



5055 Santa Teresa Blvd

Gilroy, CA 95023

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## Course Outline

**COURSE:** WTRM 206

**DIVISION:** 50

**ALSO LISTED AS:** WTRM 106

**TERM EFFECTIVE:** Summer 2025

**CURRICULUM APPROVAL DATE:** 03/11/2025

**SHORT TITLE:** BEGINNING W T PLANT OPS

**LONG TITLE:** Beginning Water Treatment Plant Operation

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

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Out of Class Hrs: 108.00

Total Learning Hrs: 162.00

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### COURSE DESCRIPTION:

This is a comprehensive course that teaches basic principles of operation and maintenance of water treatment plant. The course covers sources of water; public health aspects of water supply; physical and bacteriologic standards of water quality; types of water treatment plants, water treatment procedures, operation, storage and distribution. This course is designed to prepare the student to take the State of California Water Treatment Operator exams (T1, T2). This course was previously listed as WTRM 106. **ADVISORY:** WTRM 201 Introduction to Water/Wastewater Technology; WTRM 202 Beginning Water/Wastewater Mathematics.

**CREDIT STATUS:** D - Credit - Degree Applicable

### GRADING MODES

L - Standard Letter Grade

**REPEATABILITY:** N - Course may not be repeated

### SCHEDULE TYPES:

02 - Lecture and/or discussion

05 - Hybrid

71 - Dist. Ed Internet Simultaneous

72 - Dist. Ed Internet Delayed

**STUDENT LEARNING OUTCOMES:**

By the end of this course, a student should:

1. Describe the various methods, regulations, and procedures related to water treatment standards.
2. Demonstrate the ability to meet the written test standards for the T1 and T2 State of California water treatment operator exams.

**COURSE OBJECTIVES:**

By the end of this course, a student should:

1. Calculating the basic waterworks mathematics calculations, including dosage rates, area and volume, static head pressure, and unit and conversion factors.
2. Identify various sources of water in California that explain groundwater and surface water characteristics, the hydrological cycle, and well construction and location.
3. Identify different types of intake devices and applications, and watershed issues involved with surface sources.
4. Define the concepts and applications of coagulation and flocculation, coagulant and determine the dosage, adjust chemical feed rates.
5. Identify factors affecting the performance of sedimentation basins and describe various types of sedimentation basins and how they work, start up, and shut down.
6. Explain how other treatment processes affect the performance of the filtration process.
7. Identify the different types of disinfectants, chlorine demand/residual, chlorination equipment, as well as chlorine safety and hazards
8. Identify the adverse effects of corrosion, describe how a pipe corrodes, expose the proper chemicals to control corrosion, describe cathodic protection to control corrosion, and troubleshoot to solve corrosion problems.
9. Be able to explain the importance of taste and odor, identify causes of taste and odor, describe how to locate sources of taste and odor, and explain how to treat or eliminate undesirable taste and odor.
10. Be able to explain the responsibilities of plant operations, including regulation of flows, control of process, record keeping, maintenance of equipment, emergency procedures, and energy conservation.
11. Identify the common water quality properties, such as alkalinity, chlorine residual, chlorine demand, coliform concentration, hardness, pH, temperature, and turbidity.
12. Be able to identify the difference between physical properties of water, chemical properties of water, biological properties of water, and the effect of radioactivity on water. Compare types of reactions as applied to water treatment.
13. Identify the regulations relating to water quality. Outline regulatory requirements including the Clean Water Act (CWA), Safe Drinking Water Act (SDWA), and Basic Water Rights.
14. Evaluate the hazards and safety procedures related to water treatment and explain plant safety techniques, such as, chemical safety, and electrical safety.

**COURSE CONTENT:**

Curriculum Approval Date: 03/11/2025

9 Hours

Content: Waterworks Mathematics

Student Performance Objectives: Solve basic waterworks mathematics calculations. Calculate dosage rates, area and volume, static head pressure, and unit and conversion factors.

3 Hours

Content: Sources of Water Supply

Student Performance Objectives: Identify various sources of water in California. Explain ground water and surface water characteristics, the hydrological cycle, and well construction and location.

3 Hours

Content: Reservoir Management and Intake Structures

Student Performance Objectives: Discuss different types of intake devices and applications, and watershed issues involved with surface sources.

3 Hours

Content: Coagulation and Flocculation

Student Performance Objectives: Describe the concepts and applications of coagulation and flocculation. Perform a jar test, select the proper coagulant and determine the dosage, adjust chemical feed rates, and select optimum speeds for flash mixers and flocculators.

3 Hours

Content: Sedimentation

Student Performance Objectives: Identify factors affecting the performance of sedimentation basins and describe various types of sedimentation basins and how they work, start up, and shut down. Describe the components of effective record keeping for a sedimentation basin, as well as the safe performance of duties associated with a sedimentation basin.

3 Hours

Content: Filtration

Student Performance Objectives: Describe the various types of potable water filters and how they work. Explain how other treatment processes affect the performance of the filtration process. Discuss how to operate and maintain filters under normal and abnormal process conditions, and start up and shut down filtration processes.

6 Hours

Content: Disinfection. Mid term exam.

Student Performance Objectives: Describe different type of disinfectants, chlorine demand/residual, chlorination equipment, as well as chlorine safety and hazards. Evaluate various methods of disinfection as it relates to specific cases.

3 Hours

Content: Corrosion Control

Student Performance Objectives: Outline the adverse effects of corrosion, describe how a pipe corrodes, select the proper chemical to control corrosion, describe cathodic protection to control corrosion, and troubleshoot to solve corrosion problems.

3 Hours

Content: Taste and Odor Control

Student Performance Objectives: Explain the importance of taste and odor, identify causes of taste and odor, describe how to locate sources of taste and odor, and explain how to treat or eliminate undesirable taste and odor. Define the procedures and components used in water treatment.

3 Hours

Content: Plant Operation

Student Performance Objectives: Describe the responsibilities of plant operations, including regulation of flows, control of process, record keeping, maintenance of equipment, emergency procedures, and energy conservation.

**COURSE CONTENT(CONTINUED):**

3 Hours

Content: Laboratory Procedures

Student Performance Objectives: Analyze and explain basic water testing procedures. Explain common lab practices, including jar testing, collecting lab samples, and testing for common water quality properties, such as alkalinity, chlorine residual, chlorine demand, coli-form concentration, hardness, pH, temperature, and turbidity.

3 Hours

Content: Water Quality

Student Performance Objectives: Describe the difference between physical properties of water, chemical properties of water, biological properties of water, and the effect of radioactivity on water. Compare types of reactions as applied to water treatment.

3 Hours

Content: Regulations

Student Performance Objectives: Assess and compare regulations relating to water quality. Outline regulatory requirements including the Clean Water Act (CWA), Safe Drinking Water Act (SDWA), and Basic Water Rights.

4 Hours

Content: Safety

Student Performance Objectives: Evaluate the hazards and safety procedures related to water treatment. Explain plant safety techniques, chemical safety/MSDS, electrical safety, including ARC flash requirements, and confined space entry.

2 Hours

Final Exam.

**METHODS OF INSTRUCTION:**

Lectures, Discussions, Video Presentations, Quizzes, Assignments, Field trips (if available)

**OUT OF CLASS ASSIGNMENTS:**

Required Outside Hours 54

Assignment Description

Read corresponding textbook chapters, assignments, discussions, quizzes and weekly module material

Required Outside Hours 28

Assignment Description

Study for quizzes, midterm and final exam.

Required Outside Hours 26

Assignment Description

Discussions and assignments and presentation

**METHODS OF EVALUATION:**

Writing assignments

Evaluation Percent 10

Evaluation Description

10% - 20% Assignments, Discussions

Problem-solving assignments

Evaluation Percent 40

Evaluation Description

Percent range of total grade: 40% to 60% Assignments, Discussions and Quizzes

Objective examinations

Evaluation Percent 40

Evaluation Description

Percent range of total grade: 40% to 60%

True and False, Multiple Choice, Other: Math - Show Work

Other methods of evaluation

Evaluation Percent 10

Evaluation Description

Percent range of total grade: 0% to 20%

Discussions

**REPRESENTATIVE TEXTBOOKS:**

Water Treatment Plant Operation Volume 1, or other appropriate college level text., Kenneth D. Kerri, University Enterprises, Inc., 2018 or a comparable textbook/material.

ISBN:

Rationale: This text is an important industry standard text and is the most current edition available. This exact textbook is currently being used in the Certificate Water Program courses at CSU, Sacramento.

11th Grade Verified by: Dana Young

**ARTICULATION and CERTIFICATE INFORMATION**

Associate Degree:

CSU GE:

IGETC:

CSU TRANSFER:

Not Transferable

Not Transferable

UC TRANSFER:

Not Transferable

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:

Minimum Hours:

Course Control Number: CCC000588722

Sports/Physical Education Course: N

Taxonomy of Program: 095800