

Environmental Engineering Laboratory

UNIVERSITY OF CONNECTICUT
DEPT OF CIVIL AND ENVIRONMENTAL ENGINEERING
ENVE 3200 - SPRING 2021

Lecture: Tuesday. 11:00 AM - 12:50 PM (TLS 154)
Lab: Thursday 11:00 AM - 2:00 PM, 2:00 PM -5:00 PM (CAST 114/113/112)

Instructor: Professor Randi Mendes (email: randi.mendes@uconn.edu)
Office Hours: Mon 11:00 AM – 12:00 PM or by appointment (<https://uconn-cmr.webex.com/meet/ram15006>)

Teaching Assistants:

Nafis Fuad, nafis.fuad@uconn.edu, Office Hours: Wednesdays 3:00 PM – 5:00 PM
Aaron Golab, aaron.golab@uconn.edu, Office Hours: Tuesdays, 2:00 PM – 4:00 PM

Course Organization:

This course will expose you to environmental engineering concepts you have only seen in textbooks or have yet to cover in other courses through visual observations and data collection. We will heavily focus on the process of analyzing and interpreting data, and conceptual understanding of what the data means. You will do a lot of calculations and a lot of writing, but all will be with help and guidance from the instructors. More quantitative exercises are interspersed with qualitative observations, and more outside time as the weather gets warmer.

Grading:

Informal Lab Reports (Lab 1, 2, 4, 6, & 7)	35%
Formal Lab Reports (Lab 3 & 5)	25%
Laboratory worksheets (Lab 0, 8, & 9)	15%
Final Project Formal Report	10%
Pre-lab	10%
Laboratory Notebooks	5%

Overall Course Objectives:

At the completion of this course, you will be able to:

1. Apply fundamental and quantitative knowledge about environmental chemistry to interpret and solve water and soil quality engineering problems.
2. Apply basic statistical techniques to analyze and interpret experimental data.
3. Design, conduct, analyze and interpret lab- and pilot-scale experiments to estimate kinetic and stoichiometric information for water quality engineering unit processes.
4. Summarize, interpret, and present experimental information in formal reports.
5. Critique technical writing and provide feedback to others.
6. Work effectively as a team member to solve engineering tasks.

Mandatory Course Text/Items:

1. Laboratory Notebook – any version at the co-op as long as you can produce a carbon copy page.
2. ENVE 3200 Laboratory Manual (*pdfs available on huskyct*)

Lab Reports: The report-writing efforts will involve a buildup of report writing components (informal lab reports) that will lead to the synthesis of a well-written, flowing formal lab report with all sections linked together smoothly. A FULL data analysis and presentation must be performed for all reports. All reports (worksheets, informal, and formal) are due online via HuskyCT or to the TA at the beginning of the laboratory class, Thursday. Students will be allowed to resubmit formal reports, addressing edits, for regrades.

Worksheets (50pts): Worksheets will be provided for some labs in which neither an informal nor formal report will be completed. However, data analysis is still expected.

Informal Reports(50pts): Informal lab reports will focus on aspects of the formal report writing. As a reminder, these reports still require data analysis. A portion of the informal lab report grade will be assigned for high-quality data presentation and overall report organization

Formal Reports(70pts): Formal lab reports will be required for some of the labs in this class. A formal lab report should cover: Introduction (Relevant Theory with Objectives stated), Methodology, Results, Discussion, References, Tables/Figures and necessary Appendices as described in more detail in the *Report Guide* handout. Reports will be graded on both technical content and editorial quality.

Lab Notebooks(5pts): The laboratory notebook is an essential document for any experimental work, used to record ideas, plans, methodology/procedure in addition to data. Notes should be clear, concise, and neatly recorded (see Kanare (1985), *Writing the Laboratory Notebook* (ACS), as a guide). Due to COVID limiting our total and time capacity, the following components title, purpose, materials, and methods (see Report Guide Handout) are expected to be completed before the lab period. Your name must be on every page of your notebook. The TA's or instructor will check and give a grade for the lab notebooks at the start of every lab.

Pre-Labs(10pts): Pre-labs will be due Wednesday evening and submitted through HuskyCT. These pre labs will cover information learning during Tuesday lecture as well as the lab for that week.

Final Project(100pts): The final project will task you to investigate a problem of interest and utilize the various analytical procedures learned throughout this course as well as others discovered through your own research to develop a protocol for measuring the parameter of interest. Aspects of this report will be due throughout the term.

Quizzes(5pts): Quizzes will occur throughout the term and will roughly cover about 2 labs each.

*For full breakdown of deadlines and course schedule below.

Supplementary Texts (Available at Babbidge Library)

1. Sawyer, C.N., P.L. McCarty, G.F. Parkin (2003) Chemistry for Environmental Engineering and Science. 5th Edition, McGraw-Hill, 752 pp.
2. Robinson, M.S., Stoller, F.L., Costanza-Robinson, M.S., Jones, J.K. (2008) Write Like a Chemist. Oxford, New York.
3. Skoog, D. A.; West, D. M.; Holler, F. J. Fundamentals of Analytical Chemistry; 7 ed.; Saunders College Publishing: New York, NY, 1996, pp 870.
4. Mihelcic, J.R.; J.B. Zimmerman. Environmental Engineering Fundamentals, Sustainability, Design. John Wiley & Sons, Hoboken, NJ, 2010, pp 695.
5. Reynolds, T. D.; Richards, P. A. Unit Operations and Processes in Environmental Engineering; 2 ed.; PWS Publishing Co.: Boston, MA, 1996, pp 798.
6. Jenkins, D.; Snoeyink, V. L.; Ferguson, J. F.; Leckie, J. O. Water Chemistry, Laboratory Manual; 3 ed.; John Wiley & Sons: New York, NY, 1980.
7. Snoeyink, V. L.; Jenkins, D. Water Chemistry; 1 ed.; John Wiley & Sons: New York, NY, 1980, pp 463.
8. Droste, R. L. Theory and Practice of Water and Wastewater Treatment; John Wiley & Sons, Inc.: New York, NY, 1997, pp 800.
9. American Water Works Association. Water Quality and Treatment; 4 ed.; Mc-Graw-Hill, Inc.: New York, NY, 1999, pp 1194.
10. Standard Methods for the Examination of Water and Wastewater; 19 ed.; Eaton, A. D.; Clesceri, L. S.; Greenberg, A. E., Ed.; American Public Health Association: Washington, DC, 1995.
11. Huckin, T. N. and L. A. Olsen. 1991. Technical writing and professional communication. McGraw-Hill, Inc., New York, NY.
12. Kanare, H.M. (1985) Writing the Laboratory Notebook. American Chemical Society, Washington, D.C. *especially Ch. 5 & 6.*

Course Calendar

Section 1: 11:00 AM - 12:30 PM 2:00 PM -3:30 PM

Section 2: 12:30 PM - 2:00 PM 3:30 PM - 5:00 PM

**** Both sections will meet from 11-2 or 3-5 but in their designated meeting locations**

	Date	Lecture Topic	Meeting Location	Date	Lab Section	Lab	Meeting Location
Week 1	19-Jan	Introduction, Overview, Stats Review	Online	21-Jan		Lab 0: Excel Stats Lab	Online
Week 2	26-Jan	Data Presentation & Lab Intro	Online	28-Jan		Lab 1: Gravimetric data lab	Online
Week 3	2-Feb	Data Quantification	TLS 154	4-Feb	Section 1 Section 2	Lab 2: Safety Training & Standard Curve generation	CAST 115
Week 4	9-Feb	Alkalinity; titrations	TLS 154	11-Feb	Section 1	Lab 3: Alkalinity, Coagulation and Flocculation**	CAST 115
					Section 2	Peer Review Lab Report 2 **	CAST 117
Week 5	16-Feb	Lab Report Writing	TLS 154	18-Feb	Section 1	Peer Review Lab 3 Report **	CAST 117
					Section 2	Lab 3: Alkalinity, Coagulation and Flocculation**	CAST 115
Week 6	23-Feb	Alkalinity calculations	TLS 154	25-Feb		Calculations	ROWE 122
Week 7	2-Mar	Biological Treatment	TLS 154	4-Mar		Lab 4: BOD Demo Lab	ROWE 122
Week 8	9-Mar	Chemical Oxidation	TLS 154	11-Mar	Section 1	Lab 5: Chemical Oxidation	CAST 115
					Section 2		
Week 9	16-Mar	Adsorption	TLS 154	18-Mar	Section 1	Lab 6: Adsorption**	CAST 115
					Section 2	Project Peer Review**	CAST 117
Week 10	23-Mar	Adsorption calculations	TLS 154	25-Mar	Section 1	Project Peer Review**	CAST 117
					Section 2	Lab 6: Adsorption**	CAST 115
Week 11	30-Mar	Chlorination & Calculations	TLS 154	1-Apr	Section 1	Lab 7: Chlorination Lab	CAST 115
					Section 2		
Week 12	6-Apr	Stream Lab (Nafis Fuad)	TLS 154	8-Apr	Section 1	Lab 8: Stream Lab	TBA
					Section 2		
Spring Break (April 11 - April 17)							
Week 13	20-Apr	Soil Analysis (Cody Exley)	Online	22-Apr		Lab 9: Soils	Online
Week 14	26-Apr	Final Projects	Online	28-Apr		Project Meet Time	Online
Reading Week (April 29 – May 2)							

Course Deadlines

Week 1	T 19-Jan W 20-Jan R 21-Jan F 22-Jan	Lab 0 Pre-Lab Lab 0 Notebook	Week 8	T 9-Mar W 10-Mar R 11-Mar F 12-Mar	Lab 5 Pre-Lab Lab 4 Report (Intro + Methods)/Lab 5 Notebook
Week 2	T 26-Jan W 27-Jan R 28-Jan F 29-Jan	Lab 1 Pre-Lab Lab 0 Worksheet/Lab 1 Notebook	Week 9	T 16-Mar W 17-Mar R 18-Mar F 19-Mar	Project - Analytical Method Lab 6 Pre-Lab Lab 5 Report (Results + Discussion)/Lab 6 Notebook
Week 3	T 2-Feb W 3-Feb R 4-Feb F 5-Feb	Project Proposal Ideas (3) Lab 2 Pre-Lab Lab 1 Report (Methods)/Lab 2 Notebook	Week 10	T 23-Mar W 24-Mar R 25-Mar F 26-Mar	Lab 6 (Results + Discussion)
Week 4	T 9-Feb W 10-Feb R 11-Feb F 12-Feb	Lab 3 Pre-Lab Lab 2 Report (Intro)/Lab 3 Notebook	Week 11	T 30-Mar W 31-Mar R 1-Apr F 2-Apr	Project Sample Collection Protocol Lab 7 Pre-Lab Lab 6 Formal Report/Lab 7 Notebook
Week 5	T 16-Feb W 17-Feb R 18-Feb F 19-Feb	Lab 3 Report (Intro + Methods)	Week 12	T 6-Apr W 7-Apr R 8-Apr F 9-Apr	Lab 8 Pre-Lab Lab 7 Report (Discussion)/Lab 8 Notebook
Week 6	T 23-Feb W 24-Feb R 25-Feb F 26-Feb	Project Purpose Statement	Week 13	T 20-Apr W 21-Apr R 22-Apr F 23-Apr	Project – Hypothetical Results Discussion Lab 9 Pre-Lab Lab 8 Worksheet/Lab 9 Notebook
Week 7	T 2-Mar W 3-Mar R 4-Mar F 5-Mar	Lab 4 Pre-Lab Lab 3 Report (Formal)/Lab 4 Notebook	Week 14	T 27-Apr W 28-Apr R 29-Apr F 30-Apr	Lab 9 Worksheet All Formal Report Rewrites

***Final Project Due: April 31st 11:59 PM**