CE 5317 - Environmental Engineering Process and Analysis Lab

The University of Texas at Arlington
Department of Civil Engineering
Fall 2016

Instructors: Hyeok Choi, Ph.D.

Office Numbers: NH 437

Office Telephone Numbers: 817-272-5116

Email Addresses: hchoi@uta.edu

Faculty Profiles: Dr. Choi: http://www.uta.edu/profiles/hyeok-choi

Office hours: Mon/Wed 15:00-17:00 and by appointment

Section Information: Section 001 (lecture: 83427) and Section 101 (lab: 86190)

Time and place of class meetings: Lecture: Mon and Wed 14:00-14:50 / ERB 130
Lab: Fri 8:00-10:50 / NH B09 (B08)

Description of Course Content
The course meets for 2 hours of lecture and 3 hours of lab each week. Lectures will cover advanced analytical procedures for the analyses of air, liquid, and other wastes, including optical, chromatographic, electrical, and other instrumental methods of analysis. Lectures will also review the basics of physical/chemical processes. In the laboratory, students will demonstrate and analyze basic reactor types (CSTR, plug flow, and reactors in series) and kinetics, as well as environmental engineering processes (physical/chemical) for treatment of contaminants, including gas transfer, adsorption, advanced oxidation processes, and membrane separation.

Student Learning Outcomes
1) Students will be able to explain and analyze data from basic reactor types (CSTR, plug flow, and reactors in series) and kinetics experiments.
2) Students will be able to explain and analyze data from basic environmental engineering processes (physical/chemical) for treatment of contaminants, including gas transfer, adsorption, advanced oxidation processes, and membrane separation.
3) Students will be able to explain and analyze data from basic methods of environmental analysis (optical, chromatographic, and electrical).

Optional Texts
Chemistry for Environmental Engineering and Science by Clair N. Sawyer, Perry L. McCarty, and Gene F. Parkin, 2003 (will be placed on reserve in the Science and Engineering Library).
AEESP Environmental Engineering Processes Laboratory Manual, 2001.

Other Course Materials
MavSpace Link : https://mavspace.uta.edu/xythoswfs/webui/_xy-4103860_1-t_2VPgllm7. All course handouts will be available at the link above (password: hchoi).

Major Assignments/Exams and Grading

Assignment/Exam	**Weighting, %**
Lab Reports 1-3 (12 pts each)*	36
Midterm exam (Week 8: Oct. 19 Wednesday 14:00-14:50)	24
Lab Reports 4-6 (8 pts each)*	24
Final exam (Final week: Dec. 12 Monday, 14:00-14:50)	16

A rubric will be used to grade reports as follows: 100 for perfect, 95 for excellent, 90 for very good, 85 for good, 80 for fair, 75 for poor, and 70 for very poor (note attached rubric).

Grade Basis

90-100%	A
80-89%	B
70-79%	C
60-69%	D
<60	F

Lab Reports to Submit and Due Dates
Each report should be submitted within 1 week right after the corresponding experiment is completed (e.g., if a lab test is completed this Friday, the report needs to be submitted by right before next Friday class. Otherwise, 10% penalty will be applied for delay in each week.

Attendance: At The University of Texas at Arlington, taking attendance is not required. Rather, each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. However, students will NOT be able to submit a lab report on a lab they did not attend. As the instructor of this section, I expect that you will attend classes and labs.

Expectations for Out-of-Class Study: Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend at least an additional 6-9 hours per week of their own time in course-related activities, including reading required materials, completing assignments, preparing for exams, etc.

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. Students will not be automatically dropped for non-attendance. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/aao/fao/).

Americans with Disabilities Act: The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the Americans with Disabilities Act (ADA). All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Title IX Policy: The University of Texas at Arlington ("University") is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. *For information regarding Title IX, visit* www.uta.edu/titleIX or contact Ms. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or jmhood@uta.edu.

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

> *I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*
>
> *I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System Regents' Rule 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

Lab Safety Training: Students registered for this course must complete all required lab safety training prior to entering the lab and undertaking any activities. Students need to complete both SDS Exercise and Lab Safety Training Quiz. Once completed, Lab Safety Training is valid for the remainder of the same academic year (i.e., through the following August) and must be completed anew in subsequent years. There are no exceptions to this University policy. Failure to complete the required training will preclude participation in any lab activities, including those for which a grade is assigned.

How to take Lab Safety Training Course

1. Login to **Blackboard** at https://elearn.uta.edu with your NetID and password.
2. Under **My Blackboard** tab, click **Lab Safety Training.**
3. Click **Welcome** from the left pane to start and follow the instructions.

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

Campus Carry: Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit http://www.uta.edu/news/info/campus-carry/.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as "lecture," "seminar," or "laboratory" shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

Final Review Week: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabus. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is located to the left from ERB 130, and to the right from NH B08/B09. Onsite instruction will be given during the first class. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

The IDEAS Center (2nd Floor of Central Library) offers **free** tutoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. To schedule an appointment with a peer tutor or mentor email IDEAS@uta.edu or call (817) 272-6593.

The English Writing Center (411LIBR): The Writing Center Offers free tutoring in 20-, 40-, or 60-minute face-to-face and online sessions to all UTA students on any phase of their UTA coursework. Our hours are 9 am to 8 pm Mon.-Thurs., 9 am-3 pm Fri. and Noon-6 pm Sat. and Sun. Register and make appointments online at http://uta.mywconline.com. Classroom Visits, workshops, and specialized services for graduate students are also available. Please see www.uta.edu/owl for detailed information on all our programs and services.
The Library's 2nd floor Academic Plaza offers students a central hub of support services, including IDEAS Center, University Advising Services, Transfer UTA and various college/school advising hours. Services are available during the library's hours of operation. http://library.uta.edu/academic-plaza.

Librarian to Contact: http://www.uta.edu/library/help/subject-librarians.php. Please see the end of this document for additional information about library links.

Modern Teaching Tools and Assistances
Power point presentations, course summary and handouts, video clips, hands-on lab activities, etc.

Professional Code of Conduct: Students are expected to act in a manner consistent with a professional civil engineer. You are responsible for learning the material that makes up this course. I am responsible for helping you to learn it and determining if you have done so. Most people must do the assigned homework to learn the material of this course. My tests are designed to determine how much you have learned. To me, "learning" means understanding the material well-enough that 1) you can explain it to others so they can understand it and 2) solve problems you have not seen before. I welcome all pertinent questions in class and I am willing to spend many hours outside of class to help you learn. I also welcome any suggestions you have on how I can better help you to learn and/or determine if you have learned the material of this course. You are expected to attend every class and to show up on time.

Office Hours: In addition to my posted office hours I am also available to meet with students most times when I am in my office and the door is open. However, the surest way to meet with me is to make an appointment by phone. I will normally be in my office during office hours, but if I do not have an appointment scheduled, I will not hesitate to leave my office during office hours to attend an important meeting.

Course Update: Prior to each class, the course materials including handouts and homework will be posted in my MavSpace. Visit the link and then click CE 5317, which is open to students (https://mavspace.uta.edu/xythoswfs/webui/_xy-4103860_1-t_2VPgllm7 (password: hchoi)). You will need your NetID and corresponding password. Students need to check the MavSpace regularly before coming to class. The students also need to print out them and bring the materials (plus one chapter in advance) to the class. No hard copies for the course materials will be given to the students. I will try to send an email to students with updated information on course materials. However, it is students' responsibility to visit the MavSpace regularly and update course materials.

Emergency Phone Numbers: In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911. For non-emergencies, contact the UTA PD at 817-272-3381.

Other Useful Websites
Library Home Page library.uta.edu
Resources for Students
Academic Help
Academic Plaza Consultation Services library.uta.edu/academic-plaza
Ask Us ask.uta.edu/
Library Tutorials library.uta.edu/how-to
Subject and Course Research Guides libguides.uta.edu
Subject Librarians library.uta.edu/subject-librarians
Resources
A to Z List of Library Databases libguides.uta.edu/az.php
Course Reserves pulse.uta.edu/vwebv/enterCourseReserve.do
FabLab fablab.uta.edu/
Special Collections library.uta.edu/special-collections
Study Room Reservations openroom.uta.edu/
Teaching & Learning Services for Faculty
Copyright Consultation library-sc@listserv.uta.edu
Course Research Guide Development, Andy Herzog amherzog@uta.edu or your subject librarian
Data Visualization Instruction, Peace Ossom-Williamson peace@uta.edu
Digital Humanities Instruction, Rafia Mirza rafia@uta.edu
Graduate Student Research Skills Instruction, Andy Herzog amherzog@uta.edu or your subject librarian
Project or Problem-Based Instruction, Gretchen Trkay gtrkay@uta.edu
Undergraduate Research Skills Instruction, Gretchen Trkay gtrkay@uta.edu or your subject librarian.

Tentative Course Schedule: As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course.

1st half of the semester (8/25-10/21 and midterm exam; 60% contribution to final grade)

Week	Date	Lecture			Lab			Report
		Unit Process Topic	**Analysis Topic**	**Ref***	**Title**	**Analysis Method**	**Ref***	
0	8/25-8/26	8/26 Fri: No class			8/26 Fri: No class			-
1	8/29-9/2	8/29 Mon: Course introduction 8/31 Wed: Safety training			9/2 Fri: Lab visiting and on-site safety training			-
2	9/5-9/9	9/5 Mon: Holiday 9/7 Wed Advanced Oxidation Processes		A	9/9 Fri (TA: Wasiu) Chemical Decomposition of Organic Contaminants (Sulfamethoxazole) Using Fenton Reaction		A	Combined Report 1 (TA: Wasiu)
3	9/12-9/16		9/12 Mon 9/14 Wed High Performance Liquid Chromatography (HPLC)	A		9/16 Fri (TA: Wasiu) Chromatographic Analysis of Organic Contaminants (Sulfamethoxazole)	A	
4	9/19-9/23	9/19 Mon 9/21 Wed Membrane Separation Technology		A	9/23 Fri (TA: Zak) Physical Separation of Biological Suspension Using Membrane Technology		A	Combined Report 2 (TA: Zak)
5	9/26-9/30		9/26 Mon 9/28 Wed TOC Analyzer	A		9/30 Fri (TA: Zak) Measurement of Total Organic Carbon	A	
6	10/3-10/7	10/3 Mon 10/5 Wed Activated Carbon Adsorption		A	10/7 Fri (TA: Hesam) Physical Removal of Organic Dyes (Methylene Blue) Using Activated Carbon		A	Combined Report 3 (TA: Hesam)
7	10/10-10/14		10/10 Mon 10/12 Wed UV-Vis Spectrophotometer	A		10/14 Fri (TA: Hesam) Optical Determination of Organic Dyes (Methylene Blue)	A	
8	10/17-10/21	10/17 Mon: No class **10/19 Wed: Midterm exam**			10/21 Fri: No lab			-

2st half of the semester (10/24-12/7 and final exam; 40% contribution to final grade)

Week	Date	Lecture			Lab			Report
		Unit Process Topic	**Analysis Topic**	**Ref***	**Title**	**Analysis Method**	**Ref***	
9	10/24-10/28	10/24 Mon 10/26 Wed Kinetics	NA	B 3.10	10/28 Fri (TA: Wasiu) Kinetics of the Perdisulfate-Iodide System	NA	A	You are required to prepare only three reports (Reports 4, 5, and 6) out of the 5 labs. It is always good to select the labs which occur first so that you can focus on exam preparation when the semester approaches the end.
10	10/31-11/4	10/31 Mon CSTR Reactors	11/2 Wed Electrical Methods of Analysis (Potentiometric Analysis: Electrodes)	B 12.3	11/4 Fri (TA: Hesam) Laboratory Study of Completely Mixed Flow Reactors Using Ion Specific Electrodes	11/4 Fri (TA: Hesam) Ion Specific Electrodes	C 1.2.1	
11	11/7-11/11	11/7 Mon Plug Flow Reactors	11/9 Wed: No class	B 12.3	11/11 Fri (TA: Zak) Laboratory Study of Plug Flow Reactors	11/11 Fri (TA: Zak) Ion Specific Electrodes	C 1.2.2	
12	11/14-11/18	11/14 Mon Non-Ideal Reactors	11/16 Wed: No class	B 12.3	11/18 Fri (TA: Zak) Reactors in Series	11/18 Fri (TA: Zak) Ion Specific Electrodes	C 1.2.3	
13	11/21-11/25	Thanksgiving week 11/21 Mon: No class 11/23 Wed: No class		-	Thanksgiving week 11/25 Fri: No lab			
14	11/28-12/2	11/28 Mon Gas Transfer	11/30 Wed Chromatographic Methods of Analysis (GC)	B 12.4	12/2 Fri (TA: Wasiu) Measurement of Henry's Law Constants for Volatile Organics	12/2 Fri (TA: Wasiu) Gas chromatography	C 1.3.4	
15	12/5-12/7**	12/5 Mon: Summary 12/7 Wed: No class						
Final	12/12-12/16	**12/12 Mon: Final exam**						-

* A: Handouts will be distributed through MavSpace at https://mavspace.uta.edu/xythoswfs/webui/_xy-4103860_1-t_2VPgllm7 (password: hchoi); B: Sawyer, McCarty, and Parkin; and C: AEESP Environmental Engineering Processes Laboratory Manual.

** The semester ends on Dec. 7 (Wednesday) and thus no new lab and lecture is scheduled for the week.

Lab Instructor (TA)

Wasiu Lawal (wasiu.lawal@mavs.uta.edu)
Abolfazl Zakersalehi (abolfazl.zakersalehi@mavs.uta.edu)
Hesam Zamankhan (hesam.zamankhanmalayeri@mavs.uta.edu)

- Office: Room B09, Nedderman Hall; Office Telephone: 273-2631
- Office Hours: By appointment (most of time, they will be available in NH B09)