

University of Texas at Tyler - Department of Civil Engineering
CENG 4371/CENG 5391 Environmental Engineering Design

INSTRUCTOR:

Section 031 (HEC Campus) and 040 (Tyler Campus)

Instructor Info: Dr. Zain Al-Houri

HEC A211

zalhour@uttyler.edu

Office Hours (In Person or Virtual)

M/W: 11:15 AM – 1:15 PM

T/Th: 11:15 AM – 12:15 PM

Virtual office hour-Zoom Link

<https://uttyler.zoom.us/j/83015533336?pwd=cVB1Qnc0RFAvMThsNTdUQ2twc2c3UT09>

Meeting ID: 830 1553 3336

Passcode: 752396

or by appointment

LECTURE TIME & VENUE:

- Our course is scheduled from 9:30 am to 10:50 am on Tuesday and Thursdays in room HEC C203 or RBN02011 and as needed through the provided Zoom Portal below. There will be NO recording of the ZOOM so your attendance will be required in the synchronous meeting times. See Attendance below.
 - <https://uttyler.zoom.us/j/87356732479?pwd=OGE2bCtiUWIKZ2VURy80bGFROWRVdz09>
 - Meeting ID: 873 5673 2479
 - Passcode: 968346
- ***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 WEBSITE:

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.**

CATALOG DESCRIPTION:

Welcome to CENG 4371 (Environmental Engineering Design), the last of a three-course series on water resources and environmental engineering which includes Hydrology (CENG 3361), Introduction to Environmental Engineering (CENG 3371) and this design course (CENG 4371). Cross listed for convenience as CENG5391 for students in a graduate enrollment or as part of the CE program 4+1 path of degree completion. During the upcoming semester you will find our study of Environmental Engineering Design to be interesting, challenging, and rewarding. We will meet according to the course schedule, which also includes the course topics.

COURSE LEARNING OBJECTIVES

1. Apply basic principles of environmental engineering in the design of a water treatment plant and distribution system.
2. Apply basic principles of environmental engineering in the design of a wastewater treatment plant and collection system.
3. Apply basic principles of environmental engineering in storm water controls.
4. Analyze the performance of designed environmental engineering processes.

5. Evaluate system performance to regulatory limits for water quality and discharge.
6. Modify existing environmental system to address new or changed pollutant demands.
7. Recognize and specify environmental contaminant concentrations to certain human health concerns.
8. Distinguish between the adequacy of designs of environmental control systems.

TEXTBOOK

Environmental Engineering Principles and Practice. Richard O. Mines, Jr. Wiley 2014. ISBN 978-1-118-80145.

- *All students are expected to secure a copy of this textbook or equivalent of Introduction to Environmental Engineering Content. There are a number of acceptable alternatives, please ask if you have questions.*
- *There will be handout materials for this course as well.*

EXAMS:

- There will be 2 midterm examinations and one final examination. The exams are **TENITATIVELY** scheduled for:
Exam 1: T, October 3rd
Exam 2: T, Nov 7th
Final Exam: As published by the University.
- Exams dates may be moved up or pushed back depending on the progress of the lectures. Exams are closed book. You can use a calculator and instructor approved reference material. *Solutions to exams will NOT be posted on Canvas.* No make-up exams will be given except for medical or other similar hardships where advanced arrangements are made with the instructor; or in case of non-selective medical emergencies with appropriate physician's note or documentation. Other than the circumstances described above, failure to take the exam at the scheduled time will constitute a grade of zero in the exam. **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.**
- I do not give exam backs, but you can see and review in class and in exams.

GRADES

Grades:

Homework/Quizzes = 15%

Professional Practice (Org. attendance/Discussion) = 10 %

Midterm Exams (2) = 40 %

Design Project (Team Assignment) = 15%

Final Exam = 20 %

Grade: Scale

A: 90-100

B: 80-89

C: 70-79

D: 60-69

F: <60

- ****NOTE:** 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.
- If necessary, I reserve the right to adjust the grade scale at the end of the semester to your benefit.
- You MAY fail this course if you earn less than 60% on all Exams or if you fail to earn at least 65% on the Final exam, **regardless of your course grade.** Of course, according to UT Tyler grading policies final grades are only A, B, C, D, F and therefore, a C- is a C for a final grade. The distribution provided above is to graphically remind you of how well you are doing and your progress in the course.
- **(Graduate students)** As part of the co-enrollment requirement for this course, Graduate students will be required to complete an independent research investigation on a specific Environmental Engineering Topic (not covered by the course), submit a research paper, and

present the findings to the class as part of their course grade. Additional Graduate Grade Points are as follows:

- 1) Graduate 50 points broken down as follows and Final Grade is calculated on a basis of 150 points rather than 100 points.
 - 25 points written report.
 - 15 points presentation to class includes appropriate presentation slides.
 - 10 points to produce a FAQ document associated with your selected topic and distributed to the class members (and posted to CANVAS) at the time of your presentation.

Guidance and format for deliverable on this section of grading will be provided during the third week of class.

QUIZZES:

The instructor may give unannounced or announced in-class quizzes throughout the semester.

PROFESSIONAL PRACTICE:

Your professional practice grade will be broken down into two components. (1) 5% of the 10% percentage points will be based on your attendance at **3 ASCE or ASME 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. (2) the remaining 5 percentage is based on your participation in class discussion (assigned on Canvas), and in class activities. You are expected to attend and actively participate in all activities of the course. Non-attendance may adversely affect your grade. If your absence from class becomes excessive you may be asked by the instructor to withdraw from the class.

HOMEWORK ASSIGNMENTS AND PROJECTS

- The purpose of homework assignments and projects is to help reinforce what was taught in class. It helps to prepare students for exams and tests, including statewide exams. Completing homework assignments and projects makes students more responsible and helps them learn time management skills. It gives students another chance to review class material.
- Homework assignments and design projects will be assigned on a weekly to semester basis. Students may *discuss* their homework solutions with one another, but each student must do his/her own, **independent** assignments (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.
- The homework due date is marked on the assignment. Homework is due *before* class starts. Assignments turned in after class starts **will be considered late and will ONLY be accepted** only if approved as “COORDINATED LATE” (SEE BELOW)
- **All homework is mandatory, including problem sets.** As an engineer your goal is to make a clear, logical, and professional presentation of your work. As such both your presentation and the accuracy of your work are important, and both will be reviewed and graded. It is critical that you show all your work and leave “footprints” so that it can be easily followed. No guesswork should be required to see what you did. All submissions are due at the beginning of class on the due date. Submissions may be handed in to the instructor prior to the start of class but should typically be loaded to the appropriate submission portal in CANVAS.
- All homework in this course must be properly documented. As you are having your work reviewed it is likely that you might receive help from your classmates, just simply document it. Information from the course textbooks (equations and outlines of procedures), class notes, or me are considered immediately available to all students and need not be acknowledged or documented. **YOU ARE REQUIRED TO ACKNOWLEDGE AND DOCUMENT ALL OTHER ASSISTANCE AND REFERENCES USED.** Documentation will be accomplished in accordance with any manual for writing, footnote or endnote, for papers, but for written homework, just place the documentation right at the point you received help describing who and what assistance.

- Assigned readings. Doing the assigned reading prior to class will help you to understand the material presented during the instruction and will fill in gaps for things we do not cover (***I will not cover everything***). It will also make you more familiar with terms and concepts to be covered. To help motivate you to do the reading there may be unannounced quizzes that cover the assigned sections of the text.
- Homework Problems Sets (PS) **will either be graded as submitted (100%) or (0%) not submitted or submitted late.**
- Obviously, there are circumstances that will occur and make a timely submission impossible, and I will work with you when those circumstances legitimately occur. Notification as early as feasible will be appreciated.

HOMEWORK SUBMISSION GUIDELINES (PROFESSIONALISM REQUIREMENTS)

1. Homework should be submitted using letter size (8 ½ x 11”) paper. Engineering paper is required.
2. **Use Engineer paper only** with solutions placed in the logical flow of the problem printed on engineering paper; one side only. Homework solutions not submitted on engineering paper will receive only 90% of the graded credit.
3. The header of the first page should include the following:
 - a. Name of Student
 - b. Student Number
 - c. Course Number and Name
 - d. Homework Number
4. All problems should include:
 - a. Problem Number
 - b. A diagram of the problem (draw all free body diagrams when necessary)
 - c. A set of given quantities
 - d. A set of unknown quantities
 - e. A set of assumptions
5. All numbers and writing should be clear and readable.
6. 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:

- i. 0-24 hours late a deduction of 25% of the earned grade
- ii. 24-48 hours late a deduction of 50% of the earned grade
- iii. More than 48 hours late No credit.

CLASSROOM PROCEDURES

- I will take attendance every class.
- Participation will be taken based on student’s professional activities on Zoom and Canvas.
- 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.
- 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 replacement or alternative. Class preparation is your individual responsibility. Please refer to the Calculator Policy.
- Review the appropriate chapter (by number or topic) before the lecture so that you will be prepared for class discussions. I may have announced and unannounced quizzes over the text assignments if it

appears that students are not reading the assigned text materials. Unannounced quizzes will be used as a homework/problem set grade component.

- No food or snacks in classrooms and Labs.

LAPTOPS/PDAS/MP3 PLAYERS/CELL PHONES OR OTHER ELECTRONIC DEVICES:

- The use of any electronic device, except an approved calculator, is not permitted during exams. Your exam will be collected, and your grade will be a zero if you are caught using a non-approved electronic device/calculator. Any instances of a calculator inappropriately used during an exam will be the basis of alleging Academic Misconduct and may result in Failing (F) of the course at the determination of the course's instructor or the basis for a recommendation for expulsion from the University. Any Calculator used during an exam in this course must meet the requirements stated within the policy below.
- Use of cell phones during class time is not permitted.

CALCULATOR POLICY:

Only NCEES approved calculators will be permitted during tests and your test will be collected and your grade will be a zero if you are using a non-approved calculator.

The approved calculators include the following: (Please check the NCEES website for a complete listing, www.ncees.org/exams/calculator-policy/. Examples include but are not limited to:

- Hewlett Packard – HP 33s, HP 35s, and no others
- Casio – All FX 115 models
- Texas Instruments – All TI 30X or TI-36X models.
- If you are unsure about your calculator, it is your responsibility to check with the instructor for approval.

At any time during the exam your calculator is subject to a random search by the instructor. Failure or refusal to clear all memory or to surrender your calculator to search will disqualify you from the exam immediately, unless you can produce a calculator meeting the requirements as stated above.

LAPTOPS/PDAS/MP3 PLAYERS/CELL PHONES OR OTHER ELECTRONIC DEVICES:

- The use of any electronic device, except an approved calculator, is not permitted during exams. Your exam will be collected, and your grade will be a zero if you are caught using a non-approved electronic device/calculator. Any instances of a calculator inappropriately used during an exam will be the basis of alleging Academic Misconduct and may result in Failing (F) of the course at the determination of the course's instructor or the basis for a recommendation for expulsion from the University. Any Calculator used during an exam in this course must meet the requirements stated within the policy below.
- Use of cell phones during class time is not permitted.

FINAL DAY TO WITHDRAW:

The final day to withdraw from the course without penalty is **October 30th**.

CENSUS DATES:

The university requires that instructors report the attendance to the register at various points in the semester. Therefore, on **September 1st** 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 those who do.

INFORMATION FOR CLASSROOMS AND LABORATORIES:

Students are strongly encouraged to wear facemasks covering their nose and mouth in public settings (including classrooms and laboratories). The UT Tyler community of Patriots views adoption of these practices consistent with its HonorCode (Links to an external site.) and a sign of good citizenship and

respectful care of fellow classmates, faculty, and staff.

Students who are feeling ill or experiencing symptoms such as sneezing, coughing, or a higher than normal temperature should stay at home and notify their faculty. Students needing additional accommodations may contact the Office of Student Accessibility and Resources at University Center 3150, or call (903) 566-7079 or email saroffice@uttyler.edu.

RECORDING OF CLASS SESSIONS:

Class sessions may be recorded by the instructor for use by students enrolled in this course. Recordings that contain personally identifiable information or other information subject to FERPA shall not be shared with individuals not enrolled in this course unless appropriate consent is obtained from all relevant students. Class recordings are reserved only for the use of students enrolled in the course and only for educational purposes. Course recordings should not be shared outside of the course in any form without express permission.

ACADEMIC MISCONDUCT:

Representation of other's work as your own will not be tolerated. Cheating on examinations, quizzes, and homework and the false representation of work will be interpreted as academic dishonesty. Academic dishonesty will be subject to disciplinary action as outlined by the UT Tyler Student Guide on Conduct and Discipline. Please refer to the University of Texas at Tyler current Undergraduate Catalog for academic policies and Manual of Policies and Procedures for Student Affairs (MOPPS, Chapter 8) regarding academic integrity, cheating and plagiarism. Academic dishonesty will not be tolerated. Ignorance of the rules and policies will provide no protection from the consequences.

COLLECTION OF STUDENT WORK:

Throughout the semester I will collect student work (best, average, and worst) for the ABET outcomes notebooks. This will require me to make a copy of your work, keep your original and return a copy of the graded work to you. I will not pay attention as to what level of work you accomplished.

STUDENTS RIGHTS AND RESPONSIBILITIES:

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: <http://www.uttyler.edu/wellness/StudentRightsandResponsibilities.php>

GRADE REPLACEMENT/FORGIVENESS AND CENSUS DATE POLICES:

Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at <http://www.uttyler.edu/registrar>. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar.

Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract.

The Census Date is the deadline for many forms and enrollment actions that students need to be aware of. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses such as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment.
- Completing the process for tuition exemptions or waivers through Financial Aid

STATE-MANDATED COURSE DROP POLICY:

Texas law prohibits a student who began college for the first time in fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date). Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Registrar's Office and must be accompanied by documentation of the extenuating circumstance. Please contact the Registrar's Office if you have any questions.

DISABILITY/ACCESSIBILITY SERVICES:

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University of Tyler at Texas offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including non-visible a diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment, you are encouraged to visit <https://hood.accessiblelearning.com/UTTyler> and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at <http://www.uttyler.edu/disabilityservices>, the SAR office located in the University Center, # 3150 or call 903.566.7079.

STUDENT ABSENCE DUE TO RELIGIOUS OBSERVANCE:

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

STUDENT ABSENCE FOR UNIVERSITY-SPONSORED EVENTS AND ACTIVITIES:

If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

SOCIAL SECURITY AND FERPA STATEMENT:

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

EMERGENCY EXITS AND EVACUATION:

Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services

STUDENT STANDARDS OF ACADEMIC CONDUCT:

Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

- i. "Cheating" includes, but is not limited to:
 - copying from another student's test paper.
 - using, during a test, materials not authorized by the person giving the test;
 - failure to comply with instructions given by the person administering the test;

- possession during a test of materials which are not authorized by the person giving the test, such as class notes or specifically designed “crib notes”. The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test;
 - using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program;
 - collaborating with or seeking aid from another student during a test or other assignment without authority;
 - discussing the contents of an examination with another student who will take the examination;
 - divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructor has designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student;
 - substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment;
 - paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program or information about an unadministered test, test key, home solution or computer program;
 - falsifying research data, laboratory reports, and/or other academic work offered for credit;
 - taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct; and
 - misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.
- ii. “Plagiarism” includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another’s work and the submission of it as one’s own academic work offered for credit.
- iii. “Collusion” includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.
- iv. All written work that is submitted will be subject to review by SafeAssign™, available on Blackboard. UT Tyler Resources for Students
- [UT Tyler Writing Center](http://www.uttyler.edu/writingcenter) (903.565.5995), writingcenter@uttyler.edu
 - [UT Tyler Tutoring Center](http://www.uttyler.edu/tutoring) (903.565.5964), tutoring@uttyler.edu
 - The Mathematics Learning Center, RBN 4021, this is the open access computer lab for math students, with tutors on duty to assist students who are enrolled in early- career courses.
 - [UT Tyler Counseling Center](http://www.uttyler.edu/counseling) (903.566.7254)

UT TYLER A TOBACCO-FREE UNIVERSITY:

All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors.

Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products.

There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support. For more information on cessation programs please visit www.uttyler.edu/tobacco-free.

CAMPUS CARRY:

We respect the rights and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at <http://www.uttyler.edu/about/campus-carry/index.php>

Course Schedule - Subject to Revision

Week #	DATE	MATERIAL COVERED	READINGS*
Week 1	22-Aug	Course intro and syllabus distribution/ Review	Syllabus
	24- Aug	Sustainable Design, Engineering, and Innovation	Handout
Week 2	29-Aug	Water demand, Fire Protection, Human population growth	Handout
	31-Aug	Water demand, Fire Protection, Human population growth	Handout
Week 3	5-Sep	Intake structures	Handout
	7-Sep	Design of Water treatment systems Flocculation and Mixing, Softening Basins	Ch. 6.5 &6.6
Week 4	12-Sep	Sedimentation	Ch. 6.7
	14-Sep	Filtration	Ch. 6.8
Week 5	19-Sep	Disinfection	Ch. 6.11
	21-Sep	Distribution Considerations and Other Technologies	Ch. 6.9-6.10
Week 6	26-Sep	Storage and Flow Maintenance	Handout
	28-Sep	Design of water distribution systems	Handout
Week 7	3-Oct	EXAM I	
	5-Oct	Design of water distribution systems	Handout
Week 8	10-Oct	Design of water distribution systems	Handout
	12-Oct	Design of water distribution systems: Cross Connection Issues	Handout
Week 9	17-Oct	Design of Wastewater collection systems	Handout
	19-Oct	Design of Wastewater collection systems	Handout
Week 10	24-Oct	Design of Wastewater collection systems	Handout
	26-Oct	Design of Wastewater collection systems	Handout
Week 11	31-Oct	Design of Wastewater treatment systems Preliminary treatment	Ch. 7.2-7.3
	2-Nov	Primary treatment	Ch. 7.4
Week 12	7-Nov	EXAM I	
	9-Nov	Secondary treatment	Ch. 7.5
Week 13	14- Nov	Advanced treatment	Ch. 7.8
	16- Nov	Discharge structures and flow accommodations	Handout
Week 14	THANKSGIVING (20-24 Nov)		
Week 15	28-Nov	Stormwater Design	Handout
	30-Nov	Stormwater Design	Handout
FINAL EXAM (4-9 DEC)			

*Unless otherwise indicated readings are found in the textbook