WWTR 121 Course Outline as of Fall 2012

CATALOG INFORMATION

Dept and Nbr: WWTR 121 Title: WASTEWATER TREATMENT 2
Full Title: Wastewater Treatment 2
Last Reviewed: 9/11/2023

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	17.5	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00 Total Student Learning Hours: 157.50

Title 5 Category:	AA Degree Applicable
Grading:	Grade or P/NP
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	ENVT 121

Catalog Description:
Principles and techniques used in advanced/tertiary wastewater treatment including disinfection, chlorination, odor control, wastewater reclamation, advanced sludge treatment and disposal, laboratory control methods, National Pollution Discharge Elimination System (NPDES) discharge requirements, report writing and records. Preparation for State Water Resources Control Board (SWRCB) Wastewater Treatment Plant Operator examination for grade 3.

Prerequisites/Corequisites:
Course Completion of WWTR 120

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: Principles and techniques used in advanced/tertiary wastewater treatment including disinfection, chlorination, odor control, wastewater reclamation, advanced sludge treatment and disposal, laboratory control methods, National Pollution Discharge Elimination System (NPDES) discharge requirements, report writing and records. Preparation for State Water

Resources Control Board (SWRCB) Wastewater Treatment Plant Operator examination for grade 3. (Grade or P/NP)
Prerequisites/Corequisites: Course Completion of WWTR 120
Recommended:
Limits on Enrollment:
Transfer Credit:
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**	Effective:	Inactive:
CSU GE:	**Transfer Area**	Effective:	Inactive:
IGETC:	**Transfer Area**	Effective:	Inactive:
CSU Transfer:		Effective:	Inactive:
UC Transfer:		Effective:	Inactive:

CID:

Certificate/Major Applicable:
Both Certificate and Major Applicable

COURSE CONTENT

Outcomes and Objectives:
Upon completion of the course, students will be able to:
1. Describe the design, operation and maintenance of treatment plants with advanced/tertiary processes.
2. Explain advanced sludge treatment and disposal practices, including pertinent laws and regulations.
3. Discuss the basics of industrial waste permitting, inspection and violations.
4. Define and correctly use standard terminology and mathematical formulas related to advanced/tertiary wastewater treatment and industrial waste treatment.
5. Troubleshoot common wastewater treatment operational process problems and make decisions about appropriate corrective actions to take.
6. Recognize and explain chemical symbols, properties and reactions related to advanced/tertiary wastewater treatment.
7. Recognize certain classes of contaminants found in wastewater processes and describe their relationship to waste water treatment.
8. Explain the laws governing wastewater treatment operators at Grade 3 and penalties that may be applied to operators and facilities.
9. Access reference sources appropriate to operational problems at Grade 3 in the wastewater treatment field.

Topics and Scope:

I. Overview of wastewater treatment systems and processes
  A. Primary treatment
  B. Secondary treatment

II. Tertiary treatment processes
A. Types and their applications
B. Operational parameters
C. Methods of filtration
D. Nitrification/denitrification
E. Nutrient removal

III. Activated sludge
A. Return activated sludge
B. Waste activated sludge
C. Industrial waste pretreatment

IV. Solids handling and disposal
A. Aerobic and anaerobic digestion of solids
B. Methods of dewatering
C. Composting
D. Solids disposal

V. Odor control
A. Need
B. Odor generation and identification
C. Solutions
1. Chemical
2. Biological
D. Types of control systems
E. Masking, modifications and counteraction

VI. Types of nutrient removal processes
A. Phosphorus
1. Lime precipitation
2. Alum flocculation
B. Nitrogen
1. Biological
2. Chemical
3. Physical

VII. Disinfection and chlorination methods
A. Chemical
B. Other methods
C. Test procedures
D. Safety

VIII. Wastewater reclamation
A. Uses
B. Operating procedures
C. Regulations/monitoring
D. Land treatment systems

IX. Overview of industrial waste treatment
A. Title 40 Code of Federal Regulations (CFR)
B. Sampling methods

C. Pretreatment
1. Preventing pass through
2. Disruption of treatment processes

X. Overview of instrumentation
A. Measurement and control systems
B. Principles of sensors/transducers
C. Categories of instrumentation
1. Panel instrumentation
2. Automatic controllers
3. Air supply systems
4. Lab instruments
5. Test and calibration equipment
D. Use of computers
1. SCADA (Supervisory Control and Data Acquisition)
2. Data collection and analysis

XI. Laws and regulations governing wastewater treatment operations
A. Porter-Cologne
B. Clean Water Act: National Pollutant Discharge Elimination System (NPDES)
C. Senate Bill (SB) 198
D. California CRC's (Cooperative Research Centers)
E. Occupational Health and Safety Administration (OSHA) requirements

XII. Exam preparation
A. California Title 23 requirements
B. State of California Water Resources Control Board Wastewater Treatment Plant Operator Certification exam
C. CWEA voluntary certification test
1. Collection system maintenance
2. Wastewater treatment plant maintenance
D. Renewal requirements
E. Education and experience requirements for certification grades

Assignment:

1. Reading assignments averaging 25-40 pages per week.
2. Weekly problem solving homework assignments related to wastewater treatment and maintenance.
3. Project 1: Math problems relating to the operation of the model treatment plant.
4. Project 2: Wastewater treatment plant tour and observation report.
5. Quizzes: 10 - 15.
6. Midterm and Final exam.

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Project 2 (observation report)	Writing 10 - 20%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems; Project 1 (math problems)	Problem solving 10 - 20%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None	Skill Demonstrations 0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Quizzes, midterm and final exam.	Exams 50 - 60%

Other: Includes any assessment tools that do not logically fit into the above categories.

Attendance and class participation.	Other Category 0 - 10%

Representative Textbooks and Materials:
1. Advanced Waste Treatment, 3rd edition; California State University of Sacramento, 1995 (classic)
2. Instructor prepared materials