



## ENV 4041C – Environmental Analysis

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Preferred email: CANVAS

**UG SUPPORT:** Karen Sem ([karensem@ufl.edu](mailto:karensem@ufl.edu))  
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**OFFICE HOURS:** Office hours will be offered through zoom on T & W 6<sup>th</sup> Period (12:50-1:40PM)

**MEETING TIME:** Lecture: Asynchronous  
Laboratory: Asynchronous  
Q/A sessions: Synchronous every Monday at Period 4 (10:40-11:30AM)

**MEETING ROOM:** *Due to the unique circumstances surrounding the covid-19 pandemic, this course will be offered via remote instruction. Please know that your course instructor has worked hard to make sure you will have an outstanding learning experience—even if online courses are not your favorite. The class and lab will be offered asynchronous but you will have the opportunity to attend synchronous Q/A sessions, office hours and group meetings.*

**FERPA:** *Aspects of this course may be recorded for students in the class to revisit. If you participate with your camera engaged or utilize a profile image, you are agreeing to have yourself/image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded, you will need to keep your mute button activated and communicate using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.*

**COURSE DESCRIPTION:** This class provides the underlying theory of laboratory techniques for the analysis of contaminants in aqueous, gaseous, and solid phases, which are linked to basic concepts of ecosystems structure and function.

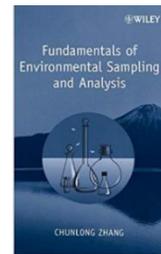
**PROFESSIONAL COMPONENT (ABET):** Fundamental concepts and principles emphasized in this course will provide students with necessary skills needed to qualitatively and quantitatively characterize environmental pollution in both natural and engineered systems. The hands-on component of this course (labs) is a tremendous asset for professional careers in environmental engineering as it exposes students to the analysis of experimental data, while helping develop scientific critical thinking and writing skills.

**RELATION TO PROGRAM OUTCOMES (ABET):** Students who successfully complete this course should be able to: (1) design and conduct laboratory experiments, and (2) critically analyze and interpret data relevant to environmental systems.

**COURSE PRE-REQUISITES:** CHM 2046 or CHM 2096 and STA2023 or equivalent

## REQUIRED TEXTBOOK AND SOFTWARE:

- Textbook title: “Fundamentals of Environmental Sampling and Analysis”
  - Author: Chunlong Zhang
  - Publisher: John Wiley & Sons, 2007.
- Software: computer with internet access, equipped with a word processor, excel or a statistical analysis software
- Tools: CANVAS, Zoom, PlayPosit, VoiceThread, Labster JoVe



## COURSE FORMAT: Each week, you will participate in three types of learning activities:

- **LECTURE:** you will need to watch the pre-recorded lecture videos posted in CANVAS for each week. In addition, students can choose to attend “live” Q/A sessions via zoom on Mondays from 10:40 – 11:30AM. These sessions will be used to clarify any questions participating students might have from the pre-recorded lectures, including practice problems. *You are required to attend to a minimum number of QA sessions to earn full credit for class participation.*
- **LAB:** several tools will be used to provide an experiential learning opportunity during remote lab instruction, including: pre-recorded lab videos by the instructor, sampling and analytical protocol videos by JoVe and laboratory simulations by Labster. Each week you will be expected to complete a series of activities, which might include reading the laboratory notes (rationale, laboratory procedures, etc.), watching videos demonstrating the lab activity, completing lab simulations (to control variables and generate data), and complete a series of exercises. These exercises, along with others that your course instructor has generated, will be available to you in the form of a CANVAS quiz or embedded in the laboratory simulation activities. You will need to complete these exercises each week, either individually or with the help of your classmates. Some of these “lab” activities are design to test your understanding of the material and others are intended to be formative—there to help you learn rather than to test you.
- **COLLABORATIVE MEETINGS:** Although this class will be held online, engaging with your classmates is mandatory. You will be placed into groups of ~4 students within the first week of class and it will be up to you, as a group, to determine when you will meet (via zoom) each week to work on discussion-based questions and learning activities.

## COURSE LEARNING OBJECTIVES: After completion of this course, you will acquire knowledge necessary for,

- accurate sampling, storage, handling and analysis of environmental samples,
- linking different analytical techniques to the identification and quantitation of different pollutants and pathogens of environmental concern,
- critical analysis and discussion of experimental data, and
- reporting scientific information.

## STUDENT RESPONSIBILITIES AND ATTENDANCE POLICY: You are expected to,

- review pre-recorded lecture videos prior to QA sessions
- attend to a minimum of 50% of the QA sessions
- complete assigned readings and assignments before the end of each module
- read lab notes and watch pre-recorded laboratory activities prior to weekly collaborative meetings
- attend weekly collaborative meetings with your assigned group members. You are permitted two absences for these meetings—no questions asked. Beyond two absences, students will receive a 2% lab grade deduction per absence. Groups are encouraged to accommodate one another’s schedules as much as possible, but are not obligated to change days/times regularly to do so—unless this is the group’s original arrangement (i.e., your group arranged to determine what will work for you each week rather than selecting a set day/time to commit to each week).

**PERSONAL CONDUCT POLICY:** Students are expected to exhibit behaviors that reflect highly upon themselves and our University:

- Read and refer to the syllabus
- Arrive to group meetings and QA sessions on time (i.e., a few minutes early)
- Show respect to the course instructor and UG support/graders
- Use professional, courteous standards for all emails and discussions:
  - Descriptive subject line
  - Address the reader using proper title and name spelling
  - Body of the email should be concise but have sufficient detail
  - Respectful salutation (e.g., cheers, thank you, sincerely, respectfully)
- No personal conversations and social media during QA sessions/instruction times
- Adherence to the UF Student Honor Code: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>
  - 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.”
  - Honor code violations of any kind will not be tolerated and sanctions will be determined by the course instructor for first-time violators
  - All allegations, regardless of the severity, will be reported to the Dean of Students Office for University-level documentation and processing.
- 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.

**MAKE-UP POLICY:** To schedule a make-up, please fill out the [make-up request form](#) posted in the CANVAS “Introduction to Course module” ahead of time and submit it to your course instructor via CANVAS email. Documentation will be required and should accompany your make-up request form. In case of last-minute illness or emergency, please contact the instructor via email explaining the situation. If you have a serious emergency or life event, please contact the Dean of Students Office ([www.dso.ufl.edu](http://www.dso.ufl.edu)) and they will contact all your instructors for you – which would serve as “documentation.”

If you have an unexcused absence and missed an assignment, you will earn a zero and will not be granted a make-up. While make-ups are given at the discretion of the instructor, requirements for make-up assignments are consistent with the university policies. These can be found at <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

**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 and discussing their access needs. Students with disabilities should follow this procedure as early as possible in the semester.

**COURSE EVALUATION:** Students are expected to provide constructive and respectful feedback on the quality of instruction in this course by completing online evaluations via GatorEvals. Guidance on how to give professional and respectful feedback is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, typically during the last two or three weeks of the semester. Summaries of the course evaluation results are available to students at <https://evaluations.ufl.edu/results/>.

**COMMITMENT TO A SAFE AND INCLUSIVE LEARNING ENVIRONMENT:** The Herbert Wertheim College of Engineering (HWCOE) values a diverse and inclusive community. It is integral to success in every area of our college. Therefore, the College is committed to non-discrimination with respect to all areas of human differences, including but not limited to national and ethnic origin, race, age, sex, sexual orientation, gender identity and expression, beliefs and opinions, religion and faiths, culture, socio-economic background, level of physical or mental ability, and veteran's status. This commitment applies in all areas—to students, faculty, and staff and intends to reflect the College's belief that educational and employment decisions and access to University activities should be based on an individual's abilities and qualifications.

The HWCOE values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. We aspire to educate students to become future leaders capable of creating diverse and inclusive work cultures wherever their careers may take them.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, [rbielling@eng.ufl.edu](mailto:rbielling@eng.ufl.edu)
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, [taylor@eng.ufl.edu](mailto:taylor@eng.ufl.edu)
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, [nishida@eng.ufl.edu](mailto:nishida@eng.ufl.edu)

**CAMPUS RESOURCES:** UF has available resources on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

#### HEALTH AND WELLNESS

- **U Matter, We Care:** Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.
- **Counseling and Wellness Center:** <http://www.counseling.ufl.edu/cwc>, and 392-1575.
- **Sexual Discrimination, Harassment, Assault, or Violence:** If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the Office of Title IX Compliance, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, [title-ix@ufl.edu](mailto:title-ix@ufl.edu)
- **Sexual Assault Recovery Services (SARS):** Student Health Care Center, 392-1161.
- **University Police Department:** at 392-1111 or 9-1-1 for emergencies, or <http://www.police.ufl.edu/>.

#### ACADEMIC RESOURCES

- **E-learning technical support:** 352-392-4357 (select option 2) or e-mail to [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu). <https://lss.at.ufl.edu/help.shtml>. Information on CANVAS tools is available via the Student Intro to ELS link at <http://lss.at.ufl.edu>.
- **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](https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf).
- **On-Line Students Complaints:** <http://www.distance.ufl.edu/student-complaint-process>.

**GRADING:** The following table outlines the point-accruing components of the course. This course is composed of both lecture + lab, but there will be emphasis on lab related activities. The course final grade will be determined as follows:

	Assignments	% Grade
Lecture	End of Module Assessments (6)	30
	In-lecture Assessments (8-12)	10
	Attendance/Participation	5
Laboratory	Individual Lab quizzes (5)	5
	Weekly Collaborative Meeting – Assessments (8-12)	25
	Individual Lab reports (3)	25

- **GRADING END OF MODULE ASSESSMENT:** You will take an open- notes assessment for each module covered in lecture. These assessments will be CANVAS quizzes with predominantly multiple choice, fill in the blank, matching, true/false, and short essay questions. Students should expect to APPLY what they are learning, not simply regurgitate information from the lecture. The assessments will open Monday morning and close Friday evening—allowing students a fair window of time for exam scheduling. Students are not permitted to share their answers to assessment questions with classmates – all honor code violations will be reported.
- **GRADING LECTURE PARTICIPATION:** You can earn participation points each week through answering questions embedded within some of the lecture videos and attending and participating in synchronous QA sessions. There are 14 Q/A sessions scheduled this semester and you are expected to participate in a minimum of 7 (50%), to get full credit in participation. Below 50% Q/A session attendance students will get a 2% deduction on the grade. Some of the in-lecture assessments will also be graded for accuracy, and count as a separate assessment grade.

  - Any point deductions will be explained in the gradebook. If you have questions or would like to meet regarding participation points, please request a private meeting with the instructor. If you are introverted, shy, and/or struggle with social interaction, please notify the instructor so a game plan can be generated to help ensure you are successful in the course from day one. It is important that ALL students feel as comfortable as possible in this learning environment for the success of EVERYONE.
- **GRADING LABS:** Lab grade is composed of individual quizzes, and reports and collaborative assessments,

  - You will complete short (4-6 questions) open-notes CANVAS quizzes for each Lab topic, individually.
  - In addition, you will be put into groups of ~4 students to work on weekly collaborative discussions and learning activities. The instructor will group students according to region so that group members are in the same time zone (if possible). The instructor will aim to have highly heterogeneous groups, (based on student’s answers in the CANVAS questionnaire). Groups will determine their own weekly schedule for meeting via zoom (or another similar online platform). Each week, the group will rotate the “leader” – who will be responsible for taking minutes of the meeting and submitting the collective work to the CANVAS assignment. All members of the group will receive the same grade for work submitted. A rubric will be provided in CANVAS for each assignment and 50% of the grade will come from participation (did you show up and did you contribute?). The other 50% of that grade will come from accuracy of responses.
  - You will also submit laboratory reports highlighting critical analysis and discussion of experimental data, and reporting of scientific information in multiple formats (poster, scientific paper and scientific note). A detailed rubric will be posted in CANVAS for each lab report format. These reports will assess your skills to identify quality of the data (accuracy, completeness, reliability), present and summarize data (tables and graphs), interpret data (statistical data analysis, peer-review literature).

**GRADING SCALE AND POLICY:** In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>.

All grades will be posted in the CANVAS gradebook. Any discrepancies with points displayed in the gradebook should be pointed out to the instructor before the last day of class (prior to reading days). There is no curve for this course but grades will be rounded to the next integer (e.g. 89.5% = 90% and 89.4% = 89%).

**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: <https://registrar.ufl.edu/ferpa.html>

Grading scale used in this course:	
Percent	Grade
94 – 100	A
90 – 93	A-
86 – 89	B+
83 – 85	B
80 – 82	B-
76 – 79	C+
73 – 75	C
70 – 72	C-
66 – 69	D+
63 – 65	D
60 – 62	D-
0 – 59	E

### TENTATIVE COURSE SCHEDULE

Week	Lecture Topics	Format	Reading Material
1	<ul style="list-style-type: none"> <li>Course Introduction</li> </ul>	Synchronous with Q/A	
<b>Module 1: Environmental Measurements</b>			
2	<ul style="list-style-type: none"> <li>Intro to Environmental sampling and analysis</li> <li>Environmental contaminants and their measurement</li> </ul>	Asynchronous. Watch Pre-recorded videos. Monday Sept 7 is a Holiday No Q/A session	1
3	<ul style="list-style-type: none"> <li>Data Reporting: calibration, performance of analytical methods, data handling, significance tests</li> </ul>	Asynchronous. Watch Pre-recorded videos prior to Sept 14 Q/A session	2
<b>Module 2: Environmental Sampling and QC Procedures</b>			
4	<ul style="list-style-type: none"> <li>Sampling plan and preservation of samples</li> <li>Environmental sampling techniques</li> </ul>	Asynchronous. Watch Pre-recorded videos prior to Sept 21 Q/A session	3,4
5	<ul style="list-style-type: none"> <li>Quality control procedures</li> </ul>	Asynchronous. Watch Pre-recorded videos prior to Sept 28 Q/A session	5
<b>Module 3: Wet Chemical Analyses and Electrochemical Methods</b>			
6	<ul style="list-style-type: none"> <li>Basic Operations and techniques in Environmental Labs</li> <li>Chemical reactions and chemical methods</li> </ul>	Asynchronous. Watch Pre-recorded videos prior to Oct 5 Q/A session	6
7	<ul style="list-style-type: none"> <li>Sample preparation techniques</li> </ul>	Asynchronous. Watch Pre-recorded videos prior to Oct 12 Q/A session	7
8	<ul style="list-style-type: none"> <li>Titration and pH</li> </ul>	Asynchronous. Watch Pre-recorded videos prior to Oct 19 Q/A session	6, 11
<b>Module 4: Spectroscopic Methods</b>			
9	<ul style="list-style-type: none"> <li>How radiation interacts with matter?</li> <li>Intro to UV-Vis and IR Spectroscopic methods and instrumentation</li> </ul>	Asynchronous. Watch Pre-recorded videos prior to Oct 26 Q/A session	8
10	<ul style="list-style-type: none"> <li>Atomic absorption spectroscopy</li> <li>ICP spectroscopy</li> <li>NMR spectroscopy</li> </ul>	Asynchronous. Watch Pre-recorded videos prior to Nov 2 Q/A session	9, 12

Week	Lecture Topics	Format	Reading Material
<b>Module 5: Chromatographic Methods</b>			
11	<ul style="list-style-type: none"> <li>▪ Intro and principles of chromatography</li> <li>▪ Gas chromatography and GC Detectors</li> </ul>	Asynchronous. Watch Pre-recorded videos prior to Nov 9 Q/A session	10
12	<ul style="list-style-type: none"> <li>▪ High performance liquid chromatography (HPLC)</li> <li>▪ HPLC detectors</li> </ul>	Asynchronous. Watch Pre-recorded videos prior to Nov 16 Q/A session	10
13	<ul style="list-style-type: none"> <li>▪ Mass spectrometry</li> </ul>	Asynchronous. Watch Pre-recorded videos prior to Nov 23 Q/A session	12
<b>Module 6: Selecting Methods for Analysis of Environmental Samples</b>			
14	<ul style="list-style-type: none"> <li>▪ Methods for water analysis</li> </ul>	Asynchronous. Watch Pre-recorded videos prior to Nov 30 Q/A session	
15	<ul style="list-style-type: none"> <li>▪ Methods for soil and air analysis</li> </ul>	Asynchronous. Watch Pre-recorded videos prior to Dec 7 Q/A session	

**TENTATIVE LAB SCHEDULE – Review CANVAS for details of each week’s activities**

Weeks	Lab Topics	To do List	Individual Lab Reports
1	<ul style="list-style-type: none"> <li>▪ <b>No Lab</b></li> </ul>	Complete questionnaire to for groups	
2	<ul style="list-style-type: none"> <li>▪ <b>LAB 1:</b> Laboratory Safety</li> </ul>	Watch pre-recorded video Access and complete UF Lab Safety Quiz Complete What if Quiz	
3-4	<ul style="list-style-type: none"> <li>▪ <b>Lab 2:</b> Data Handling</li> </ul>	Complete Lab activities Complete individual quiz Participate in collaborative meetings and submit group assessments	
5-6	<ul style="list-style-type: none"> <li>▪ <b>LAB 3:</b> Environmental Sampling</li> </ul>	Complete Lab activities Complete individual quiz Participate in collaborative meetings and submit group assessments	
7-8	<ul style="list-style-type: none"> <li>▪ <b>LAB 4:</b> Titration</li> </ul>	Complete Lab activities Complete individual quiz Participate in collaborative meetings and submit group assessments	Due on week 9
9-10	<ul style="list-style-type: none"> <li>▪ <b>LAB 5:</b> Visible Spectroscopy</li> </ul>	Complete Lab activities Complete individual quiz Participate in collaborative meetings and submit group assessments	Due on week 11
11-12	<ul style="list-style-type: none"> <li>▪ <b>LAB 6:</b> Atomic Spectroscopy</li> </ul>	Complete Lab activities Complete individual quiz Participate in collaborative meetings and submit group assessments	Due on week 14
13	<ul style="list-style-type: none"> <li>▪ <b>Lab 7:</b> Chromatography</li> </ul>	Complete Lab activities Participate in the collaborative meeting and submit group assessment	
14-15	<ul style="list-style-type: none"> <li>▪ <b>No Lab</b></li> </ul>		