

SAN DIEGO COMMUNITY COLLEGE DISTRICT
CONTINUING EDUCATION
COURSE OUTLINE

SECTION I

SUBJECT AREA AND COURSE NUMBER

MECT 423

COURSE TITLE

PLUMBING III

TYPE COURSE

NON-FEE

VOCATIONAL

CATALOG COURSE DESCRIPTION

This course provides upgrade and advanced training in plumbing occupations. Instruction includes: layout and design, sizing of piping systems, materials, specialized systems, public relations, tests and inspections, solar tests and inspections, advanced plumbing math, safety requirements, advanced theory, and plumbing and solar codes. Students will use saws, rigid chain cutters, thread-o-matics, triangles, T-squares and scales. (FT)

LECTURE/LABORATORY HOURS

120

ADVISORIES

Successful completion of Plumbing I and II is recommended. Students may be required to conform to safety-related dress codes.

RECOMMENDED SKILL LEVEL

Reading, Writing in English and ability to compute Math at the 9th grade level or higher.

INSTITUTIONAL STUDENT LEARNING OUTCOMES

1. Social Responsibility
SDCE students demonstrate interpersonal skills by learning and working cooperatively in a diverse environment.
2. Effective Communication
SDCE students demonstrate effective communication skills.

INSTITUTIONAL STUDENT LEARNING OUTCOMES (CONTINUED)

3. Critical Thinking
SDCE students critically process information, make decisions, and solve problems independently or cooperatively.
4. Personal and Professional Development
SDCE students pursue short term and life-long learning goals, mastering necessary skills and using resource management and self-advocacy skills to cope with changing situations in their lives.

COURSE GOALS

To provide instruction and practical application of occupational knowledge skills in the Plumbing industry and to provide students with a working knowledge of the tools, materials, systems, installation methods, and codes associated with the modern plumbing trade. Integrated throughout the course are career preparation standards, which include communication, interpersonal skills, problem solving, safety, technology, and other employment skills. Students who successfully complete the program will be qualified for entry-level positions in the plumbing trade. Jobs in the field include plumber, estimator, pipe fitter and plumber apprentice.

COURSE OBJECTIVES

Students will demonstrate through practical applications, written and oral communication skills, their ability to:

1. Demonstrate ability to calculate fractions, decimals, weights, measures, volumes and areas related to plumbing jobs.
2. Demonstrate ability to apply geometry, Pythagorean theorem and offsets in calculating plumbing jobs.
3. Interpret symbols, terms, isometric designs layouts and designs, dimensioning shown on blueprints.
4. Interpret blueprint rough-in sheets.
5. Estimate the amount of materials, supplies and the equipment and tools used on a job.
6. Estimate the cost of materials, supplies and the equipment, tools and other costs of the job.
7. Demonstrate use of flow and heating characteristics on jobs.
8. Interpret installation and code requirements of solar water heating and gray water systems.
9. Demonstrate methods of expansion control.
10. Demonstrate use of materials and specialized systems.
11. Demonstrate ability to interpret Appendix "A" Water Pipe Sizing and Appendix "D" Rain Water Control
12. Interpret codes related to water heater sizing.
13. Demonstrate being on time and ready to work.
14. Complete assigned work.
15. Regularly contributes to class discussion advancing thoughtful ideas and suggestions.
16. Complete work in a neat and orderly fashion.

COURSE OBJECTIVES (CONTINUED)

17. Follow directions both oral and written.
18. Work well with minimum supervision.
19. Meet industry standards for personal neatness and grooming.
20. Choose appropriate actions in response to constructive criticism.
21. Complete a resume and job application.
22. Model job interview techniques.
23. Describe career opportunities in the field.
24. Demonstrate the need for continuing education and learning.

SECTION II

COURSE CONTENT AND SCOPE

The following topics are included in the framework of the course but are not intended as limits on content. The order of presentation and relative emphasis will vary with each instructor.

1. Introduction 9 Hours
 - 1.1. Research and interpretation of Plumbing Codes
 - 1.1.1. Minimum waste and trap size
 - 1.2. Occupational safety standards
 - 1.1.1 Care of tools and equipment
 - 1.1.2 Personal safety
 - 1.1.3 Site safety
 - 1.3. Performing tests and inspections of plumbing installations
2. Workplace Basic Skills 3 Hours
 - 2.1. Expected dress and grooming in the workplace
 - 2.2. Working neatly and cleanly
 - 2.3. Attitude on the job
 - 2.4. Communications with clients and co-workers
 - 2.5. Care of customer property and facilities
3. Advanced Plumbing Math 12 Hours
 - 3.1. Calculating fractions and decimals
 - 3.2. Calculating weights, measures, volumes and areas
 - 3.3. Applied geometry, Pythagorean theorem, calculating offsets
4. Blueprint Reading 32 Hours
 - 4.1. Symbols and terms
 - 4.2. Reading and interpretation of Rough-In Sheets
 - 4.3. Interpreting isometric designs
 - 4.4. Reading and interpretation of blueprint layouts and designs
 - 4.5. Interpreting structural conditions and installation practices on blueprints
 - 4.6. Interpreting dimensioning on a plan
 - 4.6.1. center-to-center
 - 4.6.2. end-to-end
5. Estimating 12 Hours
 - 5.1. Estimating materials and supplies to be used on a job
 - 5.2. Identifying tools and equipment to be used on a job
 - 5.3. Estimating materials costs, supplies and other job costs

COURSE CONTENT AND SCOPE (CONTINUED)

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| 6. | Advanced Plumbing Theory | 18 Hours |
| | 6.1. Flow characteristics on plumbing jobs | |
| | 6.2. Heating characteristics | |
| | 6.3. Methods of expansion control | |
| | 6.4. Use of materials and specialized systems | |
| | 6.5. Interpreting solar water heating installation and codes | |
| | 6.6. Interpreting codes and installation requirements of gray water systems | |
| 7. | Advanced Sizing Methods | 24 Hours |
| | 7.1. Interpretation of Appendix "A" Water Pipe sizing | |
| | 7.2. Interpretation of water heater sizing | |
| | 7.3. Interpretation of Appendix "D" Rain Water Control | |
| 8. | Job Search Instruction | 10 Hours |
| | 8.1. Selecting a job based on experience | |
| | 8.2. Preparation of a resume | |
| | 8.3. Completing a job application | |
| | 8.4. Locating job openings | |
| | 8.5. Preparation for job interviews | |
| | 8.6. Good job interviewing techniques | |
| | 8.7. Career ladder opportunities in the plumbing trade | |

APPROPRIATE READINGS

Reading assignments are required and may include but, are not limited to the following:

Uniform Plumbing Code, 2006; International Association of Plumbing and Mechanical Officials (IAPMO), IAMPO Press; and Interpretation Manual, 2006, IAMPO Press.

Illustrated Training Manual, 6th Edition, E. Keith Blankenbaker, Goodheart-Wilcox Company, Inc., 2005

WRITING ASSIGNMENTS

Writing assignments are required and may include, but are not limited to the following:

Note taking in class, chapter worksheets and a personal resume.

OUTSIDE ASSIGNMENTS

Students are expected to spend a minimum of two hours per day outside of class in practice and preparation for each day in class. Appropriate assignments may include, but not limited to:

1. Appropriate readings
2. Preparing research projects
3. Preparing appropriate writing assignments
4. Studying as needed to perform successfully in class

APPROPRIATE ASSIGNMENTS THAT DEMONSTRATE CRITICAL THINKING

Critical thinking assignments are required and may include, but are not limited to the following: Calculation of fractions, decimals, weights, measures, geometry problems, volumes and areas. Interpretation and application of blueprint schematics and Code requirements; construction of models from detailed blueprint information; detail and re-design of plumbing drawings.

EVALUATION

A student's grade will be based on multiple measures of performance related to the course objectives. Multiple measures may include, but are not limited to the following: In-class assignments, Mid-term and Final Exams, demonstrated knowledge of layout and design, quizzes, class participation, and attendance.

METHOD OF INSTRUCTION

Methods of instruction may include, but are not limited to, the following: lecture, discussion, computer assisted instruction, laboratory, discussion seminar, lecture/lab combination, learning modules, audio-visual, collaborative learning, job shadowing, guest speakers from industry, technology demonstrations, field trips or field assignments.

TEXTS AND SUPPLIES

Textbooks may include, but are not limited to:
Uniform Plumbing Code, 2006; International Association of Plumbing and Mechanical Officials (IAPMO), IAPMO Press; and Interpretation Manual, current edition, IAPMO Press.
Illustrated Training Manual, 6th Edition, E. Keith Blankenbaker, Goodheart-Wilcox Company, Inc., current edition

WEBSITES: www.phcc.org; www.naphcc.org; www.plumbingweb.com/assn.html;
www.masterplumber.com/instructions/industry.html; www.tmbpublishing.com;
www.mathpower.com/tutorial.htm; www.sosmath.com/; tutorial.math.lamar.edu/;
www.math.com/

PREPARED BY: Nancy Helt DATE: 11-16-2009

REVISED BY: Instructional Services, SLOs added DATE: March 9, 2017

Instructors must meet all requirements stated in Policy 3100 (Student Rights, Responsibilities and Administrative Due Process), and the Attendance Policy set forth in the Continuing Education Catalog.

REFERENCES:

San Diego Community College District Policy 3100
California Community Colleges, Title 5, Section 55002
Continuing Education Catalog