



5055 Santa Teresa Blvd

Gilroy, CA 95023

Course Outline

COURSE: WTRM 209 **DIVISION:** 50 **ALSO LISTED AS:** WTRM 109

TERM EFFECTIVE: Summer 2025

CURRICULUM APPROVAL DATE: 03/11/2025

SHORT TITLE: ADVANCED W T PLANT OPERATION

LONG TITLE: Advanced 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

Out of Class Hrs: 108.00

Total Learning Hrs: 162.00

COURSE DESCRIPTION:

This course focuses on advanced water quality control and treatment with emphasis on state regulations, EPA regulations, advanced mathematics and water chemistry. The course will include an in-depth study of treatment plant processes and their relation to current water quality regulations. This course will be helpful to those preparing for the CDPH Grade T3, T4 and T5 examinations. This course was previously listed as WTRM 109. **ADVISORY:** WTRM 202 Beginning Water-Wastewater Mathematics; WTRM 206 Beginning Water Treatment Plant Operation.

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. Identify the various sources of water, and their treatment processes, in California; comparing the benefits and drawbacks.
2. Demonstrate the ability to meet the written test standards for the CDPH Grade T3, T4 and T5 water treatment operator exams.
3. Assess and compare local, state and federal regulations as they relate to water quality.

COURSE OBJECTIVES:

By the end of this course, a student should:

1. Be able to calculate dosage rates, area and volume, static head pressure, and unit and conversion factors.
2. Be able to calculate energy usage, filtration efficiency, blending rates and advanced dosages with different specific gravities. Solve advanced waterworks mathematics calculations.
3. Understand the different techniques to treat iron and manganese, including phosphate treatment, oxidizing filter treatment, and eliminating plumbing corrosion.
4. To be able to explain the fluoridation process, including the issues surrounding fluoride in the water supply, as well as how fluoride is introduced and dosed using positive displacement pumps and a saturator.
5. understand the causes of water hardening; the characteristics of calcium, manganese, and other ions in hard water; as well as techniques for removing these chemicals.
6. identify the associated chemistry and treatment process impact on scaling and corrosion, as well as other specialized processes to handle unique situations.
7. define the nanofiltration, microfiltration and desalination processes used to treat water, including any post treatment process needed with this type of filtration.
8. To be able to outline the different waste categories and the proper disposal of wastes constantly dealt with in a water treatment environment, including mercury, arsenic, nitrates, manganese, iron and other waste by-products in the treatment process.
9. Identify common maintenance activities that need to be completed in the water treatment plant and ways to track that maintenance.
10. To be able to explain how SCADA controls are read and how they work.
11. Understand the different specific laboratory procedures used to address water quality issues for different types of treatment environments.
12. Define the outline specific EPA and California regulations addressing both the primary and secondary standards of treatment.
13. Be able to define how to effectively manage a water treatment plant from a business, political, strategic, and quality control perspective.

COURSE CONTENT:

Curriculum Approval Date: 03/11/2025

6 Hours

Content: Water Works Math Review

6 Hours

Content: Advance Water Treatment Math

3 Hours

Content: Iron and Manganese Control

3 Hours

Content: Fluoridation

3 Hours

Content: Softening

3 Hours

Content: Specialized Treatment Processes

5 Hours

Content: Membrane Treatment Processes (Membrane Filtration and Demineralization).

3 Hours

Content: Handling and Disposal of Process Wastes

3 Hours

Content: Maintenance

3 Hours

Content: Instrumentation and Control Systems

3 Hours

Content: Advanced Laboratory Procedures

6 Hours

Content: Drinking Water Regulations

5 Hours

Content: Administration

2 Hours

Final Exam.

METHODS OF INSTRUCTION:

Lectures and Discussions, Multimedia, Visual Aids, Demonstrations, Facilities Tours (as available)

OUT OF CLASS ASSIGNMENTS:

Required Outside Hours 44

Assignment Description

Read textbook and study for quizzes and exams.

Required Outside Hours 44

Assignment Description

Homework: Graded take home math assignments. Take home word problem worksheets with sample problems to be graded and discussed in class.

Required Outside Hours 20

Assignment Description

Review of current news articles, weekly modules and text material

METHODS OF EVALUATION:

Writing assignments

Evaluation Percent 10

Evaluation Description

Percent range of total grade: 0% to 20% Review of weekly modules and course reading from text. Provide assignments

Problem-solving assignments

Evaluation Percent 40

Evaluation Description

Percent range of total grade: 40% to 60%

Assignments

Discussions

Quizzes

Exams

Objective examinations

Evaluation Percent 40

Evaluation Description

Percent range of total grade: 40% to 60%

Multiple Choice,

Other: Math - Show Work

Other methods of evaluation

Evaluation Percent 10

Evaluation Description

Percent range of total grade: 0% to 20% Student Participation Discussions

REPRESENTATIVE TEXTBOOKS:

Water Treatment Plant Operation, Volume II, 7th Edition, or other appropriate college level text., Kenneth D. Kerri, University Enterprises, Inc., 2020 or a comparable textbook/material.

Rationale: The current edition will be acceptable and a standard textbook for the water/wastewater industry.

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: CCC000588720

Sports/Physical Education Course: N

Taxonomy of Program: 095800