

BI 0034 - PLUMBING AND MECHANICAL INSTALLATION AND DESIGN

Catalog Description

Formerly known as CET 34

Hours: 108 (36 lecture, 72 laboratory)

Description: Introduction to the planning, installing, and maintaining of mechanical (HVAC/R) and plumbing systems in accordance with local codes and ordinances. Includes use of materials and codes related to California Green Technology and "Net Zero Energy" policies. (CSU)

Course Student Learning Outcomes

- CSLO #1: Describe and perform important aspects of safety related mechanical and plumbing installation to include power tool safety, ladder safety, noise and eye protection, proper work clothing, chemicals used, and job site safety issue.
- CSLO #2: Select materials, tools and perform simple installation of various plumbing and mechanical systems.
- CSLO #3: Identify and evaluate and discuss California Green Technology and "Net Zero Energy" policies related to residential plumbing and mechanical construction.

Effective Term

Fall 2021

Course Type

Credit - Degree-applicable

Contact Hours

108

Outside of Class Hours

54

Total Student Learning Hours

162

Course Objectives

Lecture Objectives:

1. Demonstrate important aspects of safety related Mechanical and Plumbing system installations to include power tool safety, ladder safety, noise and eye protection, proper work clothing, chemicals used, and job site safety issues.
2. Discuss career opportunities in the field of plumbing trade.
3. Share real world on-the-job Mechanical and Plumbing system experiences to prepare for additional learning.
4. Discuss and diagram architectural home drawings needed to draw an isometric of Mechanical and Plumbing system.
5. Describe how to correct size of Mechanical and Plumbing systems.
6. Instruct how to create a materials list from isometric and sizing design.
7. Instruct how materials are installed per Mechanical and Plumbing codes.

8. Describe inspection techniques used to review work prior to government review.
 9. Identify and discuss California Green Technology and "Net Zero Energy" policies related to Mechanical and Plumbing construction.
- Laboratory Objectives:
1. Share real world on-the-job Mechanical and Plumbing experiences to prepare for additional learning.
 2. Use career opportunity information to determine degree of interest in Mechanical and Plumbing specialty.
 4. Read structural and architectural blue prints, sketches, and details to draw an isometric of Mechanical and Plumbing systems.
 5. Determine correct sizing of Mechanical and Plumbing systems.
 6. Write materials list from isometric and sizing design.
 7. Install materials per Mechanical and Plumbing codes.
 8. Use inspection techniques to review work prior to government review.
 9. Identify materials, tools and simple installation of flexible Mechanical and Plumbing systems.
 10. Investigate green Mechanical and Plumbing techniques relative to California Green Technology and "Net Zero Energy" policies.

General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

Articulation Information

- CSU Transferable

Methods of Evaluation

- Problem Solving Examinations
 - Example: Students will be tested on reading and lecture material. Question Example: "Calculate the (SEER) rating of a central air conditioning system." Points will be assigned to each question and converted to a letter grade.
- Projects
 - Example: Example: Soldering of copper pipe and fittings. Grade based on industry standard.
- Skill Demonstrations
 - Example: Students will build plumbing systems demonstrating proper procedures in small groups. Work is assessed according to isometric drawing specifications and code requirements. The grading is determined by a grading rubric.

Repeatable

No

Methods of Instruction

- Laboratory
- Lecture/Discussion
- Distance Learning

Lab:

1. Lab techniques will be presented in a "describe / show / review" methodology. Students will complete a safety test before using equipment. Instructor will work with students until they can

successfully complete the test with 100% success rate. (Laboratory Objective 9)

Lecture:

1. Instructor will lecture and demonstrate aspects of safety practices and methods of plumbing installations. The student will be given an opportunity to clarify any questions in an instructor-guided discussion. (Lecture Objective 1)

Distance Learning

1. Students in online classes participate, individually and in groups, in discussion boards and respond to weekly assignments via the Learning Management System. The instructor will provide documented material (including videos) explaining or exploring the course content and provide individual feedback on all assignments. The instructor will lecture on the importance of adhering to the Mechanical code and how to research local codes. Students will research local code adoption and the answer a code-based quiz demonstrating the ability to navigate through the Mechanical codebook. Use of a grading rubric. (Laboratory Objective 10)

- OER Link:
- OER:
- 2019 Title 24 California Building Code
 - Author: State Of California
 - Publisher: State Of California
 - Publication Date: 2019
 - Text Edition:
 - Classic Textbook?: No
- OER Link:
- OER:

Other materials and-or supplies required of students that contribute to the cost of the course.

Typical Out of Class Assignments

Reading Assignments

1. Based on guest speaker information, research via the web about a construction specialty area and read about the occupational opportunities and wage rates. Bring information to class session and explain it to the other students.
2. Research a specific aspect of "green" construction, read 2 articles and summarize in class to the other students.

Writing, Problem Solving or Performance

1. In small groups, students build a Plumbing system from an isometric drawing.
2. In small groups, students build a Mechanical system from an isometric drawing.

Other (Term projects, research papers, portfolios, etc.)

Required Materials

- 2018 Uniform Plumbing Code
 - Author: International Association of Plumbing and Mechanical Officials
 - Publisher: IAPMO
 - Publication Date: 2018
 - Text Edition:
 - Classic Textbook?: No
 - OER Link:
 - OER:
- 2018 Uniform Mechanical Code
 - Author: International Association of Plumbing and Mechanical Officials
 - Publisher: IAPMO
 - Publication Date: 2018
 - Text Edition:
 - Classic Textbook?: No