



Prepares Students for College AND Careers

▲ Construction Technology I

COURSE CODES:

▲ ROP 69010 ▲ WUHSD 8039 ▲ ERUSD AT510 ▲ State (CALPADS) 7341

Industry Sector: Building and Construction Trades
Career Pathway: Residential and Commercial Construction - 123

Course Leads to: Post-Secondary Education

Course Level: Concentrator

Classroom Hours: 180
Work Based Learning: 180 (optional)

Approved Textbook/Curriculum: None

| POST-SECONDARY EDUCATION | INDUSTRY CERTIFICATIONS | EMPLOYMENT |
|---|--------------------------------|---|
| Articulation with College No Dual Enrollment with College No UC Approved a-g elective credit No | None | Related Careers (O*NET) |
| COLLEGE MAJORS | NEXT STEPS | 47-1011.00 First-Line Supervisors of Construction Trades and Extraction Workers |
| Carpentry Civil Engineering Construction Management Construction Technology Construction Managers Industrial Machinery Repairers Architecture Drafting and Design Technology Engineering Technology | ROP Construction Technology II | 11-9021.00 Construction Managers |
| | | 47-4011.00 Construction and Building Inspectors |
| | | 47-2031.01 Construction Carpenters |
| | | 17-2071.00 Electrical Engineers |
| | | 17-3012.02 Electrical Drafters |

Prerequisites:

None

Course Description:

Construction Technology I provides instruction and training in construction and construction-related occupations, including construction, remodeling, and maintenance and repair of buildings and structures. Instructional and practical experience includes blueprint reading, basic plumbing, electrical, masonry, concrete, flooring, drywall, carpentry, insulation, exterior design, and roofing. Course instruction also includes the safe use of hand and power tools, installation of plumbing and electrical fixtures, the use of squaring and leveling tools, and safety and job-readiness training for entrance into the construction and construction-related occupations.

Integrated throughout the course are standards for Career Ready Practice and Academic Content Standards which include: appropriate technical skills and academic knowledge; communication skills; career planning; applied technology; critical thinking and problem solving; personal health and financial literacy; citizenship, integrity, ethical leadership and effective management; work productively while integrating cultural and global competence; creativity and innovation; reliable research strategies, and environment, social and economic impacts of decisions.

COURSE OUTLINE

I. ORIENTATION

- A. Introduce course and facilities
- B. Discuss syllabus and major objectives
- C. Explain attendance, grading, classroom procedures, code of conduct
- D. Complete course safety requirements/test

II. CAREERS IN BUILDING AND CONSTRUCTION

- A. Research and report on the specialized occupations within the Building and Construction Technology industry
- B. Identify the steps in the hiring process from application to employment
- C. List the eligibility requirements for various building and construction technology positions
- D. Explain the impact of pre-employment activities on employability (e.g., financial irresponsibility criminal record, improper social media behavior, etc.)
- E. Identify the reasons for disqualification
- F. Describe the physical fitness requirements and the impact of nutrition and a healthy lifestyle on employability/job performance

III. PREPARING FOR COLLEGE AND CAREERS

- A. Review and Discuss California CTE Model Curriculum Standards for Career Ready Practice
- B. Create an Education Plan and a Career Plan aligned with personal goals
- C. Create a Resumé
- D. Create a Career Portfolio
- E. Complete a handwritten/hand-printed Job Application neatly, legibly and with no corrections or mistakes
- F. Practice a professional job interview
- G. Evening of Excellence Essay

IV. HISTORY OF BUILDING AND CONSTRUCTION TRADES

- A. Identify trends in the construction industry
- B. Explain the roles of contractors, sub-contractors, and labor unions within the industry
- C. Discuss environmentally-sound practices and sustainability within the industry sector

V. REGULATIONS AND SUSTAINABILITY

- A. Analyze the Americans with Disabilities Act and how it affects the construction industry
- B. Understand building codes and zoning ordinances
- C. Identify sustainable building certification systems
- D. Identify sustainable development and construction practices

VI. CONSTRUCTION MATH

- A. Accurately measure using industry tools
- B. Accurately compute linear, square, and board feet
- C. Use 3-4-5 method to layout interior partitions and the perimeter of a building slab
- D. Add, subtract, multiply, and divide fractions
- E. Accurately convert between fractions, decimals, and percentages

VII. CONSTRUCTION MATERIALS

- A. Identify and demonstrate safe and correct use of various construction materials such as nails, screws, fasteners, staples, and adhesives
- B. Understand requirements of galvanized fasteners for pressure treated materials
- C. Explain the effects of moisture to galvanized and pressure treated materials

VIII. WOOD

- A. Identify and differentiate between various grades and types of wood, engineered wood products, and other alternatives
- B. Correctly identify and understand wood grading stamps
- C. Be able to select the appropriate plywood, soft wood, hard wood for various construction jobs
- D. Judge the characteristics and imperfections of various types of woods
- E. Understand the positive aspects and negative consequences of treating wood for termites, moisture, and fire

COURSE OUTLINE

- F. Identify standard lumber sizes
- G. Estimate lumber material costs
- H. Understand proper handling and care of wood on the jobsite

IX. HAND TOOLS

- A. Demonstrate the proper and safe use of measuring instruments, including measuring tapes, levels, squares, and architect's scales
- B. Demonstrate the proper maintenance of tools
- C. Understand the difference in cost vs. quality of hand tools

X. POWER TOOLS

- A. Describe the special safety precautions necessary in the use of power tools
- B. Correctly identify and safely use and maintain various power tools used in the building and trades industry sector
- C. Understand the difference in cost vs. quality of power tools

XI. BLUEPRINTS AND SCHEMATICS

- A. Read and interpret plans and blueprint drawings
- B. Read and interpret written specifications
- C. Use an architect's scale to measure scale drawings
- D. Correctly identify lines, symbols, and abbreviations used on blueprints
- E. Create and interpret multi-view drawings
- F. Interpret a finish schedule

XII. INTRODUCTION TO FRAMING

- A. Understand and analyze codes and ordinances and their effects on the design of light frame buildings
- B. Understand proper framing terminology
- C. Identify the methods used to construct light frame buildings
- D. Describe the importance of careful and correct framing
- E. Describe structural design concepts

XIII. FLOOR FRAMING

- A. Describe and be able to demonstrate the application and installation of sub-flooring
- B. Compare and contrast different framing systems
- C. Demonstrate various industry standard steps and processes in floor framing and construction
- D. Identify materials needed and estimate costs for specific jobs

XIV. WALL FRAMING

- A. Demonstrate competency in lay out of walls, studs, headers, cripples, and frames
- B. Define exterior walls and describe the process for their construction
- C. Understand how to frame window openings
- D. Explain the use of bracings
- E. Describe the importance of fire stops and fire caulking
- F. Correctly layout doors, window openings, fire-blocks, and diagonal braces
- G. Estimate time and materials costs
- H. Describe fire ratings for walls

XV. ROOF FRAMING

- A. Demonstrate safety practices associated with roofing including safe climbing procedures
- B. Demonstrate proper and safe use and maintenance of framing tools used in the industry
- C. Develop a materials list according to specifications
- D. Understand vocabulary and terminology common in roofing
- E. Illustrate roof designs and explain their functions
- F. Differentiate between rafters and trusses
- G. Read and interpret blueprints and building codes
- H. Identify and evaluate common roofing materials
- I. Determine appropriate underlay for roof coverings using specifications
- J. Determine common ventilation requirements and locations

COURSE OUTLINE

- K. Calculate correct overhang, mark, and cut
- L. Perform basic roof repairs

XVI. SITE PREPARATION

- A. Lay out a simple building
- B. Describe steps in preparing the site and identify common ground hazards
- C. Read a blueprint and interpret site requirements
- D. Describe the types of heavy and light equipment commonly used in site preparation and discuss related safety issues
- E. Using plans and measuring equipment, square the building on site
- F. Explain notification procedures for underground alert

XVII. ELECTRICAL

- A. Describe an electrical current and the difference between AC and DC current
- B. Explain secure grounding using GFCI requirements
- C. Identify electrical design concepts
- D. Understand proper safety procedures when working around electrical sources
- E. Identify and explain installation of various media cabling, switches, and outlet boxes
- F. Understand the different sources of electrical power and how it is distributed

XVIII. DRYWALL AND INSULATION

- A. Understand codes and ratings for installation of drywall
- B. Measure and cut accurately
- C. Tape, mud, and prep for finishes
- D. Install corner beads
- E. Identify appropriate types of insulation for various applications in the design of a building
- F. Practice safe handling of insulation including the use of gloves, long sleeves, face mask, and eye protection
- G. Use proper installation techniques for rolled or blown insulation
- H. Practice air-tight door hanging
- I. Apply safe and proper techniques for door and window insulation
- J. Discuss heat transfer and how insulation can be used to control it
- K. Describe problems caused by moisture penetrating the insulation

XIX. PAINTING

- A. Identify the air quality regulations as they apply to solvents in coatings
- B. Understand the proper disposal of paint
- C. Properly tape and prep surfaces for painting
- D. Distinguish the difference between interior and exterior paint
- E. Understand different finishes and the proper tools used to achieve them

XX. PLUMBING

- A. Compare and contrast pressurized and non-pressurized liquid flow
- B. Assess assorted plumbing materials common in the plumbing industry
- C. Differentiate assorted faucet types, toilet types, sink and tub types, and related installations and repairs
- D. Implement safe and proper drain cleaning techniques
- E. Identify common hazards and safety issues related to plumbing
- F. Demonstrate proper use and maintenance of common plumbing tools and materials

XXI. MASONRY

- A. Read and interpret safety codes and guidelines for safe use of scaffolds and mortar mixer
- B. Demonstrate proper use and care of masonry tools
- C. Mix and pour concrete slab using proper finishing techniques
- D. Mix and apply grouting
- E. Describe and demonstrate safe and proper replacement and repair of concrete slabs, framing, and finishing
- F. Describe and demonstrate safe and proper repair of drywall and plaster walls

XXII. HEATING AND AIR CONDITIONING (HVAC)

- A. Identify and understand the major components of an HVAC system

COURSE OUTLINE

- B. Correctly evaluate the operation of blower motors and thermostatic controls
- C. Diagnose simple HVAC component malfunction
- D. Determine safe and correct HVAC component repair and replacement procedures

XXIII. SOLAR TECHNOLOGY

- A. Explain the difference in the various current methods of solar systems including active and passive systems
- B. Read a sun chart
- C. Compare and contrast the advantages and disadvantages of PV system configurations
- D. Identify various forms of energy
- E. Determine the location of the sun to a particular building throughout the year
- F. Discuss and understand current issues and trends related to solar technology

PROJECT-BASED LEARNING

(NAME OF PROJECT) (PRESENTATION ON...)

- A. Research
- B. Outline
- C. First Draft
- D. Final Draft
- E. Presentation

ESSENTIAL STANDARDS AND KEY ASSIGNMENTS INDUSTRY SECTOR: Building & Construction Trades

ESSENTIAL PATHWAY STANDARD - A1.0

KEY ASSIGNMENT

ESSENTIAL PATHWAY STANDARD - A2.0

KEY ASSIGNMENT

ESSENTIAL PATHWAY STANDARD – A3.0

KEY ASSIGNMENT

ESSENTIAL PATHWAY STANDARD – A4.0

KEY ASSIGNMENT

ESSENTIAL PATHWAY STANDARDS – A5.0

KEY ASSIGNMENT

STANDARDS FOR CAREER READY PRACTICE

1. Apply appropriate technical skills and academic knowledge. Career-ready individuals readily access and use the knowledge and skills acquired through experience and education. They make connections between abstract concepts with real-world applications and recognize the value of academic preparation for solving problems, communicating with others, calculating measures, and performing other work-related practices.

2. Communicate clearly, effectively, and with reason. Career-ready individuals communicate thoughts, ideas, and action plans with clarity, using written, verbal, electronic, and/or visual methods. They are skilled at interacting with others: they are active listeners who speak clearly and with purpose, and they are comfortable with terminology that is common to workplace environments. Career-ready individuals consider the audience for their communication and prepare accordingly to ensure the desired outcome.

3. Develop an education and career plan aligned with personal goals. Career-ready individuals take personal ownership of their educational and career goals and manage their individual plan to attain these goals. They recognize the value of each step in the educational and experiential process, and they understand that nearly all career paths require ongoing education and experience to adapt to practices, procedures, and expectations of an ever-changing work environment. They seek counselors, mentors, and other experts to assist in the planning and execution of education and career plans.

4. Apply technology to enhance productivity. Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring and using new technology. They understand the inherent risks—personal and organizational—of technology applications, and they take actions to prevent or mitigate these risks.

5. Utilize critical thinking to make sense of problems and persevere in solving them. Career-ready individuals recognize problems in the workplace, understand the nature of the problems, and devise effective plans to solve the problems. They thoughtfully investigate the root cause of a problem prior to introducing solutions. They carefully consider options to solve a problem and, once agreed upon, follow through to ensure the problem is resolved.

6. Practice personal health and understand financial literacy. Career-ready individuals understand the relationship between personal health and workplace performance. They contribute to their personal well-being through a healthy diet, regular exercise, and mental health activities. Career-ready individuals also understand that financial literacy leads to a secure future that enables career success.

7. Act as a responsible citizen in the workplace and the community. Career-ready individuals understand the obligations and responsibilities of being a member of a community and demonstrate this understanding every day through their interactions with others. They are aware of the impacts of their decisions on others and the environment around them, and they think about the short-term and long-term consequences of their actions. They are reliable and consistent in going beyond minimum expectations and in participating in activities that serve the greater good.

8. Model integrity, ethical leadership, and effective management. Career-ready individuals consistently act in ways that align with personal and community-held ideals and principles. They employ ethical behaviors and actions that positively influence others. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the direction and actions of a team or organization, and they recognize the short-term and long-term effects that management's actions and attitudes can have on productivity, morale, and organizational culture.

9. Work productively in teams while integrating cultural and global competence. Career-ready individuals contribute positively to every team, as both team leaders and team members. To avoid barriers to productive and positive interaction, they apply an awareness of cultural differences. They interact effectively and sensitively with all members of the team and find ways to increase the engagement and contribution of other members.

10. Demonstrate creativity and innovation. Career-ready individuals recommend ideas that solve problems in new and different ways and contribute to the improvement of the organization. They consider unconventional ideas and suggestions by others as solutions to issues, tasks, or problems. They discern which ideas and suggestions may have the greatest value. They seek new methods, practices, and ideas from a variety of sources and apply those ideas to their own workplace practices.

11. Employ valid and reliable research strategies. Career-ready individuals employ research practices to plan and carry out investigations, create solutions, and keep abreast of the most current findings related to workplace environments and practices. They use a reliable research process to search for new information and confirm the validity of sources when considering the use and adoption of external information or practices.

12. Understand the environmental, social, and economic impacts of decisions. Career-ready individuals understand the interrelated nature of their actions and regularly make decisions that positively impact other people, organizations, the workplace, and the environment. They are aware of and utilize new technologies, understandings, procedures, and materials and adhere to regulations affecting the nature of their work. They are cognizant of impacts on the social condition, environment, workplace, and profitability of the organization.

CTE ANCHOR STANDARDS—Common Core English Language Arts Alignment

1: Academics

Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to postsecondary education and employment. Refer to the industry sector alignment matrix for identification of standards. Note: alignment listed within each sector Anchor Standard

2: Communications Language Standard

Acquire and accurately use general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the (career and college) readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression. LS 9-10, 11-12.6 Anchor Standard

3: Career Planning and Management Speaking and Listening Standard

Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. SLS 11-12.2 Anchor Standard

4: Technology Writing Standard

Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments and information. WS 11-12.6 Anchor Standard

5: Problem Solving and Critical Thinking Writing Standard

Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem, narrow or broaden the inquiry when appropriate, and synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. WS 11-12.7 Anchor Standard

6: Health and Safety Reading Standards for Science and Technical Subjects

Determine the meaning of symbols, key words, and other domain-specific words and phrases as they are used in a specific scientific or technical context. RSTS 9-10 11-12.4 Anchor Standard

7: Responsibility and Flexibility Speaking and Listening Standard

Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners, building on others' ideas and expressing their own clearly and persuasively. SLS 9-10 11-12.1 Anchor Standard

8: Ethics and Legal Responsibilities Speaking and Listening Standard

Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the work. SLS 11-12.1d Anchor Standard

9: Leadership and Teamwork Speaking and Listening Standard

Work with peers to promote civil, democratic discussions and decision making; set clear goals and deadlines; and establish individual roles as needed. SLS 11-12.1b Anchor Standard

10: Technical Knowledge and Skills Writing Standard

Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. WS 11-12.6 Anchor Standard

11: Demonstration and Application

Demonstrate and apply the knowledge and skills contained in the industry-sector anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings, and the career technical student organization.