

Course Outline

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

TERM EFFECTIVE: Fall 2019 **CURRICULUM APPROVAL DATE:** 11/13/2018

SHORT TITLE: ADVANCED W T PLANT OPERATION

LONG TITLE: Advanced Water Treatment Plant Operation

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 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.

PREREQUISITES:

COREQUISITES:

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

72 - Dist. Ed Internet Delayed

STUDENT LEARNING OUTCOMES:

1. Identify the various sources of water, and their treatment processes, in California; comparing the benefits and drawbacks.

Measure of assessment: Quiz, Exam, Homework

Year assessed, or planned year of assessment: 2018

Semester: Spring

2. Assess and compare local, state and federal regulations as they relate to water quality.

Measure of assessment: Quiz, Exam, Homework

Year assessed, or planned year of assessment: 2018

Semester: Spring

3. Demonstrate the ability to meet the written test standards for the CDPH Grade T3, T4 and T5 water treatment operator exams.

Measure of assessment: Quiz, Exam, Worksheet

Year assessed, or planned year of assessment: 2018

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

Curriculum Approval Date: 11/13/2018

6 Hours

Content: Water Works Math Review

Student Performance Objectives: Calculate dosage rates, area and volume, static head pressure, and unit and conversion factors.

6 Hours

Content: Advance Water Treatment Math

Student Performance Objectives: Calculate energy usage, filtration efficiency, blending rates and advanced dosages with different specific gravities. Solve advanced waterworks mathematics calculations.

3 Hours

Content: Iron and Manganese Control

Student Performance Objectives: Discuss different techniques to treat iron and manganese, including phosphate treatment, oxidizing filter treatment, and eliminating plumbing corrosion.

3 Hours

Content: Fluoridation

Student Performance Objectives: 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.

3 Hours

Content: Softening

Student Performance Objectives: Discuss the causes of water hardening; the characteristics of calcium, manganese, and other ions in hard water; as well as techniques for removing these chemicals.

3 Hours

Content: Specialized Treatment Processes

Student Performance Objectives: Explain the associated chemistry and treatment process impact on scaling and corrosion, as well as other specialized processes to handle unique situations.

5 Hours

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

Student Performance Objectives: Explain the nanofiltration, microfiltration and desalination processes used to treat water, including any post treatment process needed with this type of filtration.

3 Hours

Content: Handling and Disposal of Process Wastes

Student Performance Objectives: 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. Analyze the hazards and safety procedures related to water treatment.

3 Hours

Content: Maintenance

Student Performance Objectives: Identify common maintenance activities that need to be completed in the water treatment plant and ways to track that maintenance. Evaluate various methods of disinfection as they relate to specific applications.

3 Hours

Content: Instrumentation and Control Systems

Student Performance Objectives: Explain how SCADA controls are read and how they work. Define the procedures and components used in advanced water treatment.

3 Hours

Content: Advanced Laboratory Procedures

Student Performance Objectives: Discuss different specific laboratory procedures used to address water quality issues for different types of treatment environments. Describe laboratory procedures as they relate to advanced water treatment. Analyze and explain advanced water testing procedures.

6 Hours

Content: Drinking Water Regulations

Student Performance Objectives: Outline specific EPA and California regulations addressing both the primary and secondary standards of treatment.

5 Hours

Content: Administration

Student Performance Objectives: Describe how to effectively manage a water treatment plant from a business, political, strategic, and quality control perspective.

2 Hours

METHODS OF INSTRUCTION:

Lecture, Video Presentation, Guest Lecturer, Field trip to a water treatment facility.

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.

METHODS OF EVALUATION:

Writing assignments

Percent of total grade: 10.00 %

Percent range of total grade: 0% to 20% Review of current news articles.

Problem-solving assignments

Percent of total grade: 40.00 %

Percent range of total grade: 40% to 60% Homework Problems, Exams

Objective examinations

Percent of total grade: 40.00 %

Percent range of total grade: 40% to 60% Multiple Choice, Other: Math - Show Work

Other methods of evaluation

Percent of total grade: 10.00 %

REPRESENTATIVE TEXTBOOKS:

Required Representative Textbooks

Kenneth D. Kerri. Water Treatment Plant Operation, Volume II, 6th Edition, or other appropriate college level text.. California State University, Sacramento: University Enterprises, Inc.,2015.

Reading Level of Text, Grade: 11th Verified by: Dana Young

ARTICULATION and CERTIFICATE INFORMATION

Associate Degree:

CSU GE:

IGETC:

CSU TRANSFER:

Not Transferable

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: CCC000588720

Sports/Physical Education Course: N

Taxonomy of Program: 095800