

CONSTRUCTION

INDUSTRY SECTOR: Building and Construction Trades

CALPADS PATHWAY: Residential and Commercial Construction (Pathway Code 123)

CALPADS COURSE TITLE: Residential & Commercial Construction

CALPADS COURSE CODE: 7342

HOURS:	Total	Classroom	Laboratory/CC/CVE
	360	81	279

JOB TITLE	ONET CODES	JOB TITLE	ONET CODES
Plumber	47-2152.02	Cost Estimator	13-1051.00
Electrician	47-2111.00	Helper - Carpenter	47-3012.00
Building Inspector	47-4011.00	Construction Carpenter	47-2031.01
Construction Laborers	47-2061.00	Helper–Construction Trades	47-3019.00
Construction and Related Workers	47-4099.00		

COURSE DESCRIPTION: This class will include instructional units designed to give the student the basic skills and understanding of the Building Trades Industry. This will include units on safety, measuring and leveling, concrete, framing, HVAC, plumbing, electrical, roofing, exterior siding, insulation, dry wall, finish carpentry, paint, flooring and seeking a job. Upon successful completion of this course, the student will be prepared to enter the construction industry.

PREREQUISITES:

1. Strong work ethic
2. Algebra 1 highly recommended

ARTICULATION:

COLLEGE:	COURSE TITLE:
Bakersfield College	B60A Construction

Requested

LEVEL: **Introductory** **Concentrator** **Capstone**

CERTIFICATION:

National Center for Construction Education and Research (NCCER) Core Curriculum, Craft Training

METHOD OF STUDENT EVALUATION:

- ✓ Formative and summative assessment
- ✓ Student projects – demonstration of skill
- ✓ Written work
- ✓ Observation of student performance
- ✓ Completion of assignments and tests
- ✓ Attendance/participation

METHOD OF INSTRUCTION:

- ✓ Lecture
- ✓ Group and individual applied projects
- ✓ Demonstration
- ✓ Field Trips
- ✓ Guest Speaker

RECOMMENDED TEXTS:

Allen, Edward and Rob Thallon. *Fundamentals of Residential Construction*. 3rd ed.

NCCER, *Core Curriculum: Introductory Craft Skills*. New York, New York: Pearson Education, Inc. 2015. Print., and associated student teaching materials.

MODEL CTE 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).

I.	SAFETY	CR	LAB/ CC	STANDARDS
	<ul style="list-style-type: none"> A. Tools B. Machines C. Industry D. Personal 	20 HRS	20 HRS	<p>CTE Anchor: A6.1, A6.2, A6.3, A6.4, A6.5, A6.6, A6.7, A6.8, A6.9, A6.10, A6.11, A6.12</p> <p>CTE Pathway: D1.2, D1.3</p>
II.	MEASURING AND LEVELING	CR	LAB/ CC	STANDARDS
	<ul style="list-style-type: none"> A. Measuring to the 16th B. Leveling C. Transit D. 345 Method E. Blue Print / Sketches F. Energy and Building Efficiency 	20 HRS	20 HRS	<p>CTE Anchor: A4.1; A5.3; A6.6, A6.10; A8.1</p> <p>CTE Pathway: D2.1, D2.2; D3.2, D3.4, D3.5, D3.5, D3.6, D3.7; D4.1, D4.2, D4.4; D9.3, D9.4, D9.5</p>
III.	CONCRETE	CR	LAB/ CC	STANDARDS
	<ul style="list-style-type: none"> A. Footings B. Flatwork C. Slabs 	5 HRS	35 HRS	<p>CTE Anchor: A5.2; A6.3, A6.4; A10.2, A10.3</p> <p>CTE Pathway: D4.3, D4.5, D4.6, D4.7; D5.1, D5.2, D5.3, D5.4, D5.5, D5.6, D5.7; D5.8, D5.9, D5.10</p>
IV.	FRAMING	CR	LAB/ CC	STANDARDS
	<ul style="list-style-type: none"> A. Floor joints and subfloor B. Layout and walls C. Ceiling joints D. Trusses and cut/stack 	5 HRS	45 HRS	<p>CTE Anchor: A4.1; A6.12; A9.3, A9.6; A10.3, A10.4, A10.5</p> <p>CTE Pathway: D3.6; D6.1, D6.2, D6.3, D6.4, D6.5, D6.6, D6.7, D6.8, D6.9, D6.10, D6.11, D6.12, D6.13, D6.14, D6.15</p>
V.	HVAC	CR	LAB/ CC	STANDARDS
	<ul style="list-style-type: none"> A. Wall heater B. Cooler C. AC/Heater and ducting 	0 HRS	6 HRS	<p>CTE Anchor: A5.2, A6.2; A7.4; A8.1; A10.1, A10.2, A10.3</p> <p>CTE Pathway: D2.1, D2.3; D3.1, D3.3; D9.1, D9.2</p>

VI.	PLUMBING	CR	LAB/ CC	STANDARDS
	<ul style="list-style-type: none"> A. Gas lines B. Drain lines C. Supply lines 	5 HRS	25 HRS	<p>CTE Anchor: A10.2, A10.3, A10.4, A10.5; A6.4; A9.7</p> <p>CTE Pathway: D2.3, D2.4, D2.5, D2.6, D2.7, D2.8, D2.9; D10.1, D10.2, D10.3, D10.4, D10.5, D10.6, D10.7, D10.8, D10.9, D10.10, D10.11, D10.12</p>
VII.	ELECTRICAL	CR	LAB/ CC	STANDARDS
	<ul style="list-style-type: none"> A. Main panel B. Sub panel C. Circuits D. Conduit E. Romex 	10 HRS	20 HRS	<p>CTE Anchor: A5.1; A6.2, A6.3; A7.4; A8.1; A10.2</p> <p>CTE Pathway: D11.1, D11.2, D11.3, D11.4, D11.5, D11.6, D11.7, D11.8, D11.9, D11.10, D11.11, D11.12, D11.13</p>
VIII.	ROOFING	CR	LAB/ CC	STANDARDS
	<ul style="list-style-type: none"> A. Composition B. Rolled roofing C. Corrugated 	0 HRS	20 HRS	<p>CTE Anchor: A6.4, A6.6; A7.7; A8.2; A9.3; A10.3</p> <p>CTE Pathway: D2.2; D6.15, D6.16; D9.6</p>
IX.	EXTERIOR SIDING	CR	LAB/ CC	STANDARDS
	<ul style="list-style-type: none"> A. Vertical B. Horizontal 	0 HRS	10 HRS	<p>CTE Anchor: A6.4, A6.10, D6.16; A8.1; A9.7; A10.2, A10.5</p> <p>CTE Pathway: D8.1, D8.3</p>
X.	INSULATION	CR	LAB/ CC	STANDARDS
	<ul style="list-style-type: none"> A. Ceiling B. Exterior walls C. Doors and windows 	0 HRS	4 HRS	<p>CTE Anchor: A5.1; A6.2, A6.3, A6.5; A7.4</p> <p>CTE Pathway: D8.8, D8.9, D8.10</p>

XI.	DRYWALL	CR	LAB/ CC	STANDARDS
	A. Hanging B. Tape and texture	2 HRS	18 HRS	CTE Anchor: A6.4, A6.6; A8.1, A8.4; A10.2, A10.5 CTE Pathway: D7.1, D7.2, D7.3
XII.	FINISH CARPENTRY	CR	LAB/ CC	STANDARDS
	A. Interior doors and trim B. Install kitchen cabinets and bath vanities	2 HRS	18 HRS	CTE Anchor: A5.1, A5.2; A6.4; A7.2; A8.4 CTE Pathway: D7.7, D7.8; D8.6, D8.7
XIII.	PAINT	CR	LAB/ CC	STANDARDS
	A. Interior B. Exterior	0 HRS	20 HRS	CTE Anchor: A5.2, A5.4; A6.2, A6.3, A6.7 CTE Pathway: D7.4, D7.5; D8.2, D8.4, D8.5, D8.11
XIV.	FLOORING	CR	LAB/ CC	STANDARDS
	A. Laminate B. Ceramic tile C. Vinyl sheeting and tile	2 HRS	18 HRS	CTE Anchor: A5.1; A6.4, A6.11; A10.1, A10.5 CTE Pathway: D7.6
XV.	SEEKING A JOB	CR	LAB/ CC	STANDARDS
	A. Job resume preparation B. Completing job application C. Performance testing D. Interviewing techniques E. Follow-up	10 HRS	0 HRS	CTE Anchor: A2.4, A2.5; A3.1, A3.9; A4.1 CTE Pathway: D1.0, D1.1; D2.1, D2.2, D2.3; D3.2, D3.3, D3.4, D3.5, D3.6, D3.7, D3.8; D7.3, D7.5, D7.6, D7.8; D8.3, D8.4, D8.5; D9.1, D9.2, D9.3, D9.5

XVI.	STANDARDS FOR CAREER READY PRACTICE
	<ol style="list-style-type: none"> 1. Apply appropriate technical skills and academic knowledge. 2. Communicate clearly, effectively, and with reason. 3. Develop an education and career plan aligned with personal goals. 4. Apply technology to enhance productivity. 5. Utilize critical thinking to make sense of problems and persevere in solving them. 6. Practice personal health and understand financial literacy. 7. Act as a responsible citizen in the workplace and the community. 8. Model integrity, ethical leadership and effective management. 9. Work productively in teams while integrating cultural and global competence. 10. Demonstrate creativity and innovation. 11. Employ valid and reliable research strategies. 12. Understand the environment, social and economic impacts of decisions.

Building and Construction Trades 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. (Direct alignment with LS 9-10, 11-12.6)

- 2.1 Recognize the elements of communication using a sender–receiver model.
- 2.2 Identify barriers to accurate and appropriate communication.
- 2.3 Interpret verbal and nonverbal communications and respond appropriately.
- 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
- 2.5 Communicate information and ideas effectively to multiple audiences using a variety of media and formats.
- 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.

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. (Direct alignment with SLS 11-12.2)

- 3.1 Identify personal interests, aptitudes, information, and skills necessary for informed career decision making.
- 3.2 Evaluate personal character traits such as trust, respect, and responsibility and understand the impact they can have on career success.
- 3.3 Explore how information and communication technologies are used in career planning and decision making.
- 3.4 Research the scope of career opportunities available and the requirements for education, training, certification, and licensure.
- 3.5 Integrate changing employment trends, societal needs, and economic conditions into career planning.
- 3.6 Recognize the role and function of professional organizations, industry associations, and organized labor in a productive society.
- 3.7 Recognize the importance of small business in the California and global economies.
- 3.8 Understand how digital media are used by potential employers and postsecondary agencies to evaluate candidates.
- 3.9 Develop a career plan that reflects career interests, pathways, and postsecondary options.

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. (Direct alignment with WS 11-12.6)

- 4.1 Use electronic reference materials to gather information and produce products and services.
- 4.2 Employ Web-based communications responsibly and effectively to explore complex systems and issues.
- 4.3 Use information and communication technologies to synthesize, summarize, compare, and contrast information from multiple sources.
- 4.4 Discern the quality and value of information collected using digital technologies, and recognize bias and intent of the associated sources.
- 4.5 Research past, present, and projected technological advances as they impact a particular pathway.
- 4.6 Assess the value of various information and communication technologies to interact with constituent populations as part of a search of the current literature or in relation to the information task.

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. (Direct alignment with WS 11-12.7)

5.1 Identify and ask significant questions that clarify various points of view to solve problems.

5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.

5.3 Use systems thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.

5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.

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. (Direct alignment with RSTS 9-10, 11-12.4)

6.1 Interpret policies, procedures, and regulations for the workplace environment, including employer and employee responsibilities.

6.2 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.

6.3 Set up a work area, or shop, to avoid potential health concerns and safety hazards, including but not limited to electrical (shock), wires (tripping), fumes (lung health), noise (hearing loss), fire (burns), and so forth, incorporating ergonomics.

6.4 Practice personal safety when lifting, bending, or moving equipment and supplies.

6.5 Demonstrate how to prevent and respond to work-related accidents or injuries; this includes demonstrating an understanding of ergonomics.

6.6 Maintain a safe and healthful working environment.

6.7 Be informed of laws/acts pertaining to the Occupational Safety and Health Administration (OSHA).

6.8 Report hazards found on the job site to supervisor/teacher.

6.9 Locate, and adhere to, Material Safety Data Sheet (MSDS) instructions.

6.10 Maintain proper use of safety apparel at all times, including but not limited to, eye protection, hearing protection, skin protection, head protection, footwear and protection from airborne particulate matter.

6.11 Comply with the safe handling, storage and disposal of chemicals, materials and adhesives in accordance with local, state, and federal safety and environmental regulations (OSHA, Environmental Protection Agency [EPA], Hazard Communication [HazCom], Material Safety Data Sheets [MSDS], etc.).

6.12 Demonstrate the proper care and safe use of hand, portable and stationary power tools.

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. (Direct alignment with SLS 9-10, 11-12.1).

7.1 Recognize how financial management impacts the economy, workforce, and community.

7.2 Explain the importance of accountability and responsibility in fulfilling personal, community, and workplace roles.

7.3 Understand the need to adapt to changing and varied roles and responsibilities.

7.4 Practice time management and efficiency to fulfill responsibilities.

7.5 Apply high-quality techniques to product or presentation design and development.

7.6 Demonstrate knowledge and practice of responsible financial management.

7.7 Demonstrate the qualities and behaviors that constitute a positive and professional work demeanor, including appropriate attire for the profession.

7.8 Explore issues of global significance and document the impact on the Building and Construction Trades sector.

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. (Direct alignment with SLS 11-12.1d)

- 8.1 Access, analyze, and implement quality assurance standards of practice.
- 8.2 Identify local, district, state, and federal regulatory agencies, entities, laws, and regulations related to the Building and Construction Trades industry sector.
- 8.3 Demonstrate ethical and legal practices consistent with Building and Construction Trades sector workplace standards.
- 8.4 Explain the importance of personal integrity, confidentiality, and ethical behavior in the workplace.
- 8.5 Analyze organizational culture and practices within the workplace environment.
- 8.6 Adhere to copyright and intellectual property laws and regulations, and use and appropriately cite proprietary information.
- 8.7 Conform to rules and regulations regarding sharing of confidential information, as determined by Building and Construction Trades sector laws and practices.

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. (Direct alignment with SLS 11-12.1b)

- 9.1 Define leadership and identify the responsibilities, competencies, and behaviors of successful leaders.
- 9.2 Identify the characteristics of successful teams, including leadership, cooperation, collaboration, and effective decision-making skills as applied in groups, teams, and career technical student organization activities.
- 9.3 Understand the characteristics and benefits of teamwork, leadership, and citizenship in the school, community, and workplace setting.
- 9.4 Explain how professional associations and organizations and associated leadership development and competitive career development activities enhance academic preparation, promote career choices, and contribute to employment opportunities.
- 9.5 Understand that the modern world is an international community and requires an expanded global view.
- 9.6 Respect individual and cultural differences and recognize the importance of diversity in the workplace.
- 9.7 Participate in interactive teamwork to solve real Building and Construction Trades sector issues and problems.

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. (Direct alignment with WS 11-12.6)

- 10.1 Interpret and explain terminology and practices specific to the Building and Construction Trades sector.
- 10.2 Comply with the rules, regulations, and expectations of all aspects of the Building and Construction Trades sector.
- 10.3 Construct projects and products specific to the Building and Construction Trades sector requirements and expectations.
- 10.4 Collaborate with industry experts for specific technical knowledge and skills.
- 10.5 Demonstrate the basic care, proper maintenance, and use of hand, portable, and stationary tools related to the Building and Construction trades.

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.

- 11.1 Utilize work-based/workplace learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the Building and Construction Trades sector program of study.
- 11.2 Demonstrate proficiency in a career technical pathway that leads to certification, licensure, and/or continued learning at the postsecondary level.
- 11.3 Demonstrate entrepreneurship skills and knowledge of self-employment options and innovative ventures.

11.4 Employ entrepreneurial practices and behaviors appropriate to Building and Construction Trades sector opportunities.

11.5 Create a portfolio, or similar collection of work, that offers evidence through assessment and evaluation of skills and knowledge competency as contained in the anchor standards, pathway standards, and performance indicators.

Building and Construction Trades
RESIDENTIAL AND COMMERCIAL CONSTRUCTION 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.

D1.1 Understand significant historical trends in the construction industry.

D1.2 Understand the environmental regulations that influence residential and commercial design.

D1.3 Demonstrate knowledge of the California Environmental Quality Act (CEQA) and Environmental Impact Review (EIRs) impacts on residential and commercial construction.

D2.0 Apply the Appropriate Mathematical Calculations used in the Construction Trades.

D2.1 Apply formulas to determine area, volume, lineal, board, and square feet.

D2.2 Apply the Pythagorean Theorem to calculate pipe offsets, roof slope, and check for square.

D2.3 Estimate the materials needed to complete a specific task.

D2.4 Determine the total developed length of the water supply piping system.

D2.5 Calculate the residual pressure at the highest outlet per the requirements of the Plumbing Code.

D2.6 Calculate the total fixture unit demand from the fixtures indicated on the construction drawings using the tables of the plumbing code.

D2.7 Calculate the proper slope for drain, waste and vent (DWV) piping.

D2.8 Apply Ohm's Law to calculate resistance, current flow, and voltage in series, parallel, and combination circuits.

D2.9 Calculate the load on an electrical system from general lighting and small and large appliances.

D3.0 Interpret and Apply Information from Technical Drawings, Schedules, and Specifications used in the Construction Trades.

D3.1 Identify the elements used in technical drawings, including types of lines, symbols, details, and views.

D3.2 Identify and interpret the elements of technical drawings, including plan, elevation, section, and detail views.

D3.3 Interpret technical drawings specifications.

D3.4 Identify plumbing, electrical, and mechanical symbols and other abbreviations used in construction drawings.

D3.5 Interpret and scale dimensions from a set of plans using an architect's scale.

D3.6 Interpret sectional and detail drawings to determine construction details such as corners, rough openings, stairs, and roof systems.

D3.7 Understand the sequencing and phases of residential and commercial construction projects.

D4.0 Demonstrate Techniques for Proper Site Preparation.

D4.1 Use leveling devices to check for elevation, level, and plumb.

D4.2 Demonstrate how to establish grades using survey instruments.

D4.3 Install batter boards.

D4.4 Check site layout for square using the diagonal method.

D4.5 Describe excavation and backfill methods.

D4.6 Identify different methods and equipment used for compaction.

D4.7 Identify types of backfill materials and how they are used.

D5.0 Demonstrate Foundation Layout Techniques to Include Setting Forms, Placing Reinforcements, and Placing Concrete According to Construction Drawings, Specifications, and Building Codes.

D5.1 Describe the sequencing procedures for placing large and small slabs.

D5.2 Demonstrate how to establish elevations for concrete structures.

D5.3 Lay out location and elevation of concrete/masonry structures based on construction drawings.

D5.4 Develop a material take-off in accordance with construction drawings and specifications.

D5.5 Lay out location for reinforcements, expansion joints, openings, and embedded items based on construction drawings, specifications, and building codes.

D5.6 Construct, place, and brace forms for concrete as detailed in construction drawings for footings, slab, and raised floors.

D5.7 Place and secure reinforcement as detailed by construction drawings, building codes, and industry standards.

D5.8 Place secure embedded hardware as detailed on construction drawings.

D5.9 Demonstrate proper removal and care of concrete forms.

D5.10 Use appropriate tools and techniques for placing, compacting, screeding, and finishing consolidating concrete in slabs and footings.

D6.0 Demonstrate Carpentry Techniques for the Construction of a Single-Family Residence.

D6.1 Properly place a moisture barrier and pest control guard on a foundation.

D6.2 Attach a sill plate at top of concrete foundation.

D6.3 Lay out, cut, and install joist supports, rim joists, and floor joists as specified on construction plans.

D6.4 Install a subfloor.

D6.5 Demonstrate wall and plate layout, including rough openings.

D6.6 Measure, cut, and assemble wall components using appropriate tools and fasteners.

D6.7 Demonstrate the ability to square wall systems and install wall bracing and shear panels according to code.

D6.8 Stand, square, plumb, and brace walls.

D6.9 Describe the applications and uses of metal stud framing.

D6.10 Lay out, cut, and install ceiling joists and common and jack rafters.

D6.11 Frame and erect shed and gable roof systems.

D6.12 Lay out and install trusses “on-center” with specified hardware.

D6.13 Install appropriate blocking, bracing, lookouts, fascia, and drip edge.

D6.14 Frame for roof penetrations and attic access.

D6.15 Apply roof sheathing and install appropriate flashings.

D6.16 Understand different roofing materials and methods of application.

D7.0 Demonstrate Proper Installation Techniques of Interior Finish Materials and Protective Finishes.

D7.1 Identify types and uses of wall finishing materials.

D7.2 Cut, fit, and install gypsum wallboard onto a framed wall using appropriate fasteners.

D7.3 Describe the finishes and textures for gypsum wallboard.

D7.4 Properly prepare walls to receive protective finishes.

D7.5 Apply finishes according to specifications and industry standards.

D7.6 Identify types and application of finish flooring materials.

D7.7 Install pre-hung interior doors.

D7.8 Install interior trim and case work.

D8.0 Demonstrate the Application of Exterior Finish Materials and Protective Finishes in Building Construction.

D8.1 Describe the installation procedures and techniques of masonry siding materials.

D8.3 Install wood, vinyl, and/or manufactured siding.

D8.4 Demonstrate preparation techniques for applying exterior paint and stain.

D8.5 Apply exterior paint and stain according to specifications.

D8.6 Describe various types and uses of doors and windows used in building construction.

D8.7 Install pre-hung windows and doors using appropriate flashing and trim.

D8.8 Caulk and seal joints to prevent air and moisture infiltration and increase energy efficiency.

D8.9 Install vents for efficient attic and crawl space ventilation.

D8.10 Install various types of floor, wall, and ceiling thermal insulation.

D8.11 Describe mold-prevention techniques.

D9.0 Understand, Integrate, and Employ Sustainable Construction Practices in the Building Trades.

D9.1 Identify design and energy solutions for improving building energy efficiency.

D9.2 Identify materials used in building construction to increase energy efficiency and sustainability.

D9.3 Calculate energy requirements and loads for buildings and structures.

D9.4 Demonstrate the application of constructing materials intended to improve building efficiency and sustainability.

D9.5 Analyze and evaluate buildings for energy efficiency and performance.

D9.6 Develop solutions to improve building energy performance and efficiency.

D10.0 Demonstrate Skills Necessary to Complete a Plumbing System in a Single-Family Residence in Accordance with Accepted Industry Standards.

D10.1 Demonstrate techniques for cutting, deburring, and joining metallic and nonmetallic water piping.

D10.2 Lay out and install hot and cold water piping to fixture locations as indicated on the construction documents.

D10.3 Perform pressure test of an installed piping system.

- D10.4 Install fastened in-place fixture valves and shut-off valves as indicated on construction drawings.
- D10.5 Install and secure proper drainage piping to fixture locations.
- D10.6 Determine the proper slope for DWV piping using hand levels, laser levels, and transits.
- D10.7 Install traps and vents as indicated by construction drawings, specifications, and government codes.
- D10.8 Install angle stops at water supply stub outs.
- D10.9 Install plumbing fixtures.
- D10.10 Connect the water supply to faucets and water closets.
- D10.11 Connect fixture tailpieces to fixtures and to traps.
- D10.12 Check for the proper functioning of fixtures.

D11.0 Demonstrate Skills Necessary to Complete an Electrical System in a Single-Family Residence in Accordance with Accepted Industry Standards.

- D11.1 Determine whether or not an electrical circuit is “live.”
- D11.2 Prepare rough framing for the installation of electrical cables and conduit.
- D11.3 Lay out components to the tolerances indicated on the construction drawings, specifications, and government codes.
- D11.4 Install typical devices, junction boxes, and panels.
- D11.5 Install lighting and ceiling fan support boxes according to the National Electrical Code (NEC).
- D11.6 Install conduit typical of residential construction and pull conductors through conduit as required by the NEC.
- D11.7 Splice and tap conductors for the installation of fixtures and devices.
- D11.8 Install low voltage control and communication cables.
- D11.9 Demonstrate grounding techniques for all electrical boxes, cabinets, and enclosures.
- D11.10 Terminate electrical connections to receptacles, switches, lighting fixtures, large appliances, and other devices.
- D11.11 Select receptacles and switches based on load requirements.
- D11.12 Terminate equipment grounding and neutral conductor at the electrical service.
- D11.13 Terminate communication and control wiring.

North Kern Vocational Training Center
CONSTRUCTION PROFICIENCIES

1. Upon completion of the course students will be able to use tools and machines safely.
2. Upon completion of the course students will be able to measure to the 16th and set-up and use a transit.
3. Upon completion of course students will be able to calculate how much concrete is needed for a job and form, pour and finish concrete.
4. Upon completion of the course students will be able to plate, layout and frame a simple wall section.
5. Upon completion of the course students will be able to understand the basics of wall heaters, coolers and ducting systems.
6. Upon completion of the course students will be able to install gas lines, various types of water supply lines and drain lines.
7. Upon completion of the course students will be able to run a light and outlet circuit, install a ceiling fan and install breakers in a main panel.
8. Upon completion of the course students will be able to calculate how much roofing supplies are needed and install composition roofing.
9. Upon completion of the course students will be able to calculate how much siding is needed for a job and complete installation.
10. Upon completion of the course students will be able to calculate how much insulation is needed and correctly install insulation.
11. Upon completion of the course students will be able to calculate how much drywall is needed and hang, tape and texture drywall.
12. Upon completion of the course students will be able to hang a prehung door and install kitchen and bath cabinets.
13. Upon completion of the course students will be able to use a roller and brush for painting.
14. Upon completion of the course students will be able to measure and install various types of flooring.
15. Upon completion of the course students will be able to fill out a job application and prepare a resume.