GAVILAN COLLEGE
5055 Santa Teresa Blvd
Gilroy, CA 95023

Course Outline

COURSE: WTRM 234 DIVISION: 50 ALSO LISTED AS: WTRM 134

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

SHORT TITLE: IND WASTEWATER/STORMWATER MGMT

LONG TITLE: Industrial Wastewater and Stormwater Management

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 provide an overview of water/ wastewater regulations with an emphasis on local, state, and federal regulatory standards. The study of the principles of wastewater and stormwater management including hydrology, water distribution, wastewater collection, stormwater management, and safe drinking water issues will be covered along with an introduction to the one water management concept. This course was previously listed as WTRM 134.

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. Explain the characteristics of water pollutants as it relates to the quality of water, discharge requirements, and human consumption.

Measure of assessment: written exam, homework, discussion, paper

Year assessed, or planned year of assessment: 2017

Semester: Fall

2. Compare and contrast local, state and federal water/wastewater laws; including describing the services and functions of agencies that regulate water/wastewater quality and compliance.

Measure of assessment: written exam, homework, paper

Year assessed, or planned year of assessment: 2017

Semester: Fall

3. Explain the challenge of moving to an integrated water management approach (One Water).

Measure of assessment: homework, discussion, paper

Year assessed, or planned year of assessment: 2017

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

Curriculum Approval Date: 11/13/2018

8 Hours

Content: Historical Prospective of Water Laws and Regulations: Water Allocation Law; Reclamation Act; Refuse Act; Marine Protection, Research and Sanctuaries Act; Clean Water Act; Safe Drinking Water Act

Student Performance Objectives: Discuss the following water laws/regulations: Water Allocation Law; Reclamation Act; Refuse Act; Marine Protection, Research and Sanctuaries Act; Clean Water Act; and Safe Drinking Water Act.

8 Hours

Content: Federal Water Agencies: U.S. Army Corp of Engineers (USACE), U.S. Bureau of Reclamation (USBR), U.S. Fish and Wildlife Service (USFWG), Bureau of Land Management, Environmental Protection Agency, Natural Resources Conservation Service (NRCS), Federal Energy Regulatory Commission (FERC), Regional Water Quality Resource Control Board

Student Performance Objectives: Discuss the purpose of each of the federal water agencies presented in class. Distinguish the federal agencies that regulate hazardous materials/waste. Define the federal water/wastewater regulatory standards.

8 Hours

Content: Local, Regional, State Water Agencies: California State Water Resources Control Board, County Wastewater Departments, Department of Environmental Health

Student Performance Objectives: Discuss the purpose of each of the local, regional, and state water agencies presented in class. Define the state and local water/wastewater regulatory standards. Distinguish the various agencies that regulate

hazardous materials/waste. Describe appropriate handling and management procedures for hazardous materials/waste.

12 Hours

Content: Water Quality Management: Water Pollution - Point Source Pollution, Nonpoint Source Pollution; Inorganic Chemicals - Metals, Minerals; Organic Chemicals - Natural Organic Chemicals, Synthetic Organic Chemicals,

Pesticides, Nutrients, Nitrogen Cycle, The Phosphorus Cycle, Eutrophication; Waterborne Diseases; Watershed Protection Program; Stormwater Management- Program Requirements, Written Program, Inspections, Phase One - Nonpoint source identification, Phase Two - Point source identification; Wastewater Discharge Requirements - Quantitative Measurement Limitations, Testing, Permitting

Student Performance Objectives: Recognize and apply appropriate terms common to the industrial wastewater and stormwater management industry. Analyze the criteria of physical, chemical, and biological interactions of pollutants and their effect on industrial wastewater and stormwater management. Explain the latest maintenance and operations methods for water, wastewater, and stormwater systems. State the program requirements for stormwater management. Identify the natural hydrologic cycle and how the 'built' environment impacts the cycle. Describe the regulations (and the governing agency) that try to mitigate the human impact. List the wastewater discharge requirements. Explain the hydrologic cycle and how human operations can impede that cycle; including why stormwater regulations are in-place.

8 Hours

Content: Drinking Water Treatment: Clarification, Coagulation/Flocculation, Aeration, Softening, Filtration, Disinfections, Sludge Treatment

Student Performance Objectives: Recognize and apply appropriate terms common to the industrial wastewater and stormwater management industry. Describe the following drinking water treatment methods: clarification, coagulation/flocculation, aeration, softening, filtration, disinfections, and sludge treatment. Define the best management practices and safe operation procedures used in industrial wastewater and stormwater management.

8 Hours

Content: Wastewater Treatment: Waste Treatment Plant Design, Preliminary Treatment, Primary Treatment, Advance Primary Treatment, Secondary Treatment, Fixed Filter Processes, Trickling Filters, Biological, Activated Growth Processes, Sludge Characteristics, Sludge Discharge

Student Performance Objectives: Examine the advances in design and construction methods for waste treatment plants. Identify the best practices in infrastructure management. Explain the preliminary, primary, advance primary and secondary treatment of wastewater as specified by the EPA. State the characteristics of sludge from wastewater. Describe how a trickling filter wastewater treatment system works. Explain wastewater treatment processes and procedures.

8 Hours

Content: Water Use Minimization: Wastewater Reuse/Minimization, Recycled Water Usage

Student Performance Objectives: Explain how to optimize the operation of water supply systems. Describe methods that can minimize water use. List ways that wastewater can be reused. List ways that recycled water can be used.

8 Hours

Content: One Water Management Concept: Water from all sources managed cooperatively to meet economic, social and environmental needs. Institutional Barriers or Opportunities for Integrated Planning and Management of Water Services, Organizations/Universities Involved in the Process, Next Steps

Student Performance Objectives: Discuss the One Water Management Concept. Identify the opportunities and constraints with the One Water Management Concept, including how employing this concept can result in triple bottom line results (social, economic and environmental). Name the organizations and universities that recognize this concept.

2 Hours

METHODS OF INSTRUCTION:

lecture, discussion, multimedia presentations, field trip(s)

OUT OF CLASS ASSIGNMENTS:

Required Outside Hours: 42

Assignment Description: Read related chapter(s) in the textbook and answer study guide questions.

Required Outside Hours: 66

Assignment Description: Homework: Write a 1-2 page paper on the history of one of the water laws/regulations presented in class. and/or Locate and visit if possible, one of the federal water agencies presented in class. Come prepared to discuss the agency you located and/or visited. and/or Locate and visit one of the local, regional, or state water agencies presented in class. Come prepared to discuss the agency you visited. and/or Select a topic presented in water quality management and prepare a written and oral report. and/or Write a 1-2 page paper on one of the drinking water treatment methods presented in class. Come prepared to discuss your paper in class. and/or Field Trip to a Wastewater Treatment Plant. Write a 1-2 page paper on the experience and come prepared to discuss your comments with the class. and/or Investigate ways that you, your relatives, your neighbors, and/or your local community reuses water and/or recycles water and be prepared to discuss your findings in class. and/or Be prepared to discuss the One Water Management Concept in class. Select a City/County to research with the intent of understanding their operations so they can present a One Water solution for that agency. AND Investigate the various organizations and universities that are employing the One Water Management Concept.

Required Outside Hours: 36

Assignment Description: Study for quizzes and exams.

METHODS OF EVALUATION:

Writing assignments
Percent of total grade: 30.00 %
Percent range of total grade: 20% to 40% Written Homework, Papers
Problem-solving assignments
Percent of total grade: 10.00 %
Percent range of total grade: 10% to 30% Quizzes, Exams, Homework
Objective examinations
Percent of total grade: 50.00 %
Percent range of total grade: 40% to 60% Multiple Choice, True/False, Matching Items
Other methods of evaluation
Percent of total grade: 10.00 %

REPRESENTATIVE TEXTBOOKS:
Ojha, Surampalli, Bardossy, Zhang, and Kao. Sustainable Water Resources Management. ASCE,2017.
Reading Level of Text, Grade: 13th Verified by: Publisher and Water,
Wastewater, and Stormwater Infrastructure Management by Neil S. Grigg, CRC Press

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: CCC000588884
Sports/Physical Education Course: N
Taxonomy of Program: 095800