

**Course Outline**

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

**TERM EFFECTIVE:** Spring 2019                      **CURRICULUM APPROVAL DATE:** 10/9/2018

**SHORT TITLE:** ADV WASTEWATER TRT PLT OP

**LONG TITLE:** Advanced Wastewater 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 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 Introduction to Water/Wastewater Technology; WTRM 207 Beginning Wastewater Treatment 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. Demonstrate competent and efficient plant operations through real-life decision-making examples.

Measure of assessment: Homework, Case Studies, Exams, Oral Presentation, Written Paper

Year assessed, or planned year of assessment: 2017

Semester: Fall

2. Value the importance and the function of wastewater treatment plant operations in the protection of public health and the environment.

Measure of assessment: Reading Assignments: Case Studies, Quizzes, Exams

Year assessed, or planned year of assessment: 2017

Semester: Fall

3. Demonstrate the ability to meet the written test standards for the State of California wastewater treatment plant operator exams.

Measure of assessment: Quizzes, Exams, Worksheets

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

Curriculum Approval Date: 10/9/2018

3 Hours

Content: Wastewater Mathematics Review

Student Performance Objectives: 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.

6 Hours

Content: Wastewater Advanced Mathematics

Student Performance Objectives: Utilize advanced calculation methods, including sludge and digester calculations, wasting rates, and fixed solid calculations. 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)

Student Performance Objectives: Explain the principles of the activated sludge process. Describe how to place a new activated sludge process into place. Collect samples, interpret lab results, and make adjustments in the treatment process. Determine aerator loadings and explain the application of different loading guidelines. Describe each of the process stages used to treat wastewater in a sequencing batch reactor (SBR). Review plans and specifications for a sequencing batch reactor.

6 Hours

Content: Sludge Digestion and Solids Handling.

Student Performance Objectives: Explain how a sludge digester works and what factors influence and control the digestion process. Recognize factors that indicate sludge digestion processes are not working properly. Discuss the various methods of solids handling and demonstrate how to maintain and operate these processes. Determine loading on sludge digesters and solids handling facilities. Develop an operating strategy for a sludge digester.

8 Hours

Content: Effluent Disposal. Midterm Exam.

Student Performance Objectives: Explain how to properly dispose of plant effluents in receiving waters. Develop an operation strategy for effluent disposal. Troubleshoot an effluent disposal system. Develop a receiving water monitoring plan. Conduct an effluent monitoring program. Review plans and specifications for an effluent disposal system. Identify the appropriate process control measures in making sound operational decisions.

3 Hours

Content: Plant Safety and Good Housekeeping

Student Performance Objectives: Identify the types of hazards that are in a wastewater treatment plant. Recognize unsafe conditions and explain how to correct them whenever they develop. Organize regular tailgate meetings. Develop the habit of always thinking safety and working safely.

3 Hours

Content: Maintenance of Plant Equipment

Student Performance Objectives: Develop a maintenance plan for a wastewater treatment plant; including equipment, building, grounds, channels, and tanks. Schedule maintenance at proper time intervals. Troubleshoot equipment. Start and stop pumps. Unplug pipe pumps and valves. Explain the operation and maintenance of sensors, transmitters, receivers, and controllers. Determine when you need assistance to solve a problem. Examine and describe wastewater processes as well as the fundamental concepts of wastewater theory.

6 Hours

Content: Laboratory Procedures and Chemistry

Student Performance Objectives: Describe how to work safely in a laboratory environment. Operate laboratory equipment. Collect representative samples of influents and effluents from a treatment process. Prepare samples for analysis. Perform plant control tests. Analyze plant effluents in accordance with NPDES permit requirements. Record laboratory results.

3 Hours

Content: Application of computers for Plant O & M

Student Performance Objectives: Discuss the use of computers in treatment plants. Identify tasks in the treatment plant that could be performed by computers. Provide reasons which justify purchasing and using computers. Recognize cautions that must be exercised by operators using computers. Evaluate both computer hardware and software.

3 Hours

Content: Analysis and Presentation of Data Records and Report Writing

Student Performance Objectives: Identify causes of variation in results. Read manometers, gauges, and charts. Analyze and present data using charts and graphs, tables, and numbers. Calculate arithmetic mean, range, median, mode, geometric mean, moving average, variance, and standard deviation.

3 Hours

Content: Records and Report Writing

Student Performance Objectives: Explain the importance and need for records. Identify the different types of records, evaluate records, and organize a report. Write a report.

2 Hours

## **METHODS OF INSTRUCTION:**

Lectures, Discussions, Video Presentations

## **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 - home math assignments. Oral 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

Percent of total grade: 30.00 %

Percent range of total grade: 20% to 40% Term or Other Papers, Other: Project

Problem-solving assignments

Percent of total grade: 20.00 %

Percent range of total grade: 10% to 40% Homework Problems, Quizzes, Exams

Objective examinations

Percent of total grade: 40.00 %

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

Other methods of evaluation

Percent of total grade: 10.00 %

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

**REPRESENTATIVE TEXTBOOKS:**

Required Representative Textbooks

Kenneth D. Kerri. Operation of Wastewater Treatment Plants Volume II, 7th Edition, or other appropriate college level text.. California State University, Sacramento: University Enterprises, Inc.,2007.

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

ISBN: 978-1-59371-038-5

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:

In-Service: N

Occupational Course: C

Maximum Hours: 3

Minimum Hours: 3

Course Control Number: CCC000588789

Sports/Physical Education Course: N

Taxonomy of Program: 095800