1. Course number and name

CENG 3371, Introduction to Environmental Engineering

2. Credits, contact hours, and categorization of credits in Table 5.1 (math and basic science, engineering topic, and/or other)

a) 3.0 Credit Hours
b) Two hours of lecture and three hours of laboratory per week
c) This is an engineering topics course in environmental engineering in which students are introduced to the engineering aspects of environmental quality. This course relies on the integration of engineering science with the basic sciences (biology and chemistry) to develop the student's ability to evaluate environmental contaminant response from an engineering standpoint.

3. Instructor's or course coordinator's names

Dr. J. Torey Nalbone and Dr. Zain Al Houri

4. Textbook, title, author, and year

Introduction to Environmental Engineering. Mackenzie Davis and David Cornwell, McGraw Hill 2023. ISBN10: 1264563876, ISBN13: 9781264563876.

5. Specific course information

a) Concepts covered are essentials of environmental engineering and the process materials and energy balance as a tool for understanding environmental processes and solving environmental engineering problems. Environmental engineering concepts must include the concept of sustainability and the process of waste minimization, conservation and resource management in a global community.
b) CHEM 1311 and CHEM 1111
c) Required course

6. Specific goals for the course

The course director's assessment of how this course contributes to the civil engineering program outcomes is listed below. The following scale is used:

1=No Contribution; 2=Small Contribution; 3=Average Contribution; 4=Large Contribution; 5=Very Large Contribution

CIVIL ENGINEERING PROGRAM OUTCOMES	Course Director Assessment
Program Outcomes: Students who qualify for graduation with a civil engineering major will demonstrate:	
1a: Can apply knowledge of traditional mathematics to solve problems	3
1b: Can apply knowledge of traditional science (calculus-based physics, Chemistry, additional science) to solve problems	4
1c: Can apply knowledge of traditional engineering skills to solve problems	4
2: Can design and conduct experiments as well as analyze and interpret data	3
3a: Can design systems, components and processes	4
4: Can work independently as well as part of a team	1
5a: Can identify, formulate, and solve engineering design problems using engineering models in the discipline of structural engineering	1
5b: Can identify, formulate, and solve engineering design problems using engineering models in the discipline of transportation engineering	1
5c: Can identify, formulate, and solve engineering design problems using engineering models in the discipline of construction management	1
5d: Can identify, formulate, and solve engineering design problems using engineering models in the discipline of hydrology and hydraulic design	2
5e: Can identify, formulate, and solve engineering design problems using engineering models in the discipline of environmental engineering	5
5f: Can identify, formulate, and solve engineering design problems using engineering models in the discipline of geotechnical engineering	2
6a: Can analyze a situation and make appropriate professional decisions	3
6b: Can analyze a situation and make appropriate ethical decisions	3
7: Have effective oral, written, and graphical communication skills	3
8a: Demonstrate a commitment to learning and continued professional development outside the classroom	3
8c: Determine the impact of engineering solutions in a global and societal context	4
9a: Can explain professional practice issues	2
9b: Can explain leadership principles and attitudes	1
9c: Can explain management concepts and processes	2
9d: Can explain concepts of business practices	1
9e: Can explain public policy and public administration	4

7. Topics covered

- Introduction to Environmental Engineering
- Environmental Public Policy and Ethics
- Water Chemistry and water quality parameters
- Materials Balance/Kinetics
- Risk Assessment
- Sustainability
- Water Resources Engineering and Groundwater
- Water Treatment
- Wastewater Treatment
- Air Pollution
- Solid Waste/ Hazardous Waste

LECTURE TIME & VENUE:

- Our course is scheduled from 02:00 PM-2:55 PM on T/Th in room (HEC Campus-0A218).
- The Lab: T, [3:00 – 5:50 pm]; [HEC Campus-D114].
- If you miss a scheduled class, you are still responsible for the material. The Presentation slides will be posted in the appropriate section of content in listed modules through the normal CANVAS modules labels as such.

Course Overview

Welcome to CENG 3371: Introduction to Environmental Engineering! This course is the first in a two-part series, followed by a design-focused course, CENG 4371. In this class, we will explore the fundamentals of environmental engineering, focusing on water chemistry, the concept of materials and energy balance as a tool for understanding environmental processes and solving engineering challenges. Topics include strategies for managing the quality of water, air, and solid waste, along with concepts of sustainability, waste minimization, risk management, and ethical considerations in a global context. I am confident you will find our study of environmental engineering this semester to be both engaging and rewarding.

Student Learning Outcomes

After successfully completing this course, you will be able to:

- Explain the components of a sustainable environment and their significance in environmental engineering.
- Analyze and evaluate ethical and public policy issues related to environmental quality and management.
- Define water quality parameters, describe their importance, and discuss their impact on environmental health.
- Explain the regulatory frameworks governing water quality, air quality, and solid waste management.
- Describe the principles and processes involved in water and wastewater treatment.
- Design and conduct experiments to investigate processes relevant to environmental engineering and interpret the results effectively.

Required Textbooks and Readings

- **Primary Textbook:** Introduction to Environmental Engineering. Mackenzie Davis and David Cornwell, McGraw Hill 2023. ISBN10: 1264563876, ISBN13: 9781264563876.
- **Additional Readings:** Throughout the semester, you will encounter insightful readings assigned and posted on Canvas.

Course Structure

This course is designed to provide a comprehensive understanding of environmental engineering principles through a combination of lectures and hands-on laboratory work.

- Lectures:
  - Frequency: Two lectures per week
  - Duration: 55 minutes
- Laboratory Sessions:
  - Frequency: One lab session per week
  - Duration: 3 hours per session
- UT Tyler's Canvas website will be used to manage the course material for the semester. There you will find

homework assignments, homework solutions, handouts and other material pertaining to the class. **Please check there regularly.**

Grading Structure

Assignment*	Percentage %
Homework/In Class Activities	**10%**
Quizzes & Weekly Summaries (Discussions)	**5%**
Professional Practice (three Org. attendance)	**5%**
Paper/Presentation	**10%**
Lab Memos	**15%**
MIDTERM EXAMS (Two)	**30%**
Final Exam	**25%**
Total	**100%**

Grading Scale

➔ **A** - (90% or higher)
➔ **B** - (80 - 89%)
➔ **C** - (70 - 79%)
➔ **D** - (60 - 69%)
➔ **F** - (Below 60%)

**There may be opportunities to earn bonus points for additional work on problem sets, exams, or for completion of other optional assignments. Opportunities for bonus points will be clearly identified by me and announced in class. Make use of these opportunities to extend your learning!*

Graded Course Requirements Information

Homework Assignments

- Homework will be assigned on a regular basis (see homework schedule).
- You will need to upload your homework as a single pdf file to canvas no later than 11:59 pm on the due date. No late homework will be accepted except for unusual circumstances.
- Homework must be submitted on engineering paper. Homework solutions not submitted on engineering paper will receive only 90% of the graded credit.
- Solutions should be presented in a clear methodical manner. Follow the "homework submission guidelines" when completing your assignment. Solutions which are not clearly presented will receive a 0 credit.
- Students may discuss their homework solutions with one another, but each student must submit their own, independent solutions (i.e. you may not just copy someone else's homework). If you receive assistance from a fellow student on a particular problem, you must cite that assistance within your solution.

Homework Submission Guidelines

- Homework should be submitted using letter size (8 ½ x 11") paper. Engineering paper is required.
- The header of the first page should include the following:
  - Name of Student: LAST NAME, FIRST NAME (All Caps)
  - Student Number
  - Course Number and Name
  - Homework Number

- There should be no more than 2 problems per page. This is to ensure that there is enough space on the paper for the grader to add comments.
- The submitted papers should be free of frail edges, stains, smudges and wrinkles.
- All problems should include:
    - Problem Number
    - A diagram of the problem
    - A set of given quantities
    - A set of unknown quantities
    - A set of assumptions
- All numbers and writing should be clear and readable.
- When required to produce a graph, use a computer program such as excel or MATLAB to generate the plot. Do not draw it by hand!

Late Homework/ Assignment Policy

- It is a basic principle of professionalism that "Professionals are not late."
- A "COORDINATED LATE" submission occurs when you miss the suspense for a graded homework assignment, and you contact me in advance. Notification immediately before the submission will not suffice.
- Point cuts up to the amounts below may be assessed for a "COORDINATED LATE" submission:
    - 0-24 hours late a deduction of 25% of the earned grade
    - 24-48 hours late a deduction of 50% of the earned grade
    - More than 48 hours late No credit.

Quizzes & Discussions

Quizzes: The instructor may give unannounced or announced in-class quizzes throughout the semester. These quizzes will cover material covered in previous lectures.

Weekly Discussions: Every week, you'll be required to post a question or comment on the discussion board related to the topics we've covered. These discussions are designed to help you exchange ideas, stay engaged, provide feedback to your instructor, and hopefully make the course more interesting and enjoyable for everyone. Participation in these activities is mandatory and accounts for 5% of your total course grade.

In-Class Activities

Active participation in class is an essential component of this course. In-class activities and exercises are designed to reinforce key concepts, develop problem-solving skills, and encourage collaboration among peers. These activities may include, but are not limited to:

- Solving example problems related to lecture topics.
- Engaging in group discussions or case studies.
- Completing short individual or team-based assignments.
- Participating in real-time quizzes or polls to assess understanding.

Regular participation will contribute to 5% of your overall grade and help build skills essential for success in this course.

Paper/Presentation

- Groups of three students will research and deliver a 15-minute presentation on a selected topic related to a current environmental concern. A list of suggested topics will be provided. Each group will also prepare a summary paper. Together, the presentation and paper will account for 10% of your final grade. Groups must

be formed, and a topic selected and submitted by Thursday, March 06. The summary paper and the PowerPoint presentation on the chosen topic are due on Tuesday, April 15, 2025.

- More information will be announced on Canvas.

Professional Practice Assignment

- Your professional practice grade will be based on your attendance at 3 ASCE student technical meetings (cookout and game night events do not count) throughout the fall semester. Example of valid meetings include guest speakers, field trips, or any other technical meeting from either organization within the college of engineering.
- For each professional practice meeting you must take a picture as proof of attendance, ensuring you are visible in the picture. Be sure to include the speaker's name and a summary of what you learned during the meeting.
- You should use template Word file when you attend professional practice meetings and must complete this for each meeting you attend.
- The due date to submit this is on the last day of class, which is April 20th.

Midterm Exams and Final Exam

- There will be 2 midterm exams and one final examination. The exams are TENITATIVELY scheduled for:
  - Exam 1: Th, Feb 20
  - Exam 2: Th, Mar 27
  - Final Exam: As published by the University.
- Exams dates may be moved up or pushed back depending on the progress of the lectures.
- Exams Format: The midterm exams are worth 30 points, and the final exam is worth 25 points. The purpose of these examinations is to assess your command of the material we've covered in a particular unit. Each exam will contain conceptual questions (MC, T/F, and short answer questions), as well as numerical questions. We'll take some time in the week before an exam to talk about study strategies, and I'll be happy to answer any review questions you may have, but bear in mind that the best way to prepare for these exams is to keep up with the readings and our in-class activities (See "Tips for success in this course" Section).
- The mid-term exams and final exam are closed book. You can use a TI-30 calculator (or FE equivalent see calculator policy below), and instructor approved reference material.
- Use the restroom prior to coming to class to take an exam. Suspicious restroom breaks in the middle of an exam are not acceptable.
- I do not give exam backs, but you can see and review in class and in my office.
- Exam solutions will NOT be posted on Canvas. However, you are welcome to visit the office to review the solutions in person. Please note that taking photos of your exam paper with your phone is not permitted.
- All exams will be held in person during class time. The final exam will also be held in person at the time, date and location specified by the university.
- Additional information will be provided in class

Late Work & Make-Up Exams:

- There will be no makeup work or extra credit allowed/granted at the end of or during the semester unless allowed/granted to everyone by the instructor. All assignments must be turned in at the appropriate time to receive credit.
- Failure to take the exam at the scheduled time will constitute a grade of zero in the exam.
- Official reasons for missing an exam are outlined in the UT Student Handbook. Report any conflict to me as soon as possible prior to the Exam. You are required to take a make-up Exam, regardless of your reason for missing the scheduled Exam.

Attendance Policy/Classroom Procedures:

- Attendance will be taken in every class, and your presence is essential, as much of your grade will depend on what we accomplish during class meetings. I understand that emergencies or unexpected situations may occasionally prevent you from attending. If this happens, please notify me as soon as possible so we can make arrangements to help you catch up. However, this does not apply to non-emergencies, such as oversleeping. For absences due to university-sponsored activities, please coordinate with me in advance to address any missed work.
- Bring study notes, textbook, note-taking material, and calculator TO EVERY CLASS. You may not borrow or exchange calculators during graded events. If your calculator fails during a graded exercise, I am not responsible for furnishing a substitute. Class preparation is your individual responsibility.
- You will need regular access to a computer with an Internet connection to be able to participate in some of the in-class activities during the period of this semester.
- It is a basic principle of professionalism that "Professionals are not Late." Please come to class on time and leave on time. Interruption of lecture is not acceptable. Normally an excuse would be given for being late or missing that class if you have a valid verified urgent emergency or some validated significant act of nature or God like a car accident.
- No food or snacks in classrooms and Labs.
- Phones ringing or vibrating are distracting during class or if you are texting during class, you will relinquish your device for the duration of the class. A second offense will result in a request for you to leave the classroom.

Tips For Success in This Course

1. **Participate.** I invite you to engage deeply, ask questions, and talk about the course content with your classmates. You can learn a great deal from discussing ideas and perspectives with your peers and professor. Participation can also help you articulate your thoughts and develop critical thinking skills.
2. **Manage your time.** I get it—students usually juggle a lot, and I know you've got commitments beyond this class. Still, doing your best often means carving out enough dedicated time for coursework. Try scheduling specific blocks of time and ensure you have enough room to finish assignments, allowing extra space for any tech issues that might pop up.
3. **Login regularly.** I recommend that you log in to Canvas several times a week to view announcements, discussion posts and replies to your posts.
4. **Do not fall behind.** This class moves at a quick pace and each week builds on the previous class content. If you feel you are starting to fall behind, check in with the instructor as soon as possible so we can troubleshoot together. It will be hard to keep up with the course content if you fall behind in the pre-work or post-work.

5. **Use Canvas notification settings.** Pro tip! Canvas can ensure you receive timely notifications in your email or via text. Be sure to enable notifications to be sent instantly or daily. (Canvas Notification Guide)
6. **Ask for help if needed.** If you are struggling with a course concept, reach out to me and your classmates for support.

Final Day to Withdraw:

The final day to withdraw from the course without penalty is **Feb 05th.**

The last day to withdraw from the course is **Mar 31.**

Census Dates:

The university requires that instructors report the attendance to the register at various points inthe semester. Therefore, on **January 27th**, I will report the attendance for the class.

UT Tyler Honor Code:

Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of thosewho do.

Communication & Support

- Netiquette (Internet etiquette): Students are expected to display proper netiquette (Internet etiquette) with their instructor and with other students. This includes being polite, stating your needs clearly and politely. Practice collegiality and mutual respect. If an email or discussion post ever concerns you, please notify me privately and we'll work toward a resolution.
- Communication and Support: In general, the most efficient way to communicate and to get the help you need with your questions and/or concerns is during my office hours. If you can't meet during my office hours, you can send me an email to schedule a time that suits you. Be professional in writing emails! Follow the following guideline in preparing in all your correspondence:

All email correspondence should take place through the Canvas system, and therefore using your Patriot email accounts; so check your Patriot email account often. I will try to respond to all emails within 24 hours.

University Policies & Student Resources:

University policies and student resources are available on the University website and in Canvas under "Syllabus". (You may copy or print the following information to include in your syllabus or use the links provided below.)

- University Policy
- Student Resources

Calendar of Topics, Readings, and Due Dates *

COURSE SCHEDULE - SUBJECT TO REVISION						
Wk. #	**DATE**	**LSN**	**Topic**	**Reading**	**Assignments**	**Lab Activities/Notes**
1	14-Jan	1	Course Introduction			
	16-Jan	2	Introduction: what is environmental engineering	1.1-1.4		
2	21-Jan	3	Environmental Systems	1.5-1.7	HW 1	Lab 01
	23-Jan	4	Risk Assessment	3.1-3.4		
3	28-Jan	5	Risk Assessment	3.1-3.4	HW 2	Lab 02
	30-Jan	6	Materials and Energy Balance-Introduction	2.1-2.7		
4	04-Feb	7	Materials Balance	2.1-2.7	HW 3	Lab 03
	06-Feb	8	Reactors	2.1-2.7		
5	11-Feb	9	Reactors	2.1-2.7	HW 4	Lab 04
	13-Feb	10	Water Resources Engineering	4.7		
6	18-Feb	11	Groundwater and wells	5.1-5.7	HW 5	Exam 1 Review
	20-Feb	12	**EXAM I**			
7	25-Feb	13	Water chemistry: Concepts	5.1-5.7	HW 6	Lab 05
	27-Feb	14	Water chemistry: Basic Water Properties and Units	5.1-5.7		
8	4-Mar	15	Water chemistry: Buffer Solutions	5.1-5.7	HW 7	Lab 06
	6-Mar	16	Water chemistry: Reaction Kinetics	5.1-5.7		
9	11-Mar	15	Water chemistry: Acids and Alkalinity	5.1-5.7	HW 8	Lab 07
	13-Mar	16	Water treatment: Coagulations, Mixing and Flocculation	6.1-6.10		
-	18-Mar	**SPRING BREAK**				
	20-Mar					
10	25-Mar	17	Water treatment: Sedimentation and Filtration	6.1-6.10	HW 9	Exam II-Review
	27-Mar	18	**EXAM II**	6.1-6.10		
11	01-Apr	19	Water Treatment: Disinfection	7.1-7.6	HW 10	Lab 08
	03-Apr	20	Water Pollution	8.1 -8.5		
12	08-Apr	21	Wastewater treatment	8.6-8.12	HW 11	Lab 09
	10-Apr	22	Wastewater Treatment			
13	15-Apr	23	Air Pollution	9.1-9.7	HW 12	Lab 10
	17-Apr	24	Noise Pollution	10.1-10.7		
14	22-Apr	25	Solid waste management	11.1-11.6	HW 13	Presentation
	24-Apr	26	Sustainability and Green Engineering	13.1-13.5		
15	29-Apr	**FINAL EXAM WEEK**				
	01-May	**Please refer to the published exam schedule by the University**				

*Note: This is a tentative schedule, and subject to change as necessary – monitor the course page for current deadlines. In the unlikely event of a prolonged university closing, or an extended absence from the university, adjustments to the course schedule, deadlines, and assignments will be made based on the duration of the closing and the specific dates missed.

All assessments and activities have a due date assigned in Canvas. This will populate the assessments and activities on the To-Do list for students in Canvas.

CENG 3371-031L: General Requirements for Laboratory Reports

LABORATORY TIME & VENUE:

- The Lab of this course is scheduled from 03:00-5:50 PM on Tuesday-HEC D114.
- Laboratory attendance is mandatory, and any absence will result in a zero grade. Additionally, lab reports will not be accepted if you were not present during the scheduled lab session.

LABORATORY REPORT:

- At the first lab, we will go through proper safety training. You will be required to sign a student safety contract prior to starting the first week's lab. Everyone is required to abide by the safety contract during the semester. Failure to follow proper procedures during a lab will result in a zero for that lab assignment.
- A laboratory report is required for each Lab. Only one lab report is required per group for most labs. **There may, however, be certain labs that require each person to submit their own work**. Due dates for each lab will be posted. Each group will need to upload a copy to Canvas. The report should be in the following format:
    - Cover Page: Laboratory Title, Course Number (CENG 3371), Your Names and Group Number. Each person in the group signs the cover page indicating that they have read the report and approve of the contents contained within.
    - Objective: Purpose of the lab should be explained in a few sentences.
    - Procedure/Theory: Include a summarized procedure of the steps you took to complete this lab. Numbered list is preferred.
    - Results and Discussion: Present tabulated raw data (Data sheets should be typed in Excel), relevant calculations, and required plots. Sample calculations can be typed or written neatly on engineering paper and placed as an appendix of the report. The remainder of the report should be typewritten. BE SURE TO USE CAPTIONS FOR FIGURES AND TABLES! REFER TO THESE FIGURES AND TABLES SPECIFICALLY IN THE TEXT USING THE FIGURE/TABLE NUMBER. Try to have a good understanding of each experiment. Analyze your results. Identify probable sources of error that may have occurred while you performed the laboratory and explain that how these errors might affect your results (final value will increase or decrease). DISCUSS!! For example, what trends do you notice in the data? Do the results make sense? Are they what you expected? If so, why? If not, why not? Some labs will have more data than others to discuss. Be sure to give a thorough discussion of your results.
    - Conclusions: Summarize your results. Relate what you have learned from class about the topic to what you have learned from performing in this lab. Explain how this experiment is useful to solve practical civil engineering problems.
    - Team Contributions: The contributions of each team member should be stated in the **internal review form**. List what portions of the report each person contributed towards and how much time each person spent. It is okay to have multiple people working on any part.
    - Things to remember: ***When writing your reports, avoid using first person like "I" or "we".***

GRADING:

Contributions towards each lab report grade (out of 100%)

- 5% Objective
- 10% Theory /Procedure
- 30% Calculation
- 30% Results and Discussion

- 10% Internal Review Form (to be submitted individually by each student).
- 15% Conclusion

TENTATIVE LAB SCHEDULE*

Date	Lab #	Lab Topic	No of Lectures
01/14	-	First Class-No Lab	1
01/21	01	ENV. LAWS AND WATERDEMAND	1
01/28	02	ENVIRONMENTAL SITE ASSESSMENT	2
02/04	03	RISK ASSESSMENT	2
02/11	04	WATER STANDARDS	2
02/18	-	EXAM 1 Review	1
02/25	05	pH measurement, EC, and Buffers-PART-I	2
03/04	06	pH measurement, EC, and Buffers-PART-II	2
03/11	07	ALKALINITY	2
03/18	-	Spring Break	
03/25	-	EXAM 2 Review	2
04/01	08	Filtration	
04/08	09	JAR TESTS	1
04/15	10	BIOCHEMICAL OXYGEN DEMAND (BOD)	2
04/22	-	Paper Presentation	2
04/29	-	Final Exam Week	

*** The Lab schedule is subject to change throughout the semester and the revisions will be noted in lab**