

WWTR 112 Section: 1129
WASTEWATER TREATMENT MATH
TUESDAY 6:00 pm – 9:00 pm
BY ZOOM
COURSE SYLLABUS FOR FALL 2020

Instructor: Max Kroschel
Email: mkroschel@santarosa.edu
Work email: mkroschel@lescur-engineers.com
Office: by ZOOM meeting, make appt.
Office Hours: Mon 6:00 pm - 7:00 pm

Textbook and Required Supplies:

- *Applied Math for Wastewater Plant Operators*, Joanne Kilpatrick Price, 1991
- *Applied Math for Wastewater Plant Operators - Workbook*, Joanne Kilpatrick Price
- Basic calculator (Only hand-held basic, non-programmable, no memory, self-contained, battery operated/solar, silent, non-printing calculators will be permitted.) This mirrors the State Water Board requirement for all Exams.
- Equivalents and Formula Sheet (Provided by Instructor)
- Pencil, eraser and straight edge. No ink allowed!

Course Content:

Student Learning Outcomes:

Upon completion of this course, the student will be able to:

1. Utilize mathematical methods applicable to the field of water and wastewater treatment and operations.
2. Analyze and calculate necessary components used in design, operation, process control and maintenance of a wastewater treatment plant.

Objectives:

Upon successful completion of this course, the student will be able to:

1. Apply general mathematical concepts to the wastewater/water industry.
2. Utilize special terminology and units as applied to wastewater/water operations.
3. Utilize basic mathematical principles for hydraulic calculations.
4. Utilize unit conversions related to flow, volume, and weight.
5. Analyze and calculate the necessary parameters used in the operation, process control and maintenance of a wastewater treatment plant.
6. Be prepared to take the math portion of the State wastewater operator exams (1&2)

Attendance:

- Class begins on the hour and ends at ten (10) minutes before the hour. Class will take two (2) breaks during the evening. **You are responsible for your attendance.** Math is based on building on concepts learned previously.
- Attendance for lecture hours is required. SRJC policy: student may be dropped if they miss more than 10% of the course. All classes are on ZOOM so there is minimal reason for not attending the class.
- Absence of 2 classes (for any reason) will constitute Excessive Absence for this Course; any student with excessive absences may be dropped from the class. See policy above.
- Excused absence for extreme cases will be considered and only by contacting the instructor **prior** to the beginning of class.

Assignments:

- Assignments are your responsibility. All assignments are to be done per instructions and due at the beginning of class on the assigned due date. Math is learned by multiple repetitions: practice, practice, practice! If you don't do the homework you are missing an opportunity to practice and then review your procedures in class.
- Homework is all the practice problems in the workbook for each section assigned for reading in the Syllabus. I may cut back on assigned problems for weeks with large reading list but will do that a week at a time. I'll review the next weeks homework at the end of each class.
- You should do all assignments electronically on your computer if you can. Compose in word, not excel. You need to practice the problems by working out the numbers on your hand held calculator and then filling in your worksheet. Make a pdf of the homework to be able to turn in electronically by uploading it before each class. Show all work.
- Put your name, course number and due date on the first page. Assemble all the pdf pages into one document, or due the work by hand and then scan the final result so you can upload it. Homework will be reviewed/graded the first part of class. I don't give a grade on homework just the numerical score: 12 out of a possible 15 for example if you get 12 right out of 15 problems.

Quizzes and Exams:

- I'm not clear yet on how the mid term and final exams are to be taken.
- Quizzes will be given intermittently throughout the semester. Since classes are on ZOOM, I'll record each class and post it so you can watch it later if you have to miss class for some reason. Quizzes are not for grade but to show you what you know or need to work on and shows me about class progress and understanding.
- **Midterm exam** will be given on **Tuesday October 13, 2020** unless otherwise notified. Sufficient notice will be given prior to any re-scheduled exam date.
- **Final exam** will be comprehensive and will be given on **Tuesday December 15, 2020** from **6:00 pm to 9:00 pm**.
- Equivalents and Formula Sheet can be used during all quizzes and exams.

Grading:

Your final grade in the course will be weighted as follows:

- Midterm Exam – 51%
- Final Exam - 49%
- This course is intended to prepare you for the math portion of the Wastewater Operators exam, so to pass the course you need to pass a written exam with a comprehensive set of problems to work and solve.

Other Important Information:

- **SRJC Student Rights and Responsibilities:**
<https://studentlife.santarosa.edu/rights-and-responsibilities>
- **Tutoring - Petaluma Campus / Santa Rosa Campus**
- **Engineering & Applied Technology (E&AT)** <http://appliedtechnology.santarosa.edu>
- **Academic Calendar**

Course Outline:

The objective of this outline is to assist you in planning your schedule. Every effort will be made to stay on schedule. However, the instructor may find it necessary to make appropriate changes to meet the learning objectives for the entire class. Instructor will assign homework problems for each topic on the schedule. In-class worksheets and assignments and quizzes will be given intermittently throughout the semester. There is a PDA day somewhere in the schedule when there are no scheduled classes and instructors are supposed to take a class for professional development. I'm taking a workshop before class begins next Friday so I'm going to ignore the PDA day because we don't need any campus facility to meet and I like this schedule with the distribution of class work over the semester. There will be **class every Tuesday, even PDA day.**

Date	Chapter	Description	Notes
8/18/2020	Hand outs Canvas	Introduction Math Functions, Basic Geometry, Area, Units, Unit Conversions: Dimensional Analysis	
8/25/2020	Hand outs Canvas 1	Basic Algebra, equations, solving for unknown, Volume Calcs, Temperature Conversions	
9/01/2020	2	Velocity and Flow Calculations	
9/08/2020	3.1 - 3.3	Milligrams/Liter to Lbs/day calculations Dosage/ BOD/ COD/ SS	
9/15/2020	3.4 - 3.5 4.1 - 4.6	MLSS/ MLVSS/ WAS Filter Loading Rates / Weir Overflow	
9/22/2020	4.7 - 4.9	Loading Rate Calculations - Solids Organic Loading & F/M ratio	
9/29/2020	4.10 - 4.12	Digester, VS & Population Loading	,
10/6/2020	5	Detention & Retention Times Review	
10/13/2020		MID-TERM EXAM	Chapters 1-5
10/20/2020	6.1 - 6.4	Unit Process Efficiency , Percent Solids Calculations Mixing % Sludges, % Volatile Solids	
10/27/2020	7.1, 7.2 - 7.3	Pressure and Force, Head Density and Specific Gravity	
11/03/2020	7.4 6.8	Horsepower and Pump Capacity Pump Efficiency	
11/10/2020	8	Primary Treatment: Wet well pumping, screenings, Grit Channel, Weir measurement	
11/17/2020	9	Sedimentation: detention time, solids loading, weir overflow, surface overflow	
11/24/2020	12	Waste Activated Sludge, F/M Ratio, Sludge Age, Solids Retention Time (SRT) Return Sludge Rate, Wasting Rate, WAS pumping	
12/01/2020	13 14	Waste Treatment Ponds Chemical Dosing & Feed rates	
12/08/2020	18	Settleability, suspended solids, volatile solids Review	
12/15/2020		FINAL EXAM ,	Comprehensive

