

CATALOG INFORMATION

Dept and Nbr: WTR 111            Title: WATER DISTRIBUTION OPER  
Full Title: Water Distribution System Operator  
Last Reviewed: 2/13/2023

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	17.5	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable  
Grading:            Grade Only  
Repeatability:    00 - Two Repeats if Grade was D, F, NC, or NP  
Also Listed As:  
Formerly:        ENVT 111

**Catalog Description:**  
This course provides training in the knowledge and skills required to safely operate a potable water distribution system. Course covers components of water distribution system facilities, flow in pipes, storage facilities, pumps, instrumentation and control, distribution system operation and maintenance, distribution system water quality, safety, and record keeping. Prepares students for the State of California certification examination for Water Distribution System Operator.

**Prerequisites/Corequisites:**  
Course Completion of WTR 102 ( or ENVT 102 or ENVT 200.2)

**Recommended Preparation:**

**Limits on Enrollment:**

**Schedule of Classes Information:**  
Description: Provides training in the knowledge and skills required to safely operate a water distribution system facility. Prepares students for the State of California certification examination for Water Distribution System Operator Grades D1 and D2 . (Grade Only)  
Prerequisites/Corequisites: Course Completion of WTR 102 ( or ENVT 102 or ENVT 200.2)

Recommended:  
Limits on Enrollment:  
Transfer Credit:  
Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>	Effective:	Inactive:
<b>CSU GE:</b>	<b>Transfer Area</b>	Effective:	Inactive:
<b>IGETC:</b>	<b>Transfer Area</b>	Effective:	Inactive:
<b>CSU Transfer:</b>		Effective:	Inactive:
<b>UC Transfer:</b>		Effective:	Inactive:

**CID:**

**Certificate/Major Applicable:**

Certificate Applicable Course

## **COURSE CONTENT**

### **Outcomes and Objectives:**

1. Identify all the major components that make up a potable water distribution system, understand the purpose and operation of each, and be able to operate these components.
2. Determine head loss in common piping configurations used in potable water distribution systems.
3. Identify the commonly used pipe materials used in potable water distribution systems and the advantages and disadvantages of each.
4. Identify the different types of valves used in a potable water distribution system, and understand the purpose and operation of each type.
5. Identify and describe the most commonly used types of storage facilities.
6. Specify the correct size centrifugal pump for common pumping applications in a potable water distribution system.
7. Identify and specify the correct instrument or control system for the most common operational monitoring and control needs in a potable water distribution system.
8. Determine if the physical facilities in a potable water distribution system are operating correctly.
9. Disinfect new and existing wells, pumps, mains, and storage facilities; calculate chlorine dosages.
10. Identify types of contaminants that could get into a potable water distribution system, identify and remove sources of contaminants in distribution systems.
11. Develop and conduct a potable water distribution system water quality monitoring program.
12. Accurately measure basic water quality parameters from distribution system samples such as pH, temperature, chlorine residual.
13. Conduct an effective flushing program.
14. Develop a record keeping system for a potable water distribution system and keep accurate records.

15. Determine safety issues relative to a specific D1 or D2 potable water distribution system and conduct an effective safety program to prevent on the job injuries.

## **Topics and Scope:**

- I. Introduction
  - A. Overview of Potable Water Distribution Systems
  - B. Roles and Responsibilities of the Distribution System Operator
  - C. Certification of Distribution System Operators
- II. Distribution System Facilities
  - A. Water Mains and Appurtenances
  - B. Pipe Installation
  - C. Valves, Fire Hydrants, Meters
- III. Flow in Pipes
  - A. Hydraulic and Energy Grade Line
  - B. Friction Loss in Pipes
- IV. Storage Facilities
  - A. Types and Purpose of Storage Facilities
  - B. Operation and Maintenance of Storage Facilities
  - C. Inspection of Storage Facilities
  - D. Removing a Storage Facility from Service and Returning it to Service
  - E. Collect Water Quality Samples from a Storage Facility
  - F. Disinfection of Storage Facilities
- V. Pumps
  - A. Principles of Centrifugal Pump Operation
  - B. Operation and Maintenance of Centrifugal Pumps
  - C. Specifying Centrifugal Pumps for Potable Water Distribution System Applications
- VI. Instrumentation and Control
  - A. Types and Purpose of Instrumentation and Controls
  - B. Primary Sensors
  - C. Telemetry and Display
  - D. Control Systems
- VII. Distribution System Operation and Maintenance
  - A. Water Distribution System Surveillance Program
  - B. Water Distribution System Water Quality Monitoring Program
  - C. Cross-Connection Control Program
  - D. Locate, Repair, Flush and Clean Distribution System Mains.
  - E. Test and Read Meters
  - F. Disinfect Mains and Storage Facilities
  - G. Record Keeping
- VIII. Water Quality Considerations
  - A. Types and Sources of Contaminants in Distribution Systems
  - B. Causes and Corrective Action to Eliminate Water Quality Degradation in Distribution Systems
- IX. Disinfection
  - A. Disinfection of Water System facilities
  - B. Chlorine Dosage Calculations
  - C. Operate and Maintain Hypochlorinators and Gas Chlorinators

- D. Trouble Shooting Chlorination Systems
- E. Chlorine Safety
- X. Safety
  - A. Potable Water Distribution System Safety Program
  - B. Personal Safety
  - C. Safety Around Common Distribution System Facilities
  - D. Working in Streets
- XI. Record Keeping (Measurements)
  - A. Operational Records
  - B. Maintenance Records
  - C. Regulatory Compliance Records

### Assignment:

1. Reading assignments, approximately 10-20 pages per week.
2. Complete questions at the end of each textbook chapter.
3. Problem solving homework assignments related to operation and maintenance of potable distribution systems.
4. Weekly quizzes.
5. Comprehensive final exam.

### Methods of Evaluation/Basis of Grade:

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course.

Writing  
0 - 0%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems, Review questions.

Problem solving  
30 - 50%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None

Skill Demonstrations  
0 - 0%

**Exams:** All forms of formal testing, other than skill performance exams.

Multiple choice, True/false, Matching items, Completion, Short answer.

Exams  
40 - 60%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Class participation.

Other Category  
5 - 10%

**Representative Textbooks and Materials:**

Water Distribution System Operation and Maintenance, Fifth Edition.

Published by: Office of Water Programs, Sacramento Foundation, 2005.