

Course Outline

COURSE: WTRM 132 **DIVISION:** 50 **ALSO LISTED AS:**

TERM EFFECTIVE: Spring 2018 **Inactive Course**

SHORT TITLE: ADV WATER DISTRIBUTION

LONG TITLE: Advanced Water Distribution

Units	Number of Weeks		Contact Hours/Week		Total Contact Hours
3	18	Lecture:	3	Lecture:	54
		Lab:	0	Lab:	0
		Other:	0	Other:	0
		Total:	3	Total:	54

COURSE DESCRIPTION:

This advanced level course prepares students for work in a highly skilled or supervisory position in the operation of a water distribution system. It prepares the student to take the State of California Water Distribution Operator exam at D3, D4, and D5 levels. This course is now listed as WTRM 232. **ADVISORY:** WTRM 105 Water Distribution 1, WTRM 108 Water Distribution 2, WTRM 102 Beginning Water/Wastewater Mathematics.

PREREQUISITES:

COREQUISITES:

CREDIT STATUS: D - Credit - Degree Applicable

GRADING MODES

- L - Standard Letter Grade
- P - Pass/No Pass

REPEATABILITY: N - Course may not be repeated

SCHEDULE TYPES:

- 02 - Lecture and/or discussion

STUDENT LEARNING OUTCOMES:

1. Interpret public health standards applicable to water supply including drinking water standards, cross connection control and backflow prevention.

Measure: written exam

PLO:

ILO: 7,2

GE-LO:

Anticipated Year of Assessment: 2016-17

2. Perform complex mathematical calculations and conversions relating to volumes, flow rates, velocities, pressure, hydrostatic force, chlorine dosage and meter accuracy.

Measure: written exam, homework

PLO:

ILO: 7,2

GE-LO:

Anticipated Year of Assessment: 2016-17

3. Identify the proper methods to select, handle, install, repair, maintain and disinfect pipe; as well as the different types of meters and their applications.

Measure: written exam, homework, discussion

PLO:

ILO: 7,2,1

GE-LO:

Anticipated Year of Assessment: 2016-17

4. Explain pumping operations and assess common pump problems, including control systems and SCADA systems.

Measure: written exam, homework, discussion

PLO:

ILO: 7,2,1

GE-LO:

Anticipated Year of Assessment: 2016-17

5. Demonstrate comprehension of chlorine delivery systems and safe handling of chlorine.

Measure: written exam, homework

PLO:

ILO: 7,2

GE-LO:

Anticipated Year of Assessment: 2016-17

6. Recognize safety hazards, safety regulations and safe work practices including the principles of emergency response planning, operations, hazards and vulnerability assessment of water distributions systems and facilities.

Measure: written exam, homework

PLO:

ILO: 7,2

GE-LO:

Anticipated Year of Assessment: 2016-17

7. Discuss the principals of management, organization and leadership techniques.

Measure: written exam, discussion

PLO:

ILO: 7,2,1

GE-LO:

Anticipated Year of Assessment: 2016-17

CONTENT, STUDENT PERFORMANCE OBJECTIVES, OUT-OF-CLASS ASSIGNMENTS

Inactive Course: 11/13/2017

3 Hours

Content: Public Health -

In-depth exploration and applications of: public health aspects of water supply; drinking water standards; cross connection control and backflow prevention.

Student Performance Objectives (SPO): Interpret and analyze public health standards applicable to water supply including drinking water standards, cross connection control and backflow prevention.

Out-of-Class Assignments: Read related textbook chapter. Review notes and complete study guide questions.

3 Hours

Content: Sources of Water and Characteristics -

Knowledge and applications of: distinct sources of surface water, groundwater and reclamation product; physical, chemical and biological characteristics of each type.

Student Performance Objectives (SPO): Distinguish and evaluate sources and characteristics of available water and their uses and applications.

Out-of-Class Assignments: Read related textbook chapter. Review notes and complete study guide questions.

3 Hours

Content: Water Production, Storage and Distribution -

Comprehensive water treatment processes and plant operations; storage reservoirs and tanks; distinct types of distribution systems; testing, monitoring and maintaining water quality in distribution systems.

Student Performance Objectives (SPO): Compare and contrast different types of water distribution systems. Interpret and synthesize drinking water public health hazards and water quality standards. Describe in detail testing and monitoring standards and processes and procedures for maintaining water quality in distribution systems.

Out-of-Class Assignments: Read related textbook chapter. Review notes and complete study guide questions. Field trip to the campus' water storage tanks.

6 Hours

Content: Mathematics and Hydraulics -

Advanced calculations and conversions relating to: chemical dosages; hydrostatics; flow rates, volumes and measurements; pump rates, head and efficiency.

Student Performance Objectives (SPO): Formulate and perform higher order mathematical calculations and conversions relating to water flow, pressure, volume, velocity, force, chlorine dosage and meter accuracy. Perform mathematical problems relating to the ability to calculate: the cost of water production, the cost of pumping water, estimating future water needs, the hydraulic gradient, water production costs, a water loss rate and annual expenditures.

Out-of-Class Assignments: Read related textbook chapter. Review notes and complete take home math problem sets.

3 Hours

Content: Disinfection -

Advanced knowledge and applications of: chlorine properties and use; chlorine reactions with various compounds; chlorine safety; breakpoint chlorination; disinfectants other than chlorine.

Student Performance Objectives (SPO): Identify and assess the proper method to disinfect pipe. Analyze and evaluate the mechanics and operations of chlorine delivery systems and safely perform chlorine related procedures. Explain how to properly collect water samples from water distribution systems and test for chlorine residual.

Out-of-Class Assignments: Read related textbook chapter. Review notes and complete study guide questions.

3 Hours

Content: Pipelines -

Pipeline concepts and principles: construction and materials; installation, protection and maintenance; applications and uses.

Student Performance Objectives (SPO): Identify and assess the proper method to handle, install, repair and maintain pipe. Assess factors considered in the selection of pipe.

Out-of-Class Assignments: Read related textbook chapter. Review notes and complete study guide questions.

3 Hours

Content: Pipeline Appurtenances -

Specific types of valves - blow-offs and air valves; applications for installation and maintenance; purposes and functions.

Student Performance Objectives (SPO): State the uses of water utility valves. Identify the various types of valves and describe their purpose. Discuss the importance of maintaining accurate valve records.

Out-of-Class Assignments: Read related textbook chapter. Review notes and complete study guide questions. Explore the campus and investigate the various types of valves/valve assembly systems utilized. Come prepared to discuss your findings with the class.

3 Hours

Content: Meters and Services -

Specific types of meters and materials; methods and practices in installation; maintenance and uses.

Student Performance Objectives (SPO): Assess factors considered in the selection of pipe including the ability to read meters and calculate their accuracy. Name the different types of meters and explain their practical applications.

Out-of-Class Assignments: Read related textbook chapter. Review notes and complete study guide questions. Determine the type of meter that is on your personal water service and come prepared to discuss with the class.

3 Hours

Content: Pumps and Motors -

Advanced pumping terminology, pumping principles, types and uses of pumps; applied interpretation of pump curves, motors, voltage power and efficiency; installation and maintenance.

Student Performance Objectives (SPO): Formulate pump functions and operations. Identify and assess pump problems. Adjust and repack packing glands. Perform routine maintenance of pumps and motors.

Out-of-Class Assignments: Read related textbook chapter. Review notes and complete study guide questions. Field trip to a local pump station. Write a 1-2 page paper on your experience.

3 Hours

Content: Electrical/Instrumentation -

Advanced terminology, types of control systems, sensing and sampling devices; specific types of electronic signals, readout devices and remote control systems; SCADA systems, signal transmission and calibration; data transmission methods and systems.

Student Performance Objectives (SPO): Utilize advanced electrical terms. Evaluate control circuits, sensing equipment and SCADA systems. Discuss data transmission methods and systems.

Out-of-Class Assignments: Read related textbook chapter. Review notes and complete study guide questions.

3 Hours

Content: Safety -

Applied principles of trenching and shoring, pipe construction, working in confined spaces and working around construction equipment; familiarity with safety regulations - SDS documentation (HazCom Regulations), OSHA regulations.

Student Performance Objectives (SPO): Conduct any required demonstration work safely by adhering to safety regulations and safe work practices. Explain the OSHA reporting requirements. Develop a safety plan.

Out-of-Class Assignments: Read related textbook chapter. Review notes and complete study guide questions. Put together a sample safety plan.

3 Hours

Content: Maps, Drawings and Records -

Synthesis, analysis and interpretation of commonly used symbols, conventions and terminology used with various types of maps and construction drawings; recordkeeping of as-built drawings, map ties, water production and maintenance records.

Student Performance Objectives (SPO): Interpret and analyze complex water distribution system maps, drawings, records and as-built drawings. Develop, maintain and interpret accurate water production and maintenance records. Explain the reason for maintaining thorough records.

Out-of-Class Assignments: Read related textbook chapter. Review notes and complete study guide questions. Prepare an as-built.

3 Hours

Content: Water System Operations -

Daily operating procedures, monitoring process information, regulation of flows; chemical use and handling operating records and reports; emergency conditions and procedures.

Student Performance Objectives (SPO): Name the types of water systems. List the common elements associated with water supply systems. Discuss the two major objectives for drinking water distribution systems - maintaining water quality and maintaining adequate pressure/flow. Discuss the safety precautions for system operation and maintenance work.

Out-of-Class Assignments: Read related textbook chapter. Review notes and complete study guide questions.

3 Hours

Content: Management and Leadership Skills -

General principals of organization; administration; communication and leadership.

Student Performance Objectives (SPO): Discuss the general principles of management, organization and leadership techniques as they relate to the water/wastewater industry.

Out-of-Class Assignments: Read related textbook chapter. Review notes and complete study guide questions.

3 Hours

Content: Emergency Response Planning and Operations -

General principles of hazard assessment and vulnerability analysis; Standardized Emergency Management System (SEMS).

Student Performance Objectives (SPO): Explain the general principles of emergency response planning and operations and the hazard and vulnerability assessment of water distributions systems and facilities. Describe SEMS.

Out-of-Class Assignments: Read related textbook chapter. Review notes and complete study guide questions. Interview a water utility management staff member about their emergency response plan and come prepared to discuss the information in class.

4 Hours

Content: Public Relations -

Assessment and response to water quality complaints; interpretation and evaluation of water quality standards violations; communications and dealing with the media; standards for public notification and dealing with the public.

Review the Water Distribution Exams Expected Range of Knowledge, the application process and the type of exam questions.

Student Performance Objectives (SPO): State the role of public relations as it relates to the water industry and the role of water distribution personnel. Discuss the application process for the water distribution exams.

Out-of-Class Assignments: Read related textbook chapter. Review notes and complete study guide questions. Complete sample water distribution exams for Grade D3, D4 and D5.

2 Hours Final

METHODS OF INSTRUCTION:

lecture, discussion, multimedia presentations, guest speakers, field trips

METHODS OF EVALUATION:

Category 1 - The types of writing assignments required:

Percent range of total grade: 10 % to 20 %

Written Homework

Category 2 - The problem-solving assignments required:

Percent range of total grade: 20 % to 40 %

Homework Problems

Quizzes

Category 3 - The types of skill demonstrations required:

Percent range of total grade: 10 % to 20 %

Performance Exams

Category 4 - The types of objective examinations used in the course:

Percent range of total grade: 40 % to 60 %

Multiple Choice

Other: Math - Show Work

REPRESENTATIVE TEXTBOOKS:

Required:

Editor: Mays, Larry W.. Water Transmission and Distribution (Fourth Edition). Denver, CO: American Water Works Association: 2010. Or other appropriate college level text.

Reading level of text, Grade: 12th Verified by: MS Word

ARTICULATION and CERTIFICATE INFORMATION

Associate Degree:

CSU GE:

IGETC:

CSU TRANSFER:

Transferable CSU, effective 201670

UC TRANSFER:

Not Transferable

SUPPLEMENTAL DATA:

Basic Skills: N

Classification: Y
Noncredit Category: Y
Cooperative Education:
Program Status: 1 Program Applicable
Special Class Status: N
CAN:
CAN Sequence:
CSU Crosswalk Course Department:
CSU Crosswalk Course Number:
Prior to College Level: Y
Non Credit Enhanced Funding: N
Funding Agency Code: Y
In-Service: N
Occupational Course: C
Maximum Hours: 3
Minimum Hours: 3
Course Control Number: CCC000571980
Sports/Physical Education Course: N
Taxonomy of Program: 095800