ENVT 103 Course Outline as of Fall 2008

CATALOG INFORMATION

Dept and Nbr: ENVT 103 Title: INTRO WTR SCI OPERATORS Full Title: Introduction to Water Sciences for Operators Last Reviewed: 1/26/2015

| Units | | Course Hours per Week | · · | Nbr of Weeks | Course Hours Total | |
|---------|------|-----------------------|------|--------------|---------------------------|-------|
| Maximum | 1.50 | Lecture Scheduled | 1.50 | 17.5 | Lecture Scheduled | 26.25 |
| Minimum | 1.50 | Lab Scheduled | 0 | 8 | Lab Scheduled | 0 |
| | | Contact DHR | 0 | | Contact DHR | 0 |
| | | Contact Total | 1.50 | | Contact Total | 26.25 |
| | | Non-contact DHR | 0 | | Non-contact DHR | 0 |

Total Out of Class Hours: 52.50

Total Student Learning Hours: 78.75

| Title 5 Category: | AA Degree Applicable |
|-------------------|-----------------------------------------------|
| Grading: | Grade Only |
| Repeatability: | 00 - Two Repeats if Grade was D, F, NC, or NP |
| Also Listed As: | |
| Formerly: | ENVT 200.3 |

Catalog Description:

Introduction to chemistry, biology, bacteriology, hydraulics, and electricity as related to the fields of water treatment technology, water distribution technology, and waste water treatment technology. Introduces concepts applied in certification preparation courses.

Prerequisites/Corequisites:

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:

Description: Introduction to chemistry, biology, bacteriology, hydraulics, and electricity as related to fields of water treatment technology, water distribution technology, and waste water treatment technology. Introduces concepts applied in certification preparation courses. (Grade Only) Prerequisites/Corequisites: Recommended:

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

| AS Degree: CSU GE: | Area Transfer Area | Effective: Effective: | Inactive: Inactive: |
|-----------------------|-----------------------|--------------------------|------------------------|
| IGETC: | Transfer Area | Effective: | Inactive: |
| CSU Transfer | Effective: | Inactive: | |
| UC Transfer: | Effective: | Inactive: | |

CID:

Certificate/Major Applicable:

Certificate Applicable Course

COURSE CONTENT

Outcomes and Objectives:

- 1. Compute and compare the variables in the flow equation Q=VA.
- 2. Explain, demonstrate, and convert between water pressure and height of water column.
- 3. Demonstrate, analyze, and estimate static pressure at any elevation from a water distribution system profile.
- 4. Define, demonstrate, analyze, and compare two ways of imparting kinetic energy to water.
- 5. Explain and compare two ways of dissipating kinetic energy from water.
- 6. Define, demonstrate, and differentiate primary, secondary, and tertiary wastewater treatment.
- 7. Compare and contrast aerobic and anaerobic wastewater treatment.
- 8. Describe, assess, and summarize aqueous ionization of chlorine, ammonia, and carbon dioxide.
- 9. Explain and evaluate the relationship between disinfection and coliform testing.
- 10. Describe, explain, demonstrate, and compare and measure volts, ohms, and amps.
- 11. Summarize Ohm's Law, identify the variables, and solve for each.
- 12. Describe and interpret electrical "ground".
- 13. Describe, demonstrate, and differentiate AC and DC.
- 14. Explain and evaluate induction and its use in transformers.
- 15. Describe, differentiate, and evaluate drinking water MCLs (maximum contaminant levels) for chemical impurities.
- 16. Describe, measure, and evaluate NPDES (National Pollution Discharge Elimination System) permit effluent limits for chemical pollutants.

Topics and Scope:

- I. Flow Definition and Equation
- II. Pressure Head (height of water column)
 - A. Elevation
 - B. Static pressure
 - C. Water distribution system profile
- III. Velocity Head (kinetic energy)
 - A. Imparting
 - B. Dissipating
- IV. Wastewater Treatment
 - A. Primary
 - B. Secondary
 - 1. aerobic
 - 2. anaerobic
 - 3. photosynthesis
 - C. Tertiary
 - D. Disinfection
 - 1. coliform testing
 - 2. chlorination
 - 3. ultraviolet radiation
- V. Aqueous Ionization
 - A. Ammonia
 - B. Carbon dioxide
 - C. Chlorine
- VI. Electricity
 - A. Current, voltage and resistance
 - B. Direct and alternating current
 - C. Ground
 - D. Induction
 - E. Ohm's law

VII. Impurities in Water

- A. Maximum concentration limits
- B. Effluent limitations

Assignment:

- 1. Reading, approximately 10 20 pages per week, based on eight week course.
- 2. Homework problems related to hydraulic, electrical and chemistry calculations.
- 3. Quizzes (4-6); 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.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course. Writing 0 - 0% **Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems

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

None

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

Multiple choice, True/false, Matching items, Completion

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

Class participation.

Representative Textbooks and Materials:

Instructor prepared materials

| Problem solving |
|-----------------|
| 25 - 45% |

| Skill Demonstrations |
|----------------------|
| 0 - 0% |

Exams 40 - 60%

Other Category 10 - 20%