Construction Technology 1, 2

CTE Industry Sector: Building and Construction Trades

Career Pathway: Residential and Commercial Construction

Career Pathway Entry-Level Job Titles:

- Apprentice carpenter, apprentice plumber, apprentice electrician

CBEDS Code(s): 5501

Course Description: The General goal of the Construction Technology course is to provide students with entry level skills in the occupational areas of carpentry, electrical, plumbing and the construction trades. Emphasis will be placed on the production methods, execution and craftsmanship of work and the use of materials given**.**

Course Hours: 360

Date Reviewed and Approved by Advisory Committee: November 10, 2016

Course Goals: Students will learn to:

1. Review industry standards and career opportunities
2. Review the course competencies
3. Review teacher and student expectations
4. Read and understand material safety data sheets (MSDS)
5. Describe and demonstrate general safety procedures
6. Identify and demonstrate personal safety procedures
7. Defend and demonstrate tool and machine safety procedures
8. Identify and describe proper accident and emergency procedures
9. Support and demonstrate proper fire safety
10. Demonstrate safe and proper operation of hand and power tools such as pneumatic, electrical and cordless
11. Identify and describe the proper care, maintenance, storage and transportation of hand and power tools
12. Calculate the area of geometric shapes
13. Demonstrate how to calculate board feet
14. Describe and demonstrate linear measurement
15. Identify and describe grades of lumber
16. Develop and demonstrate pattern construction
17. Defend and demonstrate material conservation
18. Identify and describe standard architectural and electrical symbols
19. Demonstrate proper blueprint reading skills
20. Compare and classify materials such as woods, composition materials, drywall, roofing materials, flooring materials, glass plastic laminates and sheet metal
21. Identify and describe permissible uses of the materials listed
22. Identify and defend code restrictions related to the materials listed

23. Demonstrate safe cutting techniques for the materials listed
24. Identify and describe proper moving
25. Calculate material cost for a project including shipping and delivery
26. Identify and review local labor costs and contracts
27. Calculate labor costs for a project
28. Describe the process for obtaining a building permit and how inspections relate to the building process
29. Identify and describe consumer protection related to the construction industry
30. Identify appropriate uses of drywall
31. Compare and contrast drywall and plaster
32. Practice safe cutting techniques for drywall
33. Install drywall in various locations
34. Apply safe removal techniques of existing flooring such as ceramic, asphalt tile, hardwoods, linoleum and carpet
35. Identify and use safe installation techniques on flooring such as ceramic, asphalt tile, hardwoods, linoleum and carpet
36. Compare and contrast types of finish and paint preparation
37. Identify proper masking techniques
38. Analyze and use painting and finishing methods such as brush, roller, spray gun and color matching
39. Describe proper disposal and clean-up procedures for paint and finish related materials
40. Differentiate assorted faucet types, toilet types, sink and tub types and related installations and repairs Implement safe and proper drain cleaning techniques
41. Practice air-tight door hanging
42. Describe and demonstrate safe and proper repair of drywall and plaster walls

Instructional Units:

Unit 1	**Introduction**	Class Hrs.	10	Lab Hrs.	

Description:

The students will receive training in the basis of the construction industry. Students will learn machine and tool safety as well as many facets of the building trade. Students will learn how to enter the workforce, build a foundation, frame walls, roofs and install windows and doors. The students will also be introduced to electrical and plumbing basics.

In the end of the course, the students will receive a competency certificate to help them in gaining employment in the industry.

Anchor Standards: 1.0

Unit 2	**Measuring**	Class Hrs.	4	Lab Hrs.	**10**

Description:

This unit will address how measurement is used in the Lab. How to measure using tape measures, architect rulers and carpenter squares and the units of measurement.

Pathway Standards: A1.1, A1.3, A4.1, D2.1

Unit 3	Machine Safety & Operation	Class Hrs.	8	Lab Hrs.	14

Description:

This unit will consist of safety lessons created by teachers in the field. Each lesson will explain the safe and proper use of the machine or tool. Safety lesson plans on: Bandsaw, Portable router, Jointer, Portable circular saw, Belt Sander, Hand tools, Jig Saw, Miter (compound "chop saw"), and Lathe.

Anchor Standards: 6.1, 6.2, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 8.2
Pathway Standards: A4.3, A4.4, A4.5, A4.6, A4.7, A6.1, D10.1

Unit 4	Construction Building Materials	Class Hrs.	8	Lab Hrs.	20

Description:

Various types of building materials will be introduced to the students. Framing materials, fasteners, and roofing materials will be stressed.

Pathway Standards: A1.1, A5.1, A5.2, A5.3, A5.4, A5.5, A5.7, A5.8, A5.9, A5.10, A5.11, A5.12, A5.13, A6.2, A6.3, A6.4, A6.5, A6.8, A11.1, C5.2, C8.1

Unit 5	Building Codes and Standards	Class Hrs.	8	Lab Hrs.	20

Description:

Students will be introduced to nailing patterns, Simpson connectors, and strong building practices. Students will be introduced to Building code books and what codes are the required standards for construction of residential and commercial buildings.

Anchor Standards: 7.2, 8.2, 10.1, 10.2, 10.3
Pathway Standards: D6.7

Unit 6	Introduction to Blueprints	Class Hrs.	10	Lab Hrs.	20

Description:

Students will show understanding of residential plans. Material cut lists will be produced from these drawings.

Anchor Standards: 5.3, 5.4, 8.2, 8.6, 8.7, 9.5, 10.1, 10.2
Pathway Standard: A1.7, A3.6, A4.1, C7.7, D2.1, D2.3, D3.1, D3.2, D3.3, D3.4, D3.5, D3.6, D3.7, D5.4

Unit 7	Framing	Class Hrs.	10	Lab Hrs.	30

Description:

Students will identify floor framing components, and use the parts to build a floor. Students will identify wall framing components and use the parts to frame a wall, door opening, windows, trusses, and rafters. They will also learn the process of building a house structure through a model (scale) house. Students will identify roof framing components and use the parts to frame a roof.

Anchor Standards: 5.2, 5.4, 8.1, 10.2, 10.3, 10.5, 11.2
Pathway Standards: A3.1, A3.6, A4.1, A4.2, A4.3, A5.1, A5.4, D2.3, D6.3, D6.5, D6.6, D6.7, D6.8, D6.10, D6.11, D6.12, D6.13, D6.14, D6.16

Unit 8	**Roof Finishing**	Class Hrs.	15	Lab Hrs.	**25**

Description:

Students will learn the process used to apply flashings, tar paper and composition shingles to a roof.

Anchor Standards: 6.4,6.5,6.7,7.5,10.1,10.2,10.3,10.5
Pathway Standards: D6.1, D6.14, D6.15, D6.15

Unit 9	**Exterior Installation (Windows, Doors, Wall & Trim)**	Class Hrs.	10	Lab Hrs.	**20**

Description:

Students will learn different types of sidings available as well as ways to trim out a wall. Proper procedures will be demonstrated to install windows and doors.

Anchor Standards: 6.4,6.5,6.7,7.5,10.1,10.2,10.3,10.5
Pathway Standards: D7.1, D7.4, D7.5, D7.6, D7.7, D7.8, D8.1, D8.3, D8.6, D8.7, D8.8

Unit 10	**Drywall**	Class Hrs.	10	Lab Hrs.	**20**

Description:

Students will practice hanging drywall with nails and screws according to proper procedures. Students will learn how to do finishing drywall taping, spackling and sanding.

Anchor Standards: 6.4,6.5,6.7,7.5,10.1,10.2,10.3,10.5
Pathway Standards: D2.1, D2.3, D5.4, D7.2, D7.3

Unit 11	**Electrical Wiring**	Class Hrs.	10	Lab Hrs.	**34**

Description:

Students will be introduced to hanging different types of electrical boxes, routing wires and connecting receptacles, switches and lights.

Anchor Standards: 6.4,6.5,6.7,7.5,10.1,10.2,10.3,10.5
Pathway Standards: D11.1, D11.2, D11.3, D11.4, D11.5, D11.7, D11.9, D11.10, D11.11, D11.12, D11.13

Unit 12	**Plumbing**	Class Hrs.	10	Lab Hrs.	**34**

Description:

Students will be introduced to installing copper and ABS pipe. Proper techniques to solder copper, prime and glue ABS. Students will be introduced to different types of adaptors (elbows, couplings T's) and when they will be used. Installation if fixtures (sinks, toilets, showers, etc.) will be introduced.

Anchor Standards: 6.4,6.5,6.7,7.5,10.1,10.2,10.3,10.5 Pathway Standards: D10.1, D10.2, D10.3, D10.4, D10.6, D10.7, D10.8, D10.9, D10.10, D10.11, D10.12

Totals	**Class Hrs.**	113	**Lab Hrs.**	247	**Class Hrs.**	360

Unit Objectives

Unit 1: Upon completion of this unit, the student is able to:

1	Identify the scope of practice for each position of the construction trades – carpentry, electrical, plumbing, drywall.
2	List the requirements for apprenticeship for each of the positions in the construction trades.

Unit 2: Upon completion of this unit, the student is able to:

1	Recognize scale and ratios of conversions between different units of measurements.
2	Read and use different types of measuring devices.

Unit 3: Upon completion of this unit, the student is able to:

1	Understand the safety procedures for different machine and hand tools.
2	Safely use machine and hand tools with moderate supervision.
3	Describe the different uses of each machine and hand tool.

Unit 4: Upon completion of this unit, the student is able to:

1	Describe the different materials that are used in the construction field.
2	Use appropriate building materials for specific projects.
3	Identify the materials in a construction worksite.

Unit 5: Upon completion of this unit, the student is able to:

1	Tell difference between nailing patterns used in different projects.
2	Understand which types of Simpson & strong ties are needed for building projects.
3	Describe different codes needed for specific fields of construction.
4	Read building codes and understand where they apply to the construction project.

Unit 6: Upon completion of this unit, the student is able to:

1	Read scale on the blueprints and what that represents.
2	List materials needed from the blueprints.
3	Understand what specs are and what they represent.

Unit 7: Upon completion of this unit, the student is able to:

1	Understand the difference between wall framing, roof framing and floor framing.
2	Know names of components on doors and windows (trimmers, headers, King Studs, sill).
3	Know what a truss is and how to build.
4	Identify all components of framing.

5	Build walls with windows and doors, trusses, and flooring.

Unit 8: Upon completion of this unit, the student is able to:

1	Describe and install flashing, tar paper and shingles on a roof.
2	Understand staple and nailing patterns for flashing and tar paper.
3	Install composition shingles to state standards.

Unit 9: Upon completion of this unit, the student is able to:

1	Describe the process in installing a window and door
2	Differentiate between different types of sidings
3	How to trim windows and doors
4	How to make windows and doors weatherproof

Unit 10: Upon completion of this unit, the student is able to:

1	Hang drywall appropriately.
2	Know the nailing patterns for edges and the field.
3	Calculate how much drywall will be needed in a room.
4	How to tape and "mud" seams in drywall.
5	Describe different types of textures in drywall designs.

Unit 11: Upon completion of this unit, the student is able to:

1	Route wires through walls.
2	Differentiate between different types of electrical boxes (single, double triple gang boxes, plastic and EMT boxes) and their uses.
3	Connect outlets, switches and lights.

Unit 12: Upon completion of this unit, the student is able to:

1	Measure and use copper/ABS piping for the space needed.
2	Solder copper piping
3	Prime and glue ABS piping.

Instructional Strategies:

- Students will be instructed in large and small groups, additional information will be given to those with need.
- Written and oral assignments will be given.
- Guest speakers from different trades will come in to give additional information and assist in class projects.
- Projects will be given with emphasis on craftsmanship and good workmanship.

Textbooks:

- Carpentry & Building Construction by Mark Feirer
- Electrical Wiring Residential by Ray C Mullin and Phil Simmons
- Modern Plumbing by E. Keith Blankenbaker

Instructional Materials:

- Lumber (2x4, 2x6, 2x8, 1x4, 1x6)
- Nails, screws, glue and fasteners
- Tools (hammers, screwdrivers, speed squares, miter saws, jig saws, circular saws, table saws, etc.)
- Safety glasses
- Copper/ABS pipe and tools needed with it
- Drywall
- Electrical materials (Romex wiring, wire cutters, wire strippers, caps, etc.)

Assessments

- Grades will be based on evaluation of projects built. Craftsmanship, accuracy and overall build of project will be evaluated.
- Students are expected to complete all assignments within deadlines. Due dates on all assignments may vary depending on weather conditions, presentations by pop-in mentors and advisors from construction trades.
- Work ethic and safety will be assessed regularly and graded as defined by the syllabus.
- Grades will break down as follows:
    - Attendance: 10%
    - Work Ethic: 20%
    - Projects: 40%
    - Safety & clean up: 15%
    - Exams & quizzes: 15%
- Grading Scale:

A	100-93
A-	92-90
B+	89-87
B	86-83
B-	80-82
C+	77-79
C	73-76
C-	70-72
D	60-69
F	0-59

Articulation Agreement(s):

Construction Technology 1 is articulated at Diablo Valley College. Students that pass Construction Technology 1 with a C or better and pass the college course final exam will an 80% or better can earn 4.0 units at Diablo Valley College for their CONST 135: Construction Processes: Residential course. This articulation is good during Fall 2016-Fall 2019.

UC/CSU A-G Status:

This course is <u>not</u> approved as a UC/CSU A-G course.