

Water and Wastewater Treatment

ENV 4514C – Section 7350 & ENV6932 – Section 2563

Lecture Times: Periods 9 and 10 (4:05 - 6:00 pm)

Location: FLG 280

Academic Term: Fall 2016

Instructor:

Ms. Regina Rodriguez

Email Address: reggie17r@ufl.edu

Office: 314 AP Black Hall

Office Hours: By appointment

Teaching Assistants:

Please contact through the Canvas website

- Ms. Malak Anshassi
- Email: manshassi@ufl.edu
- Office: 221 AP Black Hall
- Office Hours: Tuesdays & Thursdays
12:50PM-1:55PM
- Ms. Virginia Lane
- Email: vlane11@ufl.edu
- Office: 213 AP Black Hall
- Office Hours: Mondays & Wednesdays
4:05PM-5:10PM

Course overview:

This course focuses on the design of water and wastewater treatment plants. Specifically, we will employ design equations pertinent to the various unit processes required to purify ground and surface water and to remove unwanted contaminants from wastewater. In order to better understand the design of these systems, the course begins by covering the fundamentals that are necessary to understand why and how we design treatment plants. For example, a brief review of chemistry, biology, and hydraulics is provided followed by water quality issues.

Course Description

Design of water and wastewater treatment units. Credits: 3.

Course Pre-Requisites / Co-Requisites

None

Course Objectives

To educate students about why and how environmental engineers design water and wastewater treatment plants. To provide students with the fundamentals of water pollution and unit processes required for more advanced classes.

Required Textbooks and Software

Water Supply and Pollution Control, 8th edition. (W. Viessman, Jr. and P. Chadik)

Course Schedule

Lecture	Topic
1: Tuesday, Aug 23 (2 Periods)	Introduction: Class, Portfolio, Syllabus, Water Quality in Fallon, NV
2: Thursday, Aug 25 (1 Period)	Chapter 1, Chapter 2, Chapter 4 (skip 4.4 – 4.6) Chapter 8 (Sections 8.4 – 8.6)
3: Tuesday, Aug 30 (2 Periods) Select Teams	Chapter 6 (Sections 6.1-6.3, 6.11-6.16) Assign: Portfolio #1 (Team Charter)
4: Thursday, Sept 1 (1 Period)	Chapter 11 (Sections 11.1-11.5, 11.6)
5: Tuesday, Sept 6 (2 Periods)	Chapter 10: Potable Water Design
6: Thursday, Sept 8 (1 Period) DUE: Portfolio	Rapid Mix (Section 10.6)
7: Tuesday, Sept 13 (2 Periods)	Flocculation (Sections 10.7, 11.11-11.14) Assign: Lab #1 Rapid Mix and Flocculation Design
8: Thursday, Sept 15 (1 Period)	Sedimentation (Sections 10.8, 10.9, 10.10)
9: Tuesday, Sept 20 (2 Periods)	Filtration (Sections 10.13 -10.19)
10: Thursday, Sept 22 (1 Period)	Adsorption (PAC and GAC) (Sections 11.33,11.41-11.42)
11: Tuesday, Sept 27 (2 Periods)	Adsorption (PAC and GAC) (Sections 11.33,11.41-11.42)
12: Thursday, Sept 29 (1 Period) DUE: Lab #1	Disinfection (Sections 11.21-11.30) Assign: Lab #2 Sedimentation and Disinfection Design
13: Tuesday, Oct 4 (2 Periods)	Desalination and Membrane Technologies (Sections 11.38-11.39)
14: Thursday, Oct 6 (1 Period)	Alternative/Innovative Treatment Technologies
15: Tuesday, Oct 11 (2 Periods)	Alternative/Innovative Treatment Technologies
16: Thursday, Oct 13 (2 period)	EXAM #1
17: Tuesday, Oct 18 (2 periods)	Entrepreneurship Assign: Water Reclamation Tour Sign Up
18: Thursday, Oct 20 (1 period)	Importance of Finance in Engineering Assign: Lab #3 Create a Business Plan for an Innovative Technology
19: Tuesday, Oct 25 (2 periods) DUE: Lab #2	Business Plans
20: Thursday, Oct 27 (1 period)	Chapter 8: BOD (Section 8.11)
21: Tuesday, Nov 1 (2 Periods)	Chapter 9: Introduction to WWTP (Sections 9.1-9.2)
22: Thursday, Nov 3 (1 Period)	Chapter 10: Prelim. Treatment (10.2, 10.4, 10.5, 10.12)
23: Tuesday, Nov 8 (2 Periods)	Chapter 12: Secondary Treatment (Sections 12.19-12.21)
24: Thursday, Nov 10 (1 Period)	Chapter 12: Trickling Filter and RBCs (Sections 12.12-12.18)
25: Tuesday, Nov 15 (2 Periods)	Water Reclamation Facility Tour
26: Thursday, Nov 17 (1 Period)	Water Reclamation Facility Tour

27: Tuesday, Nov 22 (2 Periods) DUE: Lab #3	Chapter 12: Stabilization Ponds (Sections 12.27 -12.34) Chapter 13: Sludge Processing
28: Thursday, Nov 24	Holiday
29: Tuesday, Nov 29 (2 Periods)	NASA Wastewater Treatment and Acid Mine Drainage
30: Thursday, Dec 1 (1 Period)	Lab 3 Presentations and Exam review
31: Tuesday, Dec 6	Exam #2

Professional Component (ABET):

Upon completion of this course students should:

1. Have an ability to design the various unit operations in a water treatment plant.
2. Have an ability to design the various unit operations in a wastewater treatment plant.
3. Understand water quality issues and regulations.

Relation to Program Outcomes (ABET):

Outcome	Coverage*
a. Apply knowledge	Medium
B1. Conduct experiments	
B2. Statistical design of experiments	
c. Design	High
d. Function on teams	High
e. Solve programs	Medium
f. Professional and ethical responsibility	Medium
g. Communicate	High
H1. Economic impact	Medium
H2. Global, societal, and environmental impact	Medium
i. Lifelong learning	
j. Contemporary issues	Medium
k. Techniques, skills, and tools for degree program	High

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not part of the course.

Attendance Policy, Class Expectations, and Make-Up Policy

Based on the quick pace and difficulty of course material, class attendance is crucial for you to perform well on exams and in labs. However, attendance will not be checked nor graded. In class, my goal is to interact with you versus lecture to you and therefore your participation is welcome and encouraged.

Evaluation of Grades

Assignment	Percentage of Final Grade
Homework	Not Graded
Exams (2)	50%
Lab Design Portfolio	50%
	100%

Assessment Methods:

Your grade for this course will be determined based on your performance on labs, exams, and your team’s portfolio.

1. Homework will provide additional practice to solve problems in addition to those examples covered in the text and in class. It will be expected that each of you will conduct this exercise individually to help in review for the exam. Homework will not be collected or graded.
2. “Dry”Labs will be conducted on a regular basis to provide you the opportunity to address design problems in class. You will work in teams of 5 (you choose the teams) and your group will turn in a lab write-up following the method outlined below.
3. Your Portfolio is a compilation of your group’s labs, your team charter, and course assessment. The team charter includes the following: a team name; a list of team members and their email addresses; the team rules; the team’s course goals; and the team’s grading metrics. Your team will devise, in part, a grading system such that each member will be accountable for his/her participation in the group (see above). The finished portfolio should be well organized and contain the design of the various treatment units.

* At the conclusion of the semester, you will grade yourself and your team on the following scale:

1	2	3	4	5
Poor	Fair	Good	Excellent	Outstanding

All the scores will be averaged to arrive at an average team score. Your portfolio grade will be added to or deducted from based on your performance. For example, if your personal average was a 3, and your team’s average was a 4, then you will lose points on your portfolio. On the contrary, if your personal score was a 4, and your team’s average was a 3, then you will earn points on your portfolio. The amount of points that you earn or lose is based on your team’s decision (At least 10% /point). If your team chose 20%, and your score was a 4, while your team’s score was a 3, then your portfolio grade would be increased by 20%.

Grading Policy

Percent	Grade	Grade Points
94.0 - 100	A	4.00
90.0 - 93.9	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
60.0 - 69.9	D+	1.33
0 - 59.9	E	0.00

Lab Report Format: Your lab, which will consist of the design of a unit process within the treatment plant, should be concise. The report should include a brief write-up that discusses the purpose of the unit process, the methodology behind your design, and the key elements to your design. Inclusive in the report must be a schematic of the unit process including dimensions and a table summarizing your design (i.e., number of basins, dimensions, power requirements, etc.).

Page limit: 10 pages double-spaced (Points will be deducted for exceeding this limit).

Required Format:

1. Cover Page
 - a. Title
 - b. Group Name
 - c. Individual Names
 - d. Date
2. Executive Summary
 - a. **Is** a summary of the entire report that contains enough information for the readers to become acquainted with the report without reading it.
 - b. **Is not** a numbered page of the report
 - c. All information discussed in discussion **must** be included in the Exec. Sum. (ie: cost, number of basins, etc.) No new info.
3. Introduction
 - a. First numbered page of report (Page 1)
 - b. Introduces the reader to the problem you are trying to solve and gives background information on unit processes to be used.
 - c. **Does not** contain results or discussion of results.
4. Results
 - a. Includes tables or figures (**must be labeled**)
 - b. Title of table goes **above** the table
 - c. Title of figure is positioned **below** the figure
 - d. Tables, figures, and appendices must be numbered/lettered sequentially in the order that they are referenced within the report.
5. Discussion
 - a. Text discussing the tables/figures in the Results section
 - b. All tables and appendices must be referenced
6. Conclusion
 - a. Should give a summary of the conclusions and recommendations
7. Appendices
 - a. Contain example calculations (**required**) and any other pertinent information
 - b. Appendices should be referred to in the text of the report (e.g., “Example calculations can be found in Appendix A”).
8. References
 - a. References are **required** and must follow APA format
 - b. Must be cited within the text of the report

Important:

- Units are important. Without them, a number is meaningless.
- Units must be consistent throughout the report in either English or Metric.

- **Points will be deducted for omission or inconsistency of units, or if units don't make sense/are inappropriate! Examples include 4.00 tanks, 1.450395867483 ft/s, etc.**
- Be sure to justify all assumptions. The key to the labs is being able to explain your reasoning for the choices you made in your lab.

Guidelines for Communication:

- Allow ample time to arrange a meeting. Ms. Rodriguez and TAs are usually not immediately available outside of office hours!
- Ask lab questions as a team. This benefits each team member and not just the student who asked. It is important for the exams that each team member knows what the other team members are doing and understands it.
- Copy all TAs on emails. This ensures that your email receives a response.
- When emailing TAs, allow **1 business day** (24 hours) for a response. Expect to receive a response to emails sent on the weekend on the following Monday.
- Do not expect to solve all problems via email! Taking advantage of office hours is the easiest and most effective way of solving a complex issue, such as a roadblock in your design.

Tips for excelling in this course:

1. Read the book!
2. Come to class (bring your book).
3. Participate in class discussions.
4. Work independently on homework.
5. Photocopy your lab portfolio so each team member has a reference when preparing for the exams.
6. Visit office hours!

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>

Campus Resources:

Health and Wellness

U Matter, We Care:

If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling.
<https://www.crc.ufl.edu/>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.