. (This list is a good set to own)</p> <p><i>This section contains the following MC3 Topics:</i></p> <p><i>Tools and Materials: Hands-on Training</i></p>	<p>Identify and describe:</p> <ol style="list-style-type: none"> 1. 2-25' x 1" measuring tape 2. # 2 flat/straight blade screw driver 3. # 2 Philip screw driver 4. 10" adjustable wrench 5. Channel lock pliers (12") 6. Pipe wrench (14") 7. Framing and finish hammer 8. Lineman pliers (10") 9. 1" wood chisel 10. Metal/masonry chisel 11. Cat's paw nail puller 12. Flat pry bar 13. 2-Quick change utility knife 14. Vice grips (8-10") 15. Files (4 in 1) 16. Rat tail file 17. LED flashlight 18. Torpedo level 19. Speed chalk line 20. Yellow aviation tin snips 21. Solid wire strippers (10 to 18 gauge) 22. Needle nose pliers 23. 1" wheeled tube/pipe cutter 24. Fish tape 25. 24"/48" level 26. 5 in 1 scrapper 27. 2" flex putty knife 28. 6" broad knife. 29. 2" sash paint brush 30. Caulk gun 31. Propane/MAPP Torch 32. Hammer stapler 33. Plumb bob 34. Glass cutter 35. Small can WD-40 36. 5-carpenter's pencils 37. 3-Sharpies 38. Pen knife style set of hex/Allen wrenches 39. 1 1/2" x 6 margin trowel 40. 1/2" and 5/8" thread chaser 41. 20" tool bag/belt 42. Various masonry/ concrete tools 43. Various plumbing tools 44. Various electrical tools 45. Various painting/taping tools 	<p>Career Ready Practice: 1, 3</p> <p>CTE Anchor: Communication: 2.1, 2.2, 2.3 Health and Safety: 6.3, 6.6, 6.12 Technical Knowledge and Skills: 10.1, 10.5</p> <p>CTE Pathway: D1.1</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(3 hours)	46. Various roofing tools 47. Various HVAC tools 48. Various carpentry/drywall tools 49. Brooms & dustpans 50. Digging tools/shovels 51. Hand mauls, mattock/pick etc. 52. Crow bars/wrecking/digging bars 53. Counter brush and rags 54. 25' 14 gauge extension cord	
<p>I. COMMON POWER TOOLS</p> <p>Identify power tools, their purpose, the trades that use them and demonstrate their safe operations.</p> <p><i>This section contains the following MC3 Topics:</i></p> <p><i>Tools and Materials: Hands-on Training</i></p> <p>(3 hours)</p>	<p>Identify and describe:</p> <ol style="list-style-type: none"> 1. Battery screw gun 2. Power screw gun (discuss tips) 3. Worm drive Skil-Saw (discuss blades) 4. Saw-Zall (discuss blades) 5. 4 ½"/ 7"/9" angle grinder (discuss blades) 6. Belt sander (discuss sizes and belts) 7. Power drills (discuss sizes) 8. Power planners 9. Roto-hammer drills (discuss shank formats) 10. Electric jack hammer 11. Cut off saw 12. Portable table saw 13. Compound miter saw 14. Bench grinders 15. Compressors 16. Framing, finish and roofing nail guns 17. Power snakes 18. Pipe threaders 19. Laser level 20. Pressure washer/sand blaster 21. Paint spray rig/airless 22. Pass hand and power tool test 	<p>Career Ready Practice: 1, 3</p> <p>CTE Anchor: Communication: 2.1, 2.2, 2.3 Health and Safety: 6.3, 6.6, 6.12 Technical Knowledge and Skills: 10.1, 10.5</p> <p>CTE Pathway: D1.1</p>
<p>J. BUILDING CODES & GREEN CODES.</p> <p>Explore the fascinating world of building and green codes</p> <p><i>This section contains the following MC3 Topics:</i></p> <p><i>Green Construction</i></p>	<ol style="list-style-type: none"> 1. Explain the International Code Council (ICC) which puts out their code books-International Building code (IBC)-commercial buildings and apartments of 4 or more units, and the International Residential Code (IRC) covers all areas of residential building under 4 units. 2. Describe the manner that city codes are made from the ICC, IBC and IRC codes and which code has final authority. 3. Discuss Green codes, LEED programs and <u>State Title 24</u>. 4. Delve into OSHA/ CAL-OSHA construction codes. 5. Explain <u>Federal ADA Handicap Title 24</u> Disability Act. 6. Explain the National Electric Code (NEC), International & Uniform Plumbing Codes (ICC-IPC, UPC), and the International & Uniform Mechanical Codes (ICC-IMC, UMC). 	<p>Career Ready Practice: 1, 3, 4, 5, 6, 8, 10, 11, 12</p> <p>CTE Anchor: Communication: 2.1, 2.4 Career Planning and Management: 3.6 Technology: 4.1, 4.2</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(7 hours)		Problem Solving and Critical Thinking: 5.1, 5.3, 5.4 Health and Safety: 6.7, 6.11 Responsibility and Flexibility: 7.3, 7.8 Ethics and Legal Responsibilities: 8.1, 8.2, 8.3, 8.5 Leadership and Teamwork: 9.4, 9.5 Technical Knowledge and Skills: 10.1, 10.2, 10.4 CTE Pathway: D1.1, D1.2, D1.3, D9.1, D9.2, D9.3, D9.4
K. CONCRETE & MASONRY FUNDAMENTALS Obtain knowledge about the basic principles of concrete and block masonry. <i>This section contains the following MC3 Topics:</i> <i>Trade math, safeties and proper use of tools are covered in this section</i>	<ol style="list-style-type: none"> 1. Introduce the cement industry, job descriptions and pay duties. 2. Describe the masonry/concrete finishers union apprenticeship programs. 3. Discuss a brief history of concrete and masonry. 4. Demonstrate the proper techniques on building a small block wall. 5. Demonstrate the proper techniques of a small pour using different tools 6. Cover the basics on concrete/masonry codes 7. Cover estimating costs in the concrete industry. 8. Discuss codes and its application of reinforcement. 9. Explain finishing techniques. 10. Review and test. 	Career Ready Practice: 1, 3, 7 CTE Anchor: Communication: 2.3 Career Planning and Management: 3.4, 3.6, 3.9 Problem Solving and Critical Thinking: 5.3 Health and Safety: 6.1, 6.3, 6.4, 6.6, 6.12 Responsibility and Flexibility: 7.3, 7.7 Ethics and Legal Responsibilities: 8.3 Leadership and Teamwork: 9.4, 9.7

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(3 hours)		Technical Knowledge and Skills: 10.1, 10.2, 10.3, 10.5 CTE Pathway: D1.1, D1.2, D2.1, D2.3, D3.2, D4.1, D4.2, D4.3, D4.4, D4.5, D4.6, D5.1, D5.2, D5.3, D5.4, D5.5, D5.7, D5.8, D5.10
L. BASIC FRAMING Delve into framing and hardware essentials. <i>This section contains the following MC3 Topics:</i> <i>Trade math, safeties and proper use of tools are covered in this section</i>	<ol style="list-style-type: none"> 1. Explain the framing industry including related job descriptions and their pay. 2. Cover the carpenters union apprenticeship programs. 3. Discuss the brief history of wood framing and framing tools. 4. Cover basic framing codes. 5. Cover simple framing estimating. 6. Build a small wood wall with a partial roof assembly. 7. Describe and build a small metal wall. 8. Describe nails and framing hardware. 9. Review and test. 	Career Ready Practice: 1, 3, 7 CTE Anchor: Communication: 2.3 Career Planning and Management: 3.4, 3.6, 3.9 Problem Solving and Critical Thinking: 5.3 Health and Safety: 6.1, 6.3, 6.4, 6.6, 6.12 Responsibility and Flexibility: 7.3, 7.7 Ethics and Legal Responsibilities: 8.3 Leadership and Teamwork: 9.4, 9.7 Technical Knowledge and Skills: 10.1, 10.2, 10.3, 10.5 CTE Pathway: D1.1, D1.2, D2.1, D2.2, D2.3, D3.1, D3.2, D3.5, D3.7,

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(3 hours)		D4.1, D5.4, D6.2, D6.3, D6.5, D6.6, D6.7, D6.8, D6.9
<p>M. PLUMBING FUNDAMENTALS</p> <p>Covers 4 sections of basic plumbing</p> <p><i>This section contains the following MC3 Topics:</i></p> <p><i>Trade math, safeties and proper use of tools are covered in this section</i></p> <p>(3 hours)</p>	<ol style="list-style-type: none"> 1. Introduce the plumbing industry including job descriptions, duties, pay and related trades. 2. Cover the basics on the plumbers/fitters/fire sprinkler apprenticeship programs. 3. Explain four (4) major sections of plumbing. 4. Demonstrate the proper technique in threading a pipe. 5. Demonstrate sweating a fitting using soft solder. 6. Discuss the basics to plumbing codes IPC/UPC. 7. Review and test. 	<p>Career Ready Practice: 1, 3, 7</p> <p>CTE Anchor: Communication: 2.3 Career Planning and Management: 3.4, 3.6, 3.9 Problem Solving and Critical Thinking: 5.3 Health and Safety: 6.1, 6.3, 6.4, 6.6, 6.12 Responsibility and Flexibility: 7.3, 7.7 Ethics and Legal Responsibilities: 8.3 Leadership and Teamwork: 9.4, 9.7 Technical Knowledge and Skills: 10.1, 10.2, 10.3, 10.5</p> <p>CTE Pathway: D1.1, D2.2, D2.3, D2.4, D2.5, D2.6, D2.7, D3.4, D3.7, D4.1, D10.1, D10.6</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
<p>N. ELECTRICAL & LIGHTING FUNDAMENTALS</p> <p>Explore the basis of electricity working for us in our buildings.</p> <p><i>This section contains the following MC3 Topics:</i></p> <p><i>Trade math, safeties and proper use of tools are covered in this section</i></p> <p>(3 hours)</p>	<ol style="list-style-type: none"> 1. Describe the Electrical industry including job descriptions, pay and duties. 2. Cover the basics of the electrical union apprenticeship program. 3. Discuss a brief history of electrical usage and changes in the industry. 4. Discuss the development of NEC. 5. Demonstrate wiring an outlet, a switch and light, and the three (3) way setup. 6. Identify and describe the safe use of electrical tools. 7. Review and test. 	<p>Career Ready Practice: 1, 3, 7</p> <p>CTE Anchor: Communication: 2.3 Career Planning and Management: 3.4, 3.6, 3.9 Problem Solving and Critical Thinking: 5.3 Health and Safety: 6.1, 6.3, 6.4, 6.6, 6.12 Responsibility and Flexibility: 7.3, 7.7 Ethics and Legal Responsibilities: 8.3 Leadership and Teamwork: 9.4, 9.7 Technical Knowledge and Skills: 10.1, 10.2, 10.3, 10.5</p> <p>CTE Pathway: D1.1, D2.3, D2.8, D2.9, D3.4, D3.7, D11.1, D11.9, D11.7, D11.10</p>
<p>O. INTRODUCTION TO HEATING, VENTILATION & AIR CONDITIONING (HVAC)</p> <p>Realize the world of human controlled interior environment, and how we get there.</p> <p><i>This section contains the following MC3 Topics:</i></p>	<ol style="list-style-type: none"> 1. Explain the HVAC industry including job descriptions and pay scale. 2. Cover the basics on HVAC union apprenticeship program. 3. Explain the refrigeration cycle. 4. Discuss the brief history of heating and air conditioning. 5. Cover the basics of job specific tools. 6. Demonstrate an operating small window A/C unit. 7. Identify the components and parts of small window A/C unit. 8. Demonstrate cutting a tube, flaring and hard soldering. 9. Review basic mechanical codes IMC/UMC. 10. Review and test. 	<p>Career Ready Practice: 1, 3, 4, 7</p> <p>CTE Anchor: Communication: 2.3 Career Planning and Management: 3.4, 3.6, 3.9</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
<p><i>Trade math, safeties and proper use of tools are covered in this section</i></p> <p>(3 hours)</p>		<p>Problem Solving and Critical Thinking: 5.3</p> <p>Health and Safety: 6.1, 6.3, 6.4, 6.6, 6.12</p> <p>Responsibility and Flexibility: 7.3, 7.7</p> <p>Ethics and Legal Responsibilities: 8.3</p> <p>Leadership and Teamwork: 9.4, 9.7</p> <p>Technical Knowledge and Skills: 10.1, 10.2, 10.3, 10.5</p> <p>CTE Pathway: D1.1, D1.2, D2.1, D2.3, D3.4, D3.5, D3.7, D4.1, D9.1, D9.2, D10.1</p>
<p>P. DOORS, WINDOWS & FINISH CARPENTRY FUNDAMENTALS</p> <p>Conceptualize the basis for openings and the finish touches that make them so pleasant.</p> <p><i>This section contains the following MC3 Topics:</i></p> <p><i>Trade math, safeties and proper use of tools are covered in this section</i></p>	<ol style="list-style-type: none"> 1. Discuss different trades that install doors, windows, and does the finish trim, job descriptions and pay. 2. Cover those union apprenticeship programs and for those interested make application to get in. 3. Explain the codes for light (windows)/ventilation, ingress and egress. 4. Review title 24 energy code. 5. Identify different style of window and doors. 6. Explain and demonstrate how to install window and door. 7. Review and test. 	<p>Career Ready Practice: 1, 3, 7</p> <p>CTE Anchor: Communication: 2.3</p> <p>Career Planning and Management: 3.4, 3.6, 3.9</p> <p>Problem Solving and Critical Thinking: 5.3</p> <p>Health and Safety: 6.1, 6.3, 6.4, 6.6, 6.12</p> <p>Responsibility and Flexibility: 7.3, 7.7</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(3 hours)		Ethics and Legal Responsibilities: 8.3 Leadership and Teamwork: 9.4, 9.7 Technical Knowledge and Skills: 10.1, 10.2, 10.3, 10.5 CTE Pathway: D1.1, D1.2, D2.1, D2.3, D3.2, D3.5, D3.6, D3.7, D4.2, D7.7, D7.8, D8.6, D8.7
<p>Q. BASIC DRYWALL & STUCCO</p> <p>Covers relevant codes and techniques for wall coverings. Interior and exterior.</p> <p><i>This section contains the following MC3 Topics:</i></p> <p><i>Trade math, safeties and proper use of tools are covered in this section</i></p>	<ol style="list-style-type: none"> 1. Identify the different unions covering the drywall & plastering trades. 2. Explain the history and future of the wall covering industry. 3. Cover basic wall covering codes. 4. Demonstrate the correct techniques to drywall, taping and finishing. 5. Explain the importance of “fire ratings”. 6. Demonstrate waterproofing, wire netting and the three (3) coats of stucco. 7. Review and test. 	<p>Career Ready Practice: 1, 3, 7</p> <p>CTE Anchor: Communication: 2.3 Career Planning and Management: 3.4, 3.6, 3.9 Problem Solving and Critical Thinking: 5.3 Health and Safety: 6.1, 6.3, 6.4, 6.6, 6.12 Responsibility and Flexibility: 7.3, 7.7 Ethics and Legal Responsibilities: 8.3 Leadership and Teamwork: 9.4, 9.7 Technical Knowledge and Skills: 10.1, 10.2, 10.3, 10.5</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(3 hours)		CTE Pathway: D1.1, D2.1, D2.3, D3.2, D3.6, D3.7, D4.1, D7.1, D7.2, D7.3, D7.5, D8.1
<p>R. BEGINNING PAINTING: RESIDENTIAL, COMMERCIAL & INDUSTRIAL.</p> <p>Cover fundamentals of paint technology, trade understandings of applications and tools.</p> <p><i>This section contains the following MC3 Topics:</i></p> <p><i>Trade math, safeties and proper use of tools are covered in this section</i></p> <p>(3 hours)</p>	<ol style="list-style-type: none"> 1. Overview the history the paint and industrial coatings. 2. Explain the careers, duties and pay scale in the industry. 3. Cover the various finishing trades' union apprenticeship programs. 4. Explain the purpose of surface preparation. 5. Explain the various types of paints and coatings commonly used. 6. Discuss trade tools and equipment. 7. Estimate cost of material cost and labor of a specific job. 8. Demonstrate painting with roller and airless sprayer. 9. Review and test. 	<p>Career Ready Practice: 1, 3, 7</p> <p>CTE Anchor: Communication: 2.3</p> <p>Career Planning and Management: 3.4, 3.6, 3.9</p> <p>Problem Solving and Critical Thinking: 5.3</p> <p>Health and Safety: 6.1, 6.3, 6.4, 6.6, 6.12</p> <p>Responsibility and Flexibility: 7.3, 7.7</p> <p>Ethics and Legal Responsibilities: 8.3</p> <p>Leadership and Teamwork: 9.4, 9.7</p> <p>Technical Knowledge and Skills: 10.1, 10.2, 10.3, 10.5</p> <p>CTE Pathway: D1.1, D1.2, D2.1, D2.3, D3.2, D8.4, D8.5</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
<p>S. BASIC ROOF COVERING & DESIGN</p> <p>Covers a hole in your roof or a whole new roof.</p> <p><i>This section contains the following MC3 Topics:</i></p> <p><i>Trade math, safeties and proper use of tools are covered in this section</i></p> <p>(3 hours)</p>	<ol style="list-style-type: none"> 1. Overview the history of the roofing industry. 2. Explain the careers, job duties and pay scale of the roofing industry 3. Cover the basics of the roofer’s apprenticeship program. 4. Demonstrate applying torch down, asphalt shingles to a shed roof. 5. Demonstrate finding and repairing holes. 6. Estimate material and labor in the roofing industry. 7. Discuss sheet metal use in roofing. 8. Review the codes related to roofing. 9. Review and test. 	<p>Career Ready Practice: 1, 3, 5, 6, 7</p> <p>CTE Anchor: Communication: 2.3 Career Planning and Management: 3.4, 3.6, 3.9 Problem Solving and Critical Thinking: 5.3 Health and Safety: 6.1, 6.3, 6.4, 6.6, 6.12 Responsibility and Flexibility: 7.3, 7.7 Ethics and Legal Responsibilities: 8.3 Leadership and Teamwork: 9.4, 9.7 Technical Knowledge and Skills: 10.1, 10.2, 10.3, 10.5</p> <p>CTE Pathway: D1.1, D1.2, D2.1, D2.2, D2.3, D3.2, D3.7, D4.1, D6.15, D6.16</p>
<p>T. INTRODUCTION TO FLOORING & TILING</p> <p>Get down into the world of flooring, and while you’re there take a look around to a world of tiling.</p> <p><i>This section contains the following MC3 Topics:</i></p>	<ol style="list-style-type: none"> 1. Overview the history of flooring and tiling industry. 2. Explain the careers, job duties and pay scale in the flooring industry. 3. Discuss the flooring and tiling union apprenticeship programs. 4. Demonstrate the proper techniques to tiling and flooring. 5. Explain the idea of justification and estimating cost. 6. Review and test. 	<p>Career Ready Practice: 1, 3, 7</p> <p>CTE Anchor: Communication: 2.3 Career Planning and Management: 3.4, 3.6, 3.9</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
<p><i>Trade math, safeties and proper use of tools are covered in this section</i></p> <p>(3 hours)</p>		<p>Problem Solving and Critical Thinking: 5.3</p> <p>Health and Safety: 6.1, 6.3, 6.4, 6.6, 6.12</p> <p>Responsibility and Flexibility: 7.3, 7.7</p> <p>Ethics and Legal Responsibilities: 8.3</p> <p>Leadership and Teamwork: 9.4, 9.7</p> <p>Technical Knowledge and Skills: 10.1, 10.2, 10.3, 10.5</p> <p>CTE Pathway: D1.1, D2.1, D2.2, D2.3, D3.2, D4.1</p>
<p>U. JOB READINESS/SOFT SKILLS</p> <p>This course reviews essential interpersonal skills for the construction workplace.</p> <p>(10 hours)</p>	<ol style="list-style-type: none"> 1. Discuss the current state of the construction industry including topics on labor unions, public projects, commercial projects, and residential projects. 2. Discuss and practice interview preparation, completing an application, resume, communication skills and professionalism. 	<p>Career Ready Practice: 2, 3</p> <p>CTE Anchor: Communication: 2.3, 2.5 Career Planning and Management: 3.1, 3.2, 3.3, 3.4</p> <p>CTE Pathway: D1.1</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
<p>V. TRADE MATH PRACTICE</p> <p>Apply, and evaluate the mathematical requirements used in Construction.</p> <p>(80 hours*)</p>	<ol style="list-style-type: none"> 1. Demonstrate problem-solving techniques involving whole number problems, using addition, subtraction, multiplication, and division. 2. Demonstrate problem-solving techniques involving various fraction problems, using arithmetic operations (addition, subtraction, multiplication, and division). 3. Demonstrate problem-solving techniques involving various decimal problems, using arithmetic operations. 4. Demonstrate techniques for changing fractions to decimals. 5. Demonstrate techniques for changing decimals to fractions. 6. Demonstrate problem-solving techniques for various English system measuring problems, using arithmetic operations. 7. Practice taking math job entry exams. 	<p>Career Ready Practice: 1, 5</p> <p>CTE Anchor: Communication: 2.1, 2.2, 2.3 Problem Solving and Critical Thinking: 5.4</p> <p>CTE Pathway: D2.1, D2.2, D2.3</p>

SUGGESTED INSTRUCTIONAL MATERIALS and OTHER RESOURCES

TEXTS AND SUPPLEMENTAL BOOKS

Brown, Walter C. Blueprint Reading for Construction. South Holland, IL; Goodheart-Wilcox Co., 1997.

F.P. Hartwell, W.C. Schwan, H.P. Richter, Wiring Simplified 45th ed 2017.

STAFF Home Improvement 123, 3rd Edition Home Repair.

Massey, Howard. Basic Plumbing with Illustrations. Carlsbad, CA; Craftsman Book Co., 1994.

Wagner, Willis. Modern Carpentry: Building Construction Details in Easy-to-Understand Forms. Goodheart-Wilcox Co., 2003.

ICC & NEC Guide Books.

MEDIA AND TECHNOLOGY

Brown, Walter C. and Daniel P. Dorfmueller. Instructor's Powerpoint Presentations: Print Reading for Construction. CD-ROM edition. Goodheart-Wilcox Co., 2000.

The following videos are available from Hometime Series, 6200 Bury Drive, Edenprairie, MN. 55344: Framing.

Bathrooms

Ceramic Tile

Dry Wall

Fences and Gates

Windows and Doors

Plumbing

Roofing

Siding

Exterior Painting

Exterior Siding

RESOURCES

North America's Building Trade Unions Official Website:

www.nabtu.org

Multi-Craft Core Curriculum (MC3)

www.choiceworks.org/Members-and-Apprenticeship/Multi-Craft-Core-Curriculum-and-Pre-Apprenticeship

Employer Advisory Board members

CTE Model Curriculum Standards

<http://www.cde.ca.gov/ci/ct/sf/documents/buildingconstruct.pdf>

California Building Standards Commission www.bsc.ca.gov/default.htm

Green Building Advisor.com greenbuildingadvisor.com

The Daily Green thedailygreen.com

COMPETENCY CHECKLIST

TEACHING STRATEGIES and EVALUATION

METHODS AND PROCEDURES

- A. Lecture and discussion
- B. Guest lecturers
- C. Multimedia presentations
- D. Visual aids
- E. Projects
- F. Individualized instruction
- G. Field trip to apprenticeship training centers

EVALUATION

SECTION A – Orientation and Classroom Safety – Pass all assignments and exams on introduction with a minimum score of 80% or higher.

SECTION B – OSHA-10 (Construction) – Pass all assignments and exams on basic safety in the construction industry with a minimum score of 80% or higher.

SECTION C – First Aid/CPR/AED – Pass all exams and practical assessments on first aid, CPR and AED with a minimum score of 80% or higher.

SECTION D – Heritage of the American Worker – Pass all assignments and exams in heritage of the American worker with a minimum score of 80% or higher.

SECTION E – Trade Math, Measurements & Measuring Tape – Pass all assignments and exams on math, measurement and measuring tape with a minimum score of 80% or higher.

SECTION F – Apprenticeship Preparation – Pass all assignments and exams on apprenticeship preparation with a minimum score of 80% or higher.

SECTION G – Basic Blueprint, Math and Estimating – Pass all assignments and exams on basic blue print, math and estimating with a minimum score of 80% or higher.

SECTION H – Typical Hand Tools – Pass all assignments and exams on hand tools with a minimum score of 80% or higher.

SECTION I – Common Power Tools – Pass all assignments and exams on common power tools with a minimum score of 80% or higher.

SECTION J – Building Codes & Green Codes – Pass all assignments and exams on building and green codes with a minimum score of 80% or higher.

SECTION K – Concrete & Masonry – Pass all assignments and exams on concrete and masonry with a minimum score of 80% or higher.

SECTION L – Basic Framing – Pass all assignments and exams on basic framing with a minimum score of 80% or higher.

SECTION M – Plumbing Fundamentals – Pass all assignments and exams on plumbing fundamentals with a minimum score of 80% or higher.

SECTION N – Electrical & Lighting Fundamentals – Pass all assignments and exams on electrical and lighting fundamentals with a minimum score of 80% or higher.

SECTION O – Heating, Ventilation & Air Conditioning – Pass all assignments and exams on heating, ventilation and air conditioning with a minimum score of 80% or higher.

SECTION P – Doors, Windows & Finish Carpentry – Pass all assignments and exams on doors, windows and finish carpentry with a minimum score of 80% or higher.

SECTION Q – Drywall Finishing (Taping) – Pass all assignments and exams on drywall finishing with a minimum score of 80% or higher.

SECTION R – Painting: Residential, Commercial & Industrial – Pass all assignments and exams on painting with a minimum score of 80% or higher.

SECTION S – Roof Covering & Design – Pass all assignments and exams on roof covering and design with a minimum score of 80% or higher.

SECTION T – Flooring & Tiling – Pass all assignments and exams on floor and tiling with a minimum score of 80% or higher.

SECTION U – Job Readiness and Soft Skills – Pass all assignments and projects in job readiness and soft skills with a minimum score of 80% or higher.

SECTION V – Trade Math Practical – Practice test preparation for job entry exams. No competency for this section.

Statement for Civil Rights

All educational and vocational opportunities are offered without regard to race, color, national origin, gender, or physical disability.
