GAVILAN COLLEGE
5055 Santa Teresa Blvd
Gilroy, CA 95023

Course Outline

COURSE: WTRM 110 DIVISION: 50 ALSO LISTED AS:

TERM EFFECTIVE: Fall 2017 **Inactive Course**

SHORT TITLE: ADV WTR/WASTEWATER DIST MATH

LONG TITLE: Advanced Water, Wastewater, Distribution Math

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 a continuation of the Beginning Water/Wastewater Mathematics course WTRM 102 and covers advanced math concepts used in the Water/Wastewater/Distribution industry. Topics include industry standard formulas, conversion factors, MCRT, SVI, waste/return, horsepower, well drawdown, capacitance, yield, belt press cake/filtrate, SDI, sludge age, gas production and digestion rates. This course is listed as WTRM 210, effective Fall 2017. ADVISORY: Math 205 Elementary Algebra and WTRM 102 Beginning Water/Wastewater Mathematics.

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

STUDENT LEARNING OUTCOMES:

1. Apply mathematics such as addition, subtraction, multiplication, and division with whole numbers, decimals, and fractions used in the Water Industry. Review basic math concepts covered in the beginning class.

Measure: Quizzes, Exams, Homework Problems

PLO:

ILO: 3,2,7,6

2. Utilize Industry standard formula sheets and conversion factors. Convert Cubic Feet to Gallons to Pounds. Understand the Pounds Formula.

Measure: Quizzes, Exams, Homework Problems

PLO:

ILO: 3,2,7,6

3. Apply Trickling Filters and Rotating Biological Contactor Math.

Measure: Quizzes, Exams, Homework Problems

PLO:

ILO: 3,2,7,6

4. Utilize Activated Sludge Calculations.

Measure: Quizzes, Exams, Homework Problems

PLO:

ILO: 3,2,7,6

5. Apply Waste Treatment Ponds Math.

Measure:

PLO:

ILO: 3,2,7,6

6. Utilize Chemical Dosage Calculations.

Measure: Quizzes, Exams, Homework Problems

PLO:

ILO: 3,2,7,6

7. Apply Sludge Production and Thickening Calculations.

Measure: Quizzes, Exams, Homework Problems

PLO:

ILO: 3,2,7,6

8. Utilize Sludge Digestion Calculations.

Measure: Quizzes, Exams, Homework Problems

PLO:

ILO: 3,2,7,6

9. Apply Sludge Dewatering and Disposal Math.

Measure: Quizzes, Exams, Homework Problems

PLO:

ILO: 3,2,7,6

10. Utilize Laboratory Calculations. Water Treatment Filter Calculations.

Measure: Quizzes, Exams, Homework Problems

PLO:

ILO: 3,2,7,6

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

Inactive Course: 02/27/2017

Note: This course is listed as WTRM 210, effective Fall 2017.

3 Hours

Content: Apply mathematics such as addition, subtraction, multiplication, and division with whole numbers, decimals, and fractions used in the Water Industry. Review basic math concepts covered in the beginning class.

Student Performance Objectives: Apply basic math concepts as they relate to Industry standard calculations.

3 Hours

Content: Review Industry Standard Formula Sheets used and provided when taking State Certification Exams. Identification of Conversion Factors used to convert Cubic Feet to Gallons to Pounds. Identify the Pounds Formula.

Student Performance Objectives: Identify formulas needed to successfully solve word problems. Manipulate conversion factors to convert Cubic Feet to Gallons to Pounds. Solve problems using the Pounds Formula.

4 Hours

Content: Trickling Filters and Rotating Biological Contactor Math. Hydraulic Loading, Organic Loading, BOD and Suspended Solids Removed, Re-circulation Ratios, and Percent Removal/Efficiency.

Student Performance Objectives: Outline formulas needed to successfully solve word problems for unit process control.

6 Hours

Content: Activated Sludge Calculations. BOD and COD Loading, Solids Inventory, F/M Ratio, Sludge Age, SVI, MCRT, Return Sludge and Sludge Wasting Rates, Pumping Rates, and Oxidation Ditch Detention Time.

Student Performance Objectives: Identify formulas needed to successfully solve word problems for unit process control.

6 Hours

Content: Waste Treatment Ponds Math. BOD Loading, Organic Loading, BOD Removal Efficiency, Hydraulic Loading, Population Loading and Equivalent, Detention Time.

Student Performance Objectives: Outline formulas needed to successfully solve word problems for unit process control.

6 Hours

Content: Chemical Dosage Calculations. Chemical Feed Rate, Dose-Demand-Residual, Percent Strength of solution, Mixing Solutions of Different Strengths, Chemical Feed Pump Settings, Dry Chemical Feed Settings.

Student Performance Objectives: Identify formulas needed to successfully solve word problems for unit process control.

6 Hours

Content: Sludge Production and Thickening Calculations. Primary and Secondary Solids production, Percent Solids, Sludge Thickening and Volume Changes, Gravity Thickening Calculations, DAF Thickening Calculations, Centrifuge Thickening Calculations.

Student Performance Objectives: Explain formulas needed to successfully solve word problems for unit process control.

6 Hours

Content: Sludge Digestion Calculations. Sludge Volume Pumped, Pumping Times, Volatile Solids Loading, VA/Alkalinity Ratio, Lime Neutralization, Percent Reduction, Digester Gas Produced, Digestion Time, Air Requirements and Oxygen Uptake.

Student Performance Objectives: Identify formulas needed to successfully solve word problems for unit process control.

6 Hours

Content: Sludge Dewatering and Disposal Math. Filter Press, Belt Filter Press, Vacuum Filter Press Dewatering Calculations, Sand Drying Bed Calculations, and Composting Calculations.

Performance Objectives: Outline formulas needed to successfully solve word problems for unit process control.

6 Hours

Content: Laboratory Calculations. Water Treatment Filter Calculations. BOD, Settleability, Settleable Solids, Sludge Total and Volatile Solids, Suspended Solids and Volatile Solids, Temperature. Filtration Rates, Filter Loading Rates, Filter Runs, Filter Backwash Rates. Horsepower, Wire to Water HP Calculations, Kilowatt Determinations, Power Costs.

Student Performance Objectives: Identify formulas needed to successfully solve word problems for unit process control.

2 Hours

METHODS OF INSTRUCTION:

Lecture and discussion

Visual Aids

Demonstrations

Class Participation

Quizzes

In class work sheets

Exams

Homework

METHODS OF EVALUATION:

CATEGORY 1 - The types of writing assignments required:

Percent range of total grade: 0 % to %

If this is a degree applicable course, but substantial writing assignments are NOT appropriate, indicate reason;

Course is primarily computational

CATEGORY 2 - The problem-solving assignments required:

Percent range of total grade: 0 % to 100 %

Homework Problems

Quizzes

Exams

Other: Class Participation

CATEGORY 3 - The types of skill demonstrations required:

Percent range of total grade: 0 % to 10 %

Class Performance/s

CATEGORY 4 - The types of objective examinations used in the course:

Percent range of total grade: 0 % to 100 %

Multiple Choice

True/False

Other: Math Computation

REPRESENTATIVE TEXTBOOKS:

Required:

Joanne Kirkpatrick Price, Basic math Concepts for water and wastewater plant operators, Technomic, 1991 (second edition), or other appropriate college level text. This text represents an industry standard text.

ISBN: 87762-808-4

Reading level of text, Grade: 11 Verified by: Dana Young

ARTICULATION and CERTIFICATE INFORMATION

Associate Degree:

CSU GE:

IGETC:

CSU TRANSFER:

Transferable CSU, effective 201270

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: WTRM
CSU Crosswalk Course Number: 110
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: CCC000530892
Sports/Physical Education Course: N
Taxonomy of Program: 095800