

The University of Texas at Tyler
Department of Civil Engineering

CENG 3361: Applied Engineering Hydrology and Hydraulic Design

Course Syllabus (Spring 2023)

Date: December 26, 2022. This version supersedes all earlier versions.

Time & Venue	Class Times: MW, 1:25 p.m. – 2:20 p.m., RBS 2019 Lab Times: <ul style="list-style-type: none">• Section 001L: Monday: 2:30 p.m. – 5:15 p.m., RBS 1027
Instructor	Dr. Matthew Vechione Office: RBS 1011 Email: mvechione@uttyler.edu Phone: (903) 565-5711 Office hours: MW 9:30 a.m. – 11:00 a.m. or by appointment
Teaching Assistant	TBD
Course Website	See UT Tyler's Canvas website. Canvas will be used to manage the course material for the semester. There you will find announcements, homework assignments, solutions, handouts, lesson videos, and other material pertaining to the class. Please check there regularly.
Catalog Description	Welcome to CENG 3361 (Applied Engineering Hydrology and Hydraulic Design). During the upcoming semester, I believe you will find our study of hydrology and hydraulic design to be interesting, challenging, and rewarding. In this course, we will cover topics such as precipitation, hydrograph analysis, evapotranspiration, runoff, flood routing, open channel flow and design of stable channels, and hydraulic design. A project involving hydrologic system analysis and design will be assigned.
Course Outcomes	In this course, you will learn to: <ol style="list-style-type: none">1. Describe the hydrologic cycle and recognize the various storage and transport pathways in the cycle.2. Predict runoff from a storm using constant (Φ index) loss and variable (SCS Method) loss infiltration methods.3. Predict runoff from a storm using unit hydrograph methods.4. Obtain historical flood data using the Internet.

	<ol style="list-style-type: none"> 5. Apply flood frequency analysis and use probability concepts and frequency distributions to evaluate flood data. 6. Describe the hydrologic design scale, select a design storm, and specify precipitation depth and distribution. 7. Compute normal depth in a channel. 8. Design an open channel. 9. Analyze open channel structures such as weirs and spillways. 10. Use the Rational Method to compute the peak discharge for an urbanized watershed. 11. Use spreadsheets and math solving problems as a tool to perform the mathematical operations required in hydrological and hydraulic analysis and design. 12. Perform engineering tasks in a team environment and communicate effectively to others.
Prerequisite/Co-Requisite	1. CENG 3310 Fluid Mechanics and Hydraulics
Required Text	<p>No required textbook. The recommended textbook used for this class is:</p> <ul style="list-style-type: none"> • Hydrology and Hydraulic Systems, 4th Edition by Ram Gupta, Waveland Press, Inc. ISBN 1-4786-3091-4
Grading	<p>Contributions towards final grade (out of 100%)</p> <ul style="list-style-type: none"> • 5% Professional Practice (3 Student Organization Meetings) • 15% Homework • 15% Lab • 15% Exam 1 • 15% Exam 2 • 10% Project • 25% Final Examination <p>In grading the homework, assignments, tests, exams, etc., no credit will be given to methods not covered in this class, although these methods, tables, formulae may appear in the textbook. Errors or outdated material in the textbook should not be the reason for claiming full credit on work done.</p> <p>Note: There will be no makeup work or extra credit allowed/granted at the end 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.</p> <p>Letter grades will be assigned based on the final course grade:</p> <ul style="list-style-type: none"> • A 90 and above • B 80 to 89.99 • C 70 to 79.99 • D 60 to 69.99

	<ul style="list-style-type: none"> • F below 60 <p>No letter grade will be released until it is official on PeopleSoft.</p> <p>In consistency with the College of Engineering’s policy, a student who does not score 50% or more of the total points allocated to the Final Examination will automatically receive an F grade.</p>
Professional Practice	<p>You must attend three professional practice meetings to receive full credit for the professional practice portion of your grade in this course. You can attend ASCE, ITE, CMSA, IEEE, ASME, SAE, etc. student chapter meetings or when these student chapters host guest speakers. When you attend a meeting, you are expected to complete the template Word file and take a picture of yourself at the meeting as proof of your attendance. The template can be found on Canvas.</p>
Exams	<p>There will be 2 midterm examinations (held during the scheduled class time) and one final examination. The exams are TENTATIVELY scheduled for:</p> <ul style="list-style-type: none"> • Exam 1: February 20th • Exam 2: April 3rd • Final Exam: TBD Based on University Schedule <p>Exams dates may be moved up or pushed back depending on the progress of the lectures. You can use a calculator and instructor-approved reference material. Solutions to exams will NOT be posted. 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 circumstances described above, failure to take the exam at the scheduled time will constitute a grade of zero on the exam.</p>
General Exam Rules & Cheat Sheet	<p>All exams are closed book. You are only allowed to bring your writing instruments, erasers, and NCEES-approved calculators. Topics to be tested will be announced in class and on Canvas one week prior to the exam.</p> <p>The instructor will set questions from material taught in class. The meaning of “taught in class” includes verbal instructions or written notes on the white board and Canvas, briefing/ presentation during field trips, observation during field work/ experiments. They do not necessary appear in the textbook, distributed class notes, or homework. It is very important that you attend the class activities and take additional notes.</p> <p>To discourage students from focusing narrowly on only a few questions, no practice exam will be given. There are enough self-practice problems in the textbook at the end of each chapter.</p>

Calculators	<p>In line with the Civil Engineering Department's policy, <u>only calculators permitted by NCEES for use in the current semester's FE exam are permitted to be used in the CENG 3361 examinations</u>. No other model of calculator will be allowed. Models previously allowed by NCEES in the past but are no longer valid for the current FE exam are prohibited in the CENG 3361 exams. Please check www.ncees.org for the latest permitted calculator models. Examples include, but are not limited to:</p> <ul style="list-style-type: none"> • Hewlett Packard: HP 33s, HP 35s, and no others • Casio: All FX 115 models • Texas Instruments: All TI30X or TI-36X models <p>It is the student's responsibility to check the validity of his/her calculator model, purchase, and be familiar with the functions of the permitted calculators prior to the exam. At the discretion of the course instructor, any calculator not meeting the requirements stated (especially in the case of a graphing calculator) may be used but only after an inspection of the device and a clearing of all the memory within the device, performed for the instructor at a time immediately prior to the exam. 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. No borrowing of other students' calculators is allowed during exam.</p>
Field Trip	To be announced/decided.
Design Project	The design project consists of a drainage study in Tyler. Each group will present their findings and recommendations at the dates shown in the course schedule.
Homework	<p>About 40 homework problems will be assigned out of the textbook. The homework problems will be assigned at the completion of a topic and will be due in class on the day stated in the course schedule. Homework will be uploaded to Canvas as a single Word document (.doc or docx) or PDF. All homework solutions must be submitted on engineering paper (you can buy them in the Civil Engineering Department Office for \$5.00, at Office Depot, or online). Homework solutions not submitted on engineering paper will received only 90% of the graded credit.</p> <p>In all your homework and exam solutions, you are expected to present, in written form, the formulae used, the variable values, intermediate calculations, final answers, and their units. Draw a box around your final answer. Not having any of the above will lead to points being deducted.</p> <p>Do not expect all the homework problems be similar to the examples covered during class time. In some cases, you are expected to read</p>

	additional examples in the textbook or think of the solution yourself or discuss with your classmates.
Late Homework/ Assignment Policy	<p>Absolutely NO late homework will be accepted. If it is not uploaded to Canvas before the submission window closes, I will not grade it, and you will receive a zero for the assignment. No exceptions.</p> <p>Homework solutions are usually posted on Canvas two days after the due date.</p>
Grace Day Coupon	<p style="text-align: center;">CENG 3361 Homework Grace Day Coupon</p> <p>To allow for emergencies that may arise, you may use this coupon for one “grace day” for homework assignments.* In other words, one homework can be turned in 24 hours late without penalty. Cut out (or take a screenshot) of this coupon and submit in lieu of your homework assignment.</p> <p>*Not transferable to another student. *Only valid for homework assignments. *You are not required to use this coupon. If you do not use this coupon on a homework or lab assignment, turn it in with your final exam for an additional 5 bonus points on the final exam.</p>
Laboratory	<p>There will be a series of labs completed during the semester. There is one section of lab, Section 001L, where we will meet on Monday’s from 2:30 p.m. – 5:15 p.m. in RBS 1027. At the first lab, we will go through proper safety training. <u>You will be required to sign a student safety contract prior to starting the first week’s lab.</u> 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 particular lab assignment.</p> <p>Be sure to review the handout and complete all required work prior to coming to lab. This will help to prepare you the experiment and help to make the sessions run smoother. If necessary, a quiz will be given at the beginning of the lab which covers the experiment for the day.</p> <p>The instructor will assign the groups for labs that require groupwork. Each group will be required to turn in one report for the entire group. One person from each group must upload the report to Canvas. The format for the report is provided with the syllabus. Everyone is encouraged to visit the writing center, as they can provide excellent feedback and help you with your writing.</p>
Final Day to Withdraw	The final day to withdraw from the course without penalty is March 23rd.
Census Dates	The university requires that instructors report the attendance to the Registrar’s Office at various points in the semester. Therefore, on January 23rd, 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.
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/rightsresponsibilities.php
Campus Carry	We respect the right 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
UT Tyler: A Tobacco-Free University	<p>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.</p> <p>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.</p> <p>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.</p>
Grade Replacement / Forgiveness and Census Date Policies	<p>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.</p> <p>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.</p> <p>The Census Date is the deadline for many forms and enrollment actions of which students need to be aware. These include:</p> <ul style="list-style-type: none"> • Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.

	<ul style="list-style-type: none"> • 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
State-Mandated Course Drop Policy	<p>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 Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.</p>
Disability / Accessibility Services	<p>In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University of Texas at Tyler offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including a non-visible 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 <u>New Student</u> 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 of 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.</p>
Student Absence due to Religious Observance	<p>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.</p>
Student Absence for University-Sponsored Events and Activities	<p>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.</p>

<p>Social Security and FERPA Statement</p>	<p>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.</p>
<p>Emergency Exits and Evacuation</p>	<p>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.</p>
<p>Student Standards of Academic Conduct</p>	<p>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.</p> <p>i. “Cheating” includes, but is not limited to:</p> <ul style="list-style-type: none"> • 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 a non-administered 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 instructors 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;

	<ul style="list-style-type: none"> • 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. <p>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.</p> <p>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.</p> <p>iv. All written work that is submitted will be subject to review by plagiarism software.</p>
<p>UT Tyler Resources for Students</p>	<ul style="list-style-type: none"> • UT Tyler Writing Center (903.565.5995), writingcenter@uttyler.edu • UT Tyler Tutoring Center (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 (903.566.7254)

CENG 3361 General Requirements for Laboratory Reports

Lab Time	Section 001L: Monday: 2:30 p.m. – 5:15 p.m., RBS 1027
Lab Report	<p>A laboratory report is required for each experiment performed. Only one lab report is required per group. 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:</p> <ul style="list-style-type: none"> • Cover Page: Laboratory Title, Course Number (CENG 3361), Your Names and Group Number. Each person in the group must sign the cover page indicating that they have read the report and approve of the contents contained within. • Objective: Purpose of the experiment should be explained in a few sentences. • Procedure: 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 are provided with the standard laboratory procedure), relevant calculations, and required plots. BE SURE TO USE CAPTIONS FOR FIGURES, TABLES AND GRAPHS! Refer to the figures, graphs, and tables by number in the text of the discussion. Partial credit can only be assigned if you present your work in a logical manner. Neatly show your work and attach a page of sample calculations. 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 this lab. Explain that how this experiment is useful to solve the practical civil engineering problems. • Team Contributions: The contributions of each team member should be stated in this section. 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.
Grading	<p>Contributions towards each lab report grade (out of 100%)</p> <ul style="list-style-type: none"> • 10% Objective • 20% Procedure • 40% Results and Discussion • 30% Conclusion

Things to Remember	<ul style="list-style-type: none">• After finishing the experiments, clean the instruments and the work area.• Data sheets should be typed in Excel.• 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.• When writing your reports, avoid using first person like “I” or “we”.• USE CAPTIONS FOR FIGURES AND TABLES! REFER TO THESE FIGURES AND TABLES SPECIFICALLY IN THE TEXT USING THE FIGURE/TABLE NUMBER!!
--------------------	--

Tentative Schedule

Lsn	Date	Topic	Text	HW Assigned	HW Due
1	1/9	Course Introduction			
2	1/11	Hydrologic Cycle and Budget	2.1 - 2.4		
	1/16	No Class (MLK Day)			
3	1/18	Probability and Statistics in Hydrology	11	HW 1	
4	1/23	Precipitation	2.5 - 2.7		
5	1/25	Precipitation (IDF)	2.8	HW 2	HW 1
6	1/30	Evaporation and Transpiration	3		
7	2/1	Evaporation and Transpiration	3	HW 3	HW 2
8	2/6	Infiltration and SCS Curve Number	4		
9	2/8	Infiltration and SCS Curve Number	4	HW 4	HW 3
10	2/13	Runoff	9.1 - 9.2		
11	2/15	Rational Method	16.10	HW 5	HW 4
	2/20	Exam I			
12	2/22	Hydrographs	9.5 – 9.7		
13	2/27	Unit Hydrographs	9.8 – 9.9	HW 6	HW 5
14	3/1	Surface Water Flow Measurements	8		
15	3/6	Stream Flow Measurements	8		
16	3/8	Introduction to Hydraulic Structures	Handout	HW 7	HW 6
	3/13	No Class (Spring Break)			
	3/15	No Class (Spring Break)			
17	3/20	Open Channel Flow	14		
18	3/22	Open Channel Flow	14	HW 8	HW 7
19	3/27	Weirs	13.1 – 13.5		
20	3/29	Weirs	13.1 – 13.5	HW 9	HW 8
	4/3	Exam II			
21	4/5	Spillways	13.12 – 13.18		
22	4/10	Energy Dissipators	Handout		
23	4/12	Culverts	17.7	HW10	HW9, Project
24	4/17	Project Presentations			
25	4/19	Project Presentations			HW10
	4/24	Final Exam			

Tentative Lab Schedule

Lab	Date	Topic	Lab Due
	1/9	No Lab Meeting (First Week)	
1	1/16	Hydrologic Cycle as a Mass Balance	Lab 0
2	1/23	Probability and Statistics	Lab 1
3	1/30	Areal Rainfall and Thiessen Method	Lab 2
4	2/6	Infiltration	Lab 3
5	2/13	Exam I Review	Lab 4
6	2/20	Stormwater Runoff	
7	2/27	Hydrographs	Lab 6
8	3/6	Watershed Delineation and Design Project	Lab 7
	3/13	No Lab Meeting (Spring Break)	
9	3/20	Flow Measurements	Lab 8
10	3/27	Exam II Review	Lab 9
11	4/3	Open Channel Flow, Weirs, Spillways	
12	4/10	Design Project Presentation Dry-Run	Lab 11
13	4/17	Final Exam Review	