



5055 Santa Teresa Blvd
Gilroy, CA 95023

Course Outline

COURSE: WTRM 211 **DIVISION:** 50 **ALSO LISTED AS:** WTRM 111

TERM EFFECTIVE: Summer 2024

CURRICULUM APPROVAL DATE: 06/11/2024

SHORT TITLE: ADV WASTEWATER TRT PLT OP

LONG TITLE: Advanced Wastewater 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 is designed to familiarize students with advanced wastewater treatment systems, including secondary and tertiary treatment, solids handling, disinfection, reclamation of wastewater, as well as laboratory study. The course prepares students for the CSWRB Wastewater Treatment Plant Operator examinations. This course was previously listed as WTRM 111. **ADVISORY:** WTRM 201 and WTRM 207.

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
- 71 - Dist. Ed Internet Simultaneous
- 72 - Dist. Ed Internet Delayed

STUDENT LEARNING OUTCOMES:

By the end of this course, a student should:

1. Demonstrate the ability to meet the written test standards for the State of California wastewater treatment plant operator exams.
2. Identify the function of wastewater treatment plant operations in the protection of public health and the environment.
3. Demonstrate competent and efficient plant operations through real-life decision-making examples.

COURSE OBJECTIVES:

By the end of this course, a student should:

1. Utilize basic math principles and formulas as they apply to a wastewater treatment plant, which may include Tank Areas and Volumes, Flow Rates and Velocity, Milligram per Liter to Pounds, Chemical Dosages, Loading Rates, Detention Times and Retention Times, Efficiency and Percent Removal Rates, and Pumping Rates.
2. Utilize advanced calculation methods, including sludge and digester calculations, wasting rates, and fixed solid calculations.
3. Explain the principles of the activated sludge process and describe how to place a new activated sludge process works.
4. Explain how a sludge digester works and what factors influence and control the digestion process.
5. Explain how to properly dispose of plant effluents in receiving waters.
6. Identify the types of hazards that are in a wastewater treatment plant.
7. Develop a maintenance plan for a wastewater treatment plant; including equipment, building, grounds, channels, and tanks.
8. Describe how to work safely in a laboratory environment.
9. Discuss the use of computers in treatment plants and identify tasks in the treatment plant that could be performed by computers.
10. Identify causes of variation in results, by reading manometers, gauges, and charts.
11. Explain the importance and need for records.

COURSE CONTENT:

Curriculum Approval Date: 06/11/2024

5 Hours

Content: Wastewater Mathematics Review: Tank Areas and Volumes, Flow Rates and Velocity, Milligram per Liter to Pounds, Chemical Dosages, Loading Rates, Detention Times and Retention Times, Efficiency and Percent Removal Rates, and Pumping Rates.

6 Hours

Content: Wastewater Advanced Mathematics: sludge and digester calculations, wasting rates, fixed solid calculations and Interpret and analyze performance calculations for wastewater processes and apply these techniques to real-life situations.

6 Hours

Content: Activated Sludge (Conventional Activated Sludge Plants), including explaining the principles of the activated sludge process and describing how to place a new activated sludge process works. Demonstrate how to collect samples, interpret lab results, and make adjustments in the treatment process and determine aerator loadings and explain the application of different loading guidelines. Demonstrating each of the process stages used to treat wastewater in a sequencing batch reactor (SBR) and reviewing plans and specifications for a sequencing batch reactor.

6 Hours

Content: Sludge Digestion and Solids Handling: Explaining how a sludge digester works and what factors influence and control the digestion process and recognizing factors that indicate sludge digestion processes are not working properly. Discussion of the various methods of solids handling and demonstration of how to maintain and operate these processes, loading on sludge digesters and solids handling facilities.

8 Hours

Content: Effluent Disposal: Explaining how to properly dispose of plant effluents in receiving waters and operation strategy for effluent disposal including troubleshooting an effluent disposal system. Demonstration of a receiving water monitoring plan and conducting an effluent monitoring program.

3 Hours

Content: Plant Safety and Good Housekeeping, including identifying the types of hazards that are in a wastewater treatment plant and recognizing unsafe conditions and explaining how to correct them whenever they develop. Demonstrating, organize regular tailgate meetings and strategies to develop the habit of always thinking safety and working safely. Identifying when you need assistance to solve a problem and examine and describe wastewater processes as well as the fundamental concepts of wastewater theory.

3 Hours

Content: Maintenance of Plant Equipment, including developing a maintenance plan for a wastewater treatment plant for equipment, building, grounds, channels, and tanks. Demonstrating schedule maintenance at proper time intervals, troubleshoot equipment, start / stop pumps and unplug pipe pumps and valves. Demonstrating the operation and maintenance of sensors, transmitters, receivers, and controllers.

6 Hours

Content: Laboratory Procedures and Chemistry including describing how to work safely in a laboratory environment, operate laboratory equipment, collecting representative samples of influents and effluents from a treatment process. Identifying and analyze plant effluents in accordance with National Pollutant Discharge Elimination System (NPDES) permit requirements.

3 Hours

Content: Application of computers for Plant Operations & Maintenance by discussing the use of computers in treatment plants and identifying tasks in the treatment plant that could be performed by computers. Discussing reasons which justify purchasing and using computers and recognizing cautions that must be exercised by operators using computers.

3 Hours

Content: Analysis and Presentation of Data Records and Report Writing and present data using charts and graphs, tables, and numbers. Calculate arithmetic mean, range, median, mode, geometric mean, moving average, variance, and standard deviation.

COURSE CONTENT (CONTINUED):

3 Hours

Content: Records and Report Writing and identify the different types of records, evaluate records, and organize a report.

2 Hours

Final Exam.

METHODS OF INSTRUCTION:

Lectures, Discussions, Video Presentations, Quizzes, Assignments

OUT OF CLASS ASSIGNMENTS:

Required Outside Hours 36

Assignment Description

Read textbook and study for quizzes (Periodic short objective tests of course-related concepts, such as mathematical theory, procedures or techniques applied to wastewater treatment.) and midterm and final exams (A combination of objective questions on important concepts and mathematical problems.).

Required Outside Hours 36

Assignment Description

Homework (such as): Take - math assignments. Discussions and presentation demonstrating the student's understanding of an article taken from a trade journal that addresses a wastewater related topic that exemplifies current discussions or theories.

Required Outside Hours 36

Assignment Description

Written term paper or research project. Suggested topics: Examine wastewater theory in practice through the case studies and analysis of current articles in the media. OR Apply control techniques to specific and practical wastewater situations.

METHODS OF EVALUATION:

Writing assignments

Evaluation Percent 30

Evaluation Description

Percent range of total grade: 20% to 40%

Term or Other Papers,

Assignments

Discussions

Problem-solving assignments

Evaluation Percent 30

Evaluation Description

Percent range of total grade: 10% to 40%

Homework Problems,

Group Discussions

Quizzes,

Exams,

Objective examinations

Evaluation Percent 40

Evaluation Description

Percent range of total grade: 40% to 60%

Multiple Choice,

True/False,

Other: Math - Show Work

REPRESENTATIVE TEXTBOOKS:

Operation of Wastewater Treatment Plants Volume II, 7th Edition, or other appropriate college level text., Kenneth D. Kerri, University Enterprises, Inc., 2007 or a comparable textbook/material.

ISBN: 978-1-59371-038-5

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:

In-Service: N

Occupational Course: C

Maximum Hours:

Minimum Hours:

Course Control Number: CCC000588789

Sports/Physical Education Course: N

Taxonomy of Program: 095800