

SAN DIEGO COMMUNITY COLLEGE DISTRICT
CONTINUING EDUCATION
COURSE OUTLINE

SECTION I

SUBJECT AREA AND COURSE NUMBER

MECT 422

COURSE TITLE

PLUMBING II

TYPE COURSE

NON-FEE

VOCATIONAL

CATALOG COURSE DESCRIPTION

This course is focused on the latest adopted Uniform Plumbing Code (UPC), the model plumbing code adopted by the State of California, published by the International Association of Plumbing and Mechanical Officials (IAPMO). Instruction also includes basic mathematics as it relates to the plumbing trade. (FT)

LECTURE/LABORATORY HOURS

120

ADVISORIES

Successful completion of Plumbing I is strongly advised. Students must pass basic plumbing and safety test with 100 percent accuracy. 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 in plumbing math as it relates to lengths, areas, volumes, weights, 45 degree offsets and surfaces.
2. Demonstrate knowledge of UPC interpretations and administration of the Code; definitions and general regulations.
3. Demonstrate knowledge of the requirements, regulations and interpretations of: plumbing fixtures; water heaters and gas exhaust vents and reference standards.
4. Demonstrate knowledge of the requirements, regulations, interpretations and sizing of water supply and distribution including materials and installation techniques.
5. Demonstrate knowledge of the requirements, regulations and sizing of: drain, waste and vent systems, traps, and special waste systems, including materials and installation techniques.
6. Describe standard rough-in: techniques, heights, distances, spacing, and installation practices.
7. Demonstrate ability to interpret requirements, regulations and sizing of: building sewers, private sewage disposal and storm drain systems including materials and installation techniques.
8. Explain the requirements, regulations, interpretations and sizing of low and medium pressure natural gas and LPG systems including materials and installation techniques.
9. Demonstrate knowledge of the use of special drain, vent, and angle fittings: pipe joints and connections.
10. Discuss knowledge of the requirements and regulation of Medical Gas Systems.
11. Define the symbol interpretation and use of isometric and orthographic drawings.

COURSE OBJECTIVES (CONTINUED)

12. Demonstrate being on time and ready to work.
13. Complete assigned work in a neat and orderly fashion.
14. Contribute to class discussion advancing thoughtful ideas and suggestions.
15. Follow oral and written directions.
16. Work well with minimum supervision.
17. Meet industry standards for personal neatness and grooming.
18. Choose appropriate actions in response to constructive criticism.
19. Complete a resume and job application.
20. Model job interview techniques.
21. Describe career opportunities in the field.
22. 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 3 Hours
 - 1.1. Overview of Course
 - 1.1.1. Mathematics
 - 1.1.2. Uniform Plumbing Code (UPC)
 - 1.1.3. Testing
2. Basic Mathematics As It Relates To Plumbing 6 Hours
 - 2.1. Need and Use of Math in the Trade
 - 2.2. Measurements/Dimensions
 - 2.3. Addition/Subtraction of feet and inches (base 12)
 - 2.4. Multiplication/Division of feet and inches
 - 2.4.1. Need to convert
 - 2.4.2. Decimal conversions
 - 2.4.3. Calculator use
 - 2.5. Application
 - 2.5.1. Lengths
 - 2.5.2. Formulas for Square Areas
 - 2.5.2.1. Squares
 - 2.5.2.2. Rectangles
 - 2.5.2.3. Triangles
 - 2.5.2.4. Circles
 - 2.5.2.5. Cylinders
 - 2.5.3. Formulas for Cubic Volumes
 - 2.5.3.1. Cubes
 - 2.5.3.2. Cylinders
3. Basic Trigonometry As It Relates To Plumbing 6 Hours
 - 3.1. Need and use
 - 3.2. Terms and theories
 - 3.3. Triangle types

COURSE CONTENT AND SCOPE (CONTINUED)

3.3.1.	Acute	
3.3.2.	Obtuse	
3.3.3.	Equilateral	
3.3.4.	Isosceles	
3.3.5.	Right (90°)	
3.3.6.	45°	
3.4.	Applications	
3.4.1.	Use of Pythagorean Theorem	
3.4.2.	Origin and use of 1.414 constant	
4.	Introduction And Brief History Of Plumbing Codes	4 Hours
4.1.	Review of need	
4.2.	Evolution	
4.3.	Amending and amendments	
4.4.	Variations	
4.5.	Use/interpretations	
5.	Code-Administrative, Definitions, General Regulations	10 Hours
5.1.	Scope	
5.2.	Authority	
5.3.	Permits	
5.4.	Appeals	
5.5.	Definitions	
5.5.1.	Dictionary use/Code use	
5.5.2.	Review of terms	
5.6.	Materials	
5.6.1.	Standards	
5.6.2.	Alternates	
5.7.	Methods	
5.7.1.	Workmanship	
5.7.2.	Alternate methods	
5.7.3.	Foundation, structural and support considerations	
6.	Plumbing Fixtures, Fittings, Water Heaters And Vents	8 Hours
6.1.	General requirements	
6.2.	Materials	
6.3.	Special/prohibited fixtures	
6.4.	Installation	
6.5.	Spacing/securing	
6.6.	Definitions	
6.7.	Permits	
6.8.	Enclosures/combustion air	
6.9.	Protection/clearances	
6.10.	Venting/limitations	
6.10.1.	Materials	
6.10.2.	Areas of venting systems	
6.10.3.	Termination of venting systems	
7.	Water Supply And Distribution	17 Hours
7.1.	Requirements	
7.2.	Cross-connection control	

COURSE CONTENT AND SCOPE (CONTINUED)

- 7.3. Materials
- 7.4. Pressures - Minimum/Maximum
- 7.5. Installation/testing
- 7.6. Sizing
- 8. Sanitary Drainage, Building Sewers And Private Disposal Systems 12 Hours
 - 8.1. Materials
 - 8.2. Fixture units
 - 8.3. Installation/grade
 - 8.4. Cleanouts
 - 8.5. Location
 - 8.6. Sizing
 - 8.7. Testing
 - 8.8. Terminations
- 9. Indirect Wastes, Venting, Traps And Interceptors 12 Hours
 - 9.1. Definitions
 - 9.2. Sizing
 - 9.3. Receptors
 - 9.4. Chemical wastes
 - 9.5. Material
 - 9.6. Grade, connection and termination
 - 9.7. Special venting systems
 - 9.7.1. Wet Venting
 - 9.7.2. Island Venting
 - 9.7.3. Combination waste and vent system
 - 9.8. Traps/Interceptors
 - 9.8.1. Requirements/protection
 - 9.8.2. Trap arm description
 - 9.8.3. Prohibited traps
 - 9.8.4. Interceptors
 - 9.8.4.1. Types
 - 9.8.4.2. Design
- 10. Fuel Gas Piping 15 Hours
 - 10.1. Definitions
 - 10.2. Materials
 - 10.3. Installation/workmanship/testing
 - 10.4. Appliance connectors
 - 10.5. Sizing
 - 10.5.1. BTU/cu. ft.
 - 10.5.2. CFH
 - 10.5.3. Low pressure natural gas systems
 - 10.5.4. Medium Pressure natural gas systems
 - 10.5.4.1. 2 psi
 - 10.5.4.2. 3 psi
 - 10.5.4.3. 5 psi
 - 10.5.5. LPG systems

COURSE CONTENT AND SCOPE (CONTINUED)

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| 11. | Storm Drain and Medical Gas | 6 Hours |
| | 11.1. General requirements | |
| | 11.2. Materials | |
| | 11.3. Installation/workmanship | |
| | 11.4. Testing | |
| 12. | Drawings | 15 Hours |
| | 12.1. System design | |
| | 12.1.1 Goals | |
| | 12.1.2. Strategies | |
| | 12.2. Job layout | |
| | 12.3. Orthographic view | |
| | 12.4. Isometric view | |
| | 12.4.1. Fitting identification (size/type) | |
| | 12.4.2. Fitting takeoff | |
| | 12.4.3. Material takeoff | |
| 13. | Job Search Instruction | 6 Hours |
| | 13.1. Job market analysis | |
| | 13.2. Writing a resume | |
| | 13.3. Job interview techniques | |
| | 13.4. Career ladders and 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., current edition

WRITING ASSIGNMENTS

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

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California Community Colleges, Title 5, Section 55002
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