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

<table>
<thead>
<tr>
<th>Units</th>
<th>Number of Weeks</th>
<th>Contact Hours/Week</th>
<th>Total Contact Hours</th>
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<tbody>
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<td>3</td>
<td>18</td>
<td>Lecture: 3</td>
<td>Lecture: 54</td>
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<td></td>
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<td>Lab: 0</td>
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<td>Total: 3</td>
<td>Total: 54</td>
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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.

8 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.

2 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.

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
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.
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