CNST A266: PLUMBING 2

Item	Value
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. Topics include basic principles, function, and design, as well as the installation of finish plumbing, repair and service of plumbing systems, and the installation of solar, spa, and sprinkler systems in a single family dwelling. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Identify and use the hand tools, power tools, and special trade tools of the plumbing industry.
2. Explain the regulations governing the construction, location, and installation of residential plumbing systems, fixtures and appliances.
3. Demonstrate the code compliant installation of common residential plumbing systems, fixtures and appliances.

Course Objectives

- 1. Review the History of Plumbing.
- 2. Review water delivery, water storage and water conservation in Southern Calif.
- 3. Review regulations governing the construction, location, and installation of gas and electric water heaters
- 4. Demonstrate the installation of residential water heaters.
- 5. Contrast the different water closet fixtures and the particular attributes of the various designs.
- 6. Demonstrate the installation of a water closet.
- 7. Contrast the different water supply tubing and the particular attributes of the various products.
- 8. Demonstrate the installation of a simple PEX water supply system.
- 9. Discuss and identify the location and code requirements for the installation of series of lavatory sinks connected with one common drain.
- 10. Recognize the details of lavatory faucet fixtures
- 11. Practice the proper installation, repair and trouble shooting of washer and washer less type faucets
- 12. Examine the physical and chemical characteristics of seamless copper tubing, including a review of the ASTM standards in manufacturing of copper tube
- 13. Exam the use of various solders and fluxes with copper tubing
- 14. Practice the cutting, measuring, sanding, fluxing, and soldering of seamless copper tube.
- 15. Demonstrate the installation of a simple copper water supply system.
- 16. Tub/shower combo installation. Review the installation of a complete bathroom fixture installation, including code requirements for the tub/shower combo installation, sizing and location of the fixtures.
- 17. Practice the proper installation of a tub/shower combo installation
- 18. Review the proper installation of a drain, waste, and vent system for kitchens.
- 19. Review water hammer device locations and code requirements.
- 20. Review the height dimensions and definition of solenoid-actuated valves.
- 21. Practice the proper installation of a drain, waste, and vent system for a kitchen, including the installation of kitchen sinks, faucets, garbage disposer, and dishwasher.

Lecture Content

Introduction and safety History of plumbing Study and examination of water delivery, water storage, and water conservation in Southern Calif. Tour of Orange County Water District Students operate and practice using plumbing-related hand tools and power tools. Regulations governing the construction, location, and installation of gas and electric water heaters Prohibited locations of relief valves and their discharge Protection from seismic damage Dangers of water heaters Installation of gas and electric water heaters Student installation project Water closet fixtures Manufacturing techniques Installation and code requirements Repair and replacement of toilet tanks Student installation project Pex pipe Pex water system Installation techniques Student installation project Lavatory sink study Location and code requirements Installation of series of lavatory sinks connected with one common drain Details of lavatory faucet fixtures Proper installation, repair, and troubleshooting of washer and washerless type faucets Student installation project Copper tubing Examination of physical and chemical characteristics of seamless copper tubing ASTM standards in manufacturing of copper tube Use of various solders and fluxes Demonstration of soldering seamless copper tubing Student participation in cutting measuring sanding, fluxing, and soldering of seamless copper tube Complete bathroom fixture installation Code requirements for Tub/Shower combo installation Size and fixture locations Student installation project Drain waste and vent system of kitchens Water hammer device locations and code requirements Height dimensions and definition of solenoid actuated valves Student installation project Kitchen design Installation of kitchen sinks and faucets Installation of garbage disposer Student installation project

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, guest speakers, and demonstrations

Reading Assignments

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Writing Assignments

Student must show math proficiency in lineal footage, square area, volume calculations, and plumbing material installation estimating. Student must show proficiency in building plan reading, identification of residential construction components, and understanding of the Uniform Plumbing Code. Student must show proficiency with full size/scale residential plumbing drain, waste, vents, supply system, and plumbing finish fixture 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

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

Textbooks Resources

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