WTR 102 Course Outline as of Fall 2017

CATALOG INFORMATION

Dept and Nbr: WTR 102   Title: MATH METHODS WATER TREAT
Full Title: Mathematical Methods for Water Treatment Technology
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 102

Catalog Description:
Mathematical methods for the fields of water treatment technology, water distribution technology, and waste water treatment technology. Prepares students for certification examinations.

Prerequisites/Corequisites:

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: Mathematical methods for the fields of water treatment technology, water distribution technology and waste water treatment technology. Prepares students for certification examinations. (Grade Only)
Prerequisites/Corequisites:
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:
Certificate Applicable Course

COURSE CONTENT

Outcomes and Objectives:
1. Distinguish between measured and counted quantities.
2. Distinguish the number of significant figures in measured quantities.
3. Calculate median and average values.
4. Use a pocket calculator to perform water measurement calculations.
5. Calculate areas of triangles, rectangles, and circles.
6. Calculate volumes of cylindrical and rectangular tanks.
7. Convert between common units of time, mass, length, area, volume, and temperature.
8. Calculate concentrations, flows, pressures, and velocities using ratios and percentages.
9. Calculate percent composition from formula and molecular weights.
10. Calculate electricity costs from load and power rates.

Topics and Scope:

I. Numbers quantifying an identified commodity
    A. Units identifying the commodity
    B. Integers quantifying counted commodities
    C. Measured commodities may require decimal fractions
II. Significant figures
    A. The imprecision of measurement
    B. Applications to computed values
    C. The decimal point
    D. Non-zero digits
    E. Zero
III. Basic Math Operations & Rules
    A. Addition and Subtraction
    B. Multiplication and Division
    C. Exponents

    D. Scientific Notation
    E. Operations with Fractions

IV. Useful pocket calculators
    A. Verify ability to multiply and divide
    B. Very large numbers
    C. Very small numbers

V. Median values

VI. Mean values - Determining a 7-day average

VII. Computation of areas
    A. Area of a rectangle
    B. Area of a triangle
    C. Area of a circle

VIII. Computation of volumes
    A. The product of an area and a length
    B. Volume of a box
    C. Volume of a cylinder

IX. Units
    A. Length
    B. Area
    C. Volume
    D. Time
    E. Mass
    F. Temperature

X. Dimensional analysis of rates
    A. "Per" implies division
    B. Speed = length / time
    C. Pressure = force / area
    D. Flow = volume / time
    E. Concentration = mass / volume
    F. Unit Price = value / quantity

XI. Express conversion factors as fractions

XII. Applying the fractional conversion factor process to
    A. Percent computations
    B. Ratios
    C. Fahrenheit - Celsius temperature conversions

XIII. Dimensional analysis of rates, ratios and concentrations

XIV. Using molecular weights to calculate percent composition
    A. Identify the atomic weight of common elements
    B. Determining the ratio of atoms in chemical formulae
    C. Applying the fractional percent conversion

Assignment:

1. Reading, approximately 5-10 pages per week, based on eight weeks.
2. Problem sets such as flow rates, surface area, volume calculations,
other calculations pertaining to water treatment and distribution.
3. Quizzes (1-3); 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 problem sets such as flow rates, surface area, volume calculations, other calculations pertaining to water treatment and distribution. | Problem solving 40 - 60% |

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.

| Multiple choice, True/false, Matching items, Completion | Exams 40 - 60% |

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

| None | Other Category 0 - 0% |

Representative Textbooks and Materials:
Instructor prepared materials.
Mathematics Manual for Water and Wastewater Treatment Plant Operators, Frank Spellman; CRC Press, 2004
Math Text for Water & Wastewater Technicians, Grover Wright; 3rd edition. Wright's Training, 1997 (classic)