# CNST A265: PLUMBING 1

| Item | Value |
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| Curriculum Committee Approval Date | 12/02/2020 |
| Top Code | 095230 - Plumbing, Pipefitting and Steamfitting |
| Units | 4 Total Units |
| Hours | 108 Total Hours (Lecture Hours 54; Lab Hours 54) |
| Total Outside of Class Hours | 0 |
| Course Credit Status | Credit: Degree Applicable (D) |
| Material Fee | Yes |
| Basic Skills | Not Basic Skills (N) |
| Repeatable | No |
| Grading Policy | Standard Letter (S) |

## Course Description

A course designed to provide students with entry-level instruction involving the theory and skills of residential plumbing systems. Knowledge of basic principles, functions and design, as well as the physical ability to install and test the rough-in plumbing in a single family dwelling. Transfer Credit: CSU.

## Course Level Student Learning Outcome(s)

1. Demonstrate competency when using the hand tools, power tools, and special trade tools of the plumbing industry.
2. Size, design and assemble/install the different types of household sanitary plumbing drainage system and water supply systems to meet the plumbing code requirements.
3. Size, design and assemble/install the different types of gas appliance supply systems to meet the mechanical and plumbing code requirements.

## Course Objectives

- 1. Identify, select, and work with general, hand, power, and special plumbing trade tools.
- 2. Interpret and apply basic plumbing mathematical calculations.
- 3. Recognize and understand different types of sewage disposal systems.
- 4. Interpret, translate, and implement code requirements in a sanitary plumbing drainage system.
- 5. Interpret, translate, and implement code requirements in a plumbing supply system.
- 6. Assemble the design of a properly sized drain system.
- 7. Assemble the design of a properly sized waste system.
- 8. Assemble the design of a properly sized vent system.
- 9. Assemble the design of a properly sized hot and cold water supply system.
- 10. Implement code requirements of water distribution systems.
- 11. Recognize the general nature and application of all gases used in plumbing, especially Southern California natural gas.
- 12. Interpret basic fundamental blueprints and prepare materials lists from self produced piping system design sketches.
- 13. Value the overall scope of plumbing in the modern home.

## Lecture Content

Students instructed on safety procedures of lab environment Students operate and practice using plumbing related hand tools and power tools History of plumbing Study and examination of water delivery, water storage, and water conservation in Southern California Review water availability via the Delta, Owens Valley, Colorado River, and Orange County Aquifer, and proposed desalination plants for Southern California Plumbing mathematics; students will add and subtract fractions, read measuring tape, and calculate pipe size for drain, waste, vent, and water delivery pipe systems Design, illustrate, and install plastic drain soil pipe Plastic waste pipe brachs are installed/connected to main stack Plastic vent pipe brachs are installed/connected to main stack Plastic drain, waste, and vent system is water pressure tested and graded in accord with design and plumbing code requirements Study of chemical composition and manufacturing of seamless copper tubing Use of various solders and fluxes Demonstration of soldering seamless copper tubing Design rough stage of water delivery pipe Create water supply isometric drawings with fixture unit calculations Installation of seamless copper water pipe in lab; system will be pressure tested Study the advantages and disadvantages of a cast iron pipe drain, waste, and vent systems used today in modern construction Practice cutting cast iron pipe using a snap cutter Design, inventory, and installation of cast iron drain, waste, vent pipe systems from students isometric design drawings Cast iron drain, waste, vent pipe system installed and pressure tested; project is back filled with soil; compaction is tested Study the new materials used today in modern construction technology, including but not limited to pex pipe, chloro poly vinyl chloride pipe, and corrugated stainless steel pipe are demonstrated; tools and adhesives are studied and used in application of various types of pipe Install cast iron drain, waste, and vent system for first and second floor rough-in on multi story house Install water supply/delivery system for first and second floor stage of rough-in of a bathroom with a lavatory sink, tub/shower combo, and a water closet for a multi-story house; cold water will be installed with seamless copper pipe and the hot water system in CPVC pipe Familiarized with sizing, GPM, maintenance and diagnostic codes for “Hot Water on Demand” water heaters; install tank type gas water heaters Water system and DWV system is pressure tested

## Lab Content

Faculty input required.

## Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- Lab (04)
- DE Live Online Lab (04S)

## Instructional Techniques

Instruction methodologies will include, but not necessarily be restricted to, the following: 1. Detailed multimedia/lectures of each topic covered 2. Student feedback during each lecture 3. Detailed illustrative discussion of lecture handout and textbook information. 4. Building plan reading. 5. Full scale/size laboratory installation projects pertaining to subjects discussed during which students work individually and in small groups. 6. Field trips and guest speaker and demonstrations.

## Reading Assignments

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## Writing Assignments

Students must show math proficiency in lineal footage, square area, volume calculations, and plumbing material installation estimating. Students must show proficiency in building plan reading, identification of residential construction components, and understanding of the California Plumbing Code. Students must show proficiency with full size/scale residential plumbing drain, waste, vent, and supply system installations in the laboratory environment.

## Out-of-class Assignments

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## Demonstration of Critical Thinking

Tests and quizzes, lab construction projects, estimating assignments, and sketches of house plumbing components

## Required Writing, Problem Solving, Skills Demonstration

Students must show math proficiency in lineal footage, square area, volume calculations, and plumbing material installation estimating. Students must show proficiency in building plan reading, identification of residential construction components, and understanding of the California Plumbing Code. Students must show proficiency with full size/scale residential plumbing drain, waste, vent, and supply system installations in the laboratory environment.

## Textbooks Resources

1. Required Smith, Lee. Plumbing Technology Design and Installation, ed. Independence: Delmar Publishing, Thomas Learning , 2000 Rationale: -