

**University of Texas at Tyler - Department of Civil Engineering**  
**CENG 3310.460 Fluid Mechanics and Hydraulics**  
**Summer 2025**  
As of July-7, 2025

**Instructor:** Dr. Kostas Kalfas  
RBS 1035  
TBA  
[kkalfas@uttyler.edu](mailto:kkalfas@uttyler.edu)

**Office Hours:**  
By appointment

**Lectures:**  
Uploaded recorded session on Canvas

**Course Website:**  
Canvas will be used to manage the course material for the semester. There you will find homework assignments, solutions, handouts and other material pertaining to the class. **Please check there regularly.**

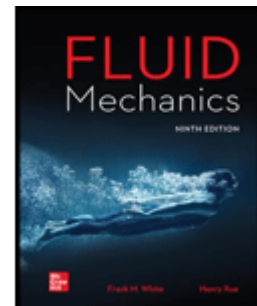
**Classroom Procedure:**  
This is an online course and all lectures will be available on Canvas.

**Catalog Description:**  
This course serves as an introduction to fluid mechanics. In previous courses the basic laws for solids have been developed and implemented. The intent of this course is to formulate and apply analogous laws for fluids. The initial portion of the class focuses on defining a fluid and its properties. This is followed by an analysis of fluids at rest (hydrostatics) and the forces they impart on mechanical objects such as dams. The final portion of the class covers fluids in motion. A variety of analysis techniques are covered. Once developed, these analysis techniques are used to investigate a range of fluid dynamics problems such as the flow within piping and external aerodynamic drag forces. All this is accomplished through the following **course objectives:**

- i. Identify, explain, and distinguish fluids based on their chemo-physical properties.
- ii. Calculate forces on solid objects due to hydrostatic pressure.
- iii. Apply the concepts of conservations of mass, momentum, and energy to a dynamic fluid system.
- iv. Model fluid systems using dimensional analysis and similitude.
- v. Calculate energy losses in a confined, pressurized conduit system.
- vi. Calculate forces on solid objects immersed in an unconfined fluid flow.

**Prerequisite:**  
Differential Equations and Statics, with a grade of 2.0 or better.

**Required Text and Readings:**  
*Fluid Mechanics*, Frank M. White, McGraw Hill, 9<sup>th</sup> Edition. ISBN: 9781260258318 (hardcover); 9781260446555 (spiral bound); or 9781260446586 (e-book). You will be expected to prepare for each lesson by reading the ascribed chapter/section from this text.



**Note about the Syllabus:**

This syllabus is a statement of intent about how the course will be taught this semester. It outlines what we will cover, what you will need to do in the course, and it explains what and when you must do it to successfully complete the course and get a great final grade. This syllabus is intended to protect you from arbitrary or untimely changes in course requirements and due dates. But I reserve the right to make changes as necessary to the syllabus with announcement of changes. As we learned during 2020, there are many circumstances outside of our direct course control that may require changes to this syllabus in content and schedule. These will always be announced in advance and the syllabus will be updated on Canvas so all can be aware of the required changes.

### Exams:

There will be 2 take-home exams. The due dates will be posted on Canvas.

Exams dates will not be moved; they will be fixed. *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 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 TAKE-HOME. YOU WILL NEED TO PLAN YOUR TIME TO SUBMIT YOUR ANSWERS BEFORE THE DUE DATE AND TIME.** Grades are assigned based on earned points; **GRADED EVENTS ARE NOT SUBJECT TO A CURVE.** Any student scoring **less than 65% on all EXAMS or less than 50% on any exam may fail the course regardless of their final grade.**

### Homework/ Problems Sets:

Homework will be assigned on a regular basis and submitted as PDF's through Canvas. You can scan documents and make PDFs. Homework is due on the date outlined in the schedule. **You will need to upload your homework as a single pdf file to canvas no later than 11:59 pm on the date it is due.** No late homework will be accepted except for unusual circumstances. This course has a strict late policy — late homework will receive a ZERO (0). If any special circumstances arise that require an extension (illness, emergencies, trips, other responsibilities, personal issues, etc.), please ensure you coordinate with me at least 24 hours prior to the due date, and I will work with you on adjusting the due date as appropriate. Except for extremely rare circumstances, all uncoordinated late work will receive no course credit or a substantial cut. Talk to me prior to not turning in an assignment, I'll work with you, and rather you do an assignment late than not at all! Failure to follow the correct homework format will result in points deduction. Homework that is not submitted as complete and following the homework guidelines will receive a ZERO (0). **Homework must be submitted on an engineering paper.** Solutions should be presented in a clear, neat and methodical manner. Follow the "homework submission guidelines" when completing your assignment. Solutions which are not clearly presented will NOT receive full credit.

### Homework/ Problems Sets Submission Guidelines (Professionalism Requirements):

1. Homework should be submitted using letter size (8 ½ x 11") paper. Engineering paper is required. Use the format shown in Enclosure 1 of this Syllabus as the standard for homework and sample calculation pages.
2. Cover Sheet. All submissions must have a signed cover page. For HW use the provided cover sheet. Before signing the cover sheet take time to reflect and ensure that all work is either yours or that credit is given where due. Homework **will not be accepted** without the signed cover page, no exceptions. For group work, all members of the group must sign the cover sheet. If a member of the group is not physically at UT Tyler, then they must sign the cover page as soon as possible upon returning. Engineers are ethical and give credit where credit is due, it's a good practice to start or continue now.
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. 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.
5. Multiple sheets should be stapled at the top left corner of the page.
6. The submitted papers should be free of frail edges, stains, smudges and wrinkles.
7. 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.
8. All numbers and writing should be clear and readable.
9. 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 (or use a **straight edge** for diagrams)! In that case, you may neatly tape or glue short computer printouts onto Engineer paper at the appropriate place in the logical flow of the problem. Neatness, clarity and completeness are evaluated.
10. The **final answer should be boxed** and at the bottom of the problem.
11. Use parenthetical **documentation** for HWs. Provide a documentation statement right where you received help / assistance (not at the end of the assignment). Credit the person giving the assistance, be accurate and precise, and circle the assistance with a cloud. Endnotes, works cited, or bibliography are not required unless specifically stated for a special requirement such as the laboratory report.
- (a) In the parenthetical citation for all HWs and any hand calculations for lab reports you **MUST** clearly state the name of the source, ideas obtained from the source, exact portion of the work where assistance was given, extent of assistance received, and how you used that assistance to modify your work. Unclear documentation may result in point deductions. Examples of parenthetical documentation are included in the examples in Figure 1.
  - (b) Collaboration (working together) is authorized and encouraged – just do the right thing to provide credit where due. On occasion, students have reported that they worked together but didn't think they needed to document working together – you must document! Grading penalties are almost never assessed for getting help (unless you directly copy another person's assignment). Grading penalties are always assessed for lack of/improper documentation. Also, as a guideline, you should always collaborate with a person, not with a piece of paper or an electronic document.
  - (c) Use of documents received digitally from others, such as Excel files, computer code, PowerPoint presentations, laboratory write-ups, etc., is not recommended. Collaboration refers to interacting with another person, not just their work. If you do refer to someone else's file in the preparation of your own assignment, it must be formally documented including how used, where used, and referenced or copied to what extent while developing/completing your assignment.
  - (d) Assistance received from any instructor, the course textbook, or course materials provided through Canvas are considered "common knowledge" and do not need to be documented. If your only sources for completing your assignment were from this list you can confidently initial next to the acknowledgment statement that you received "no assistance". Course documents from previous semesters, and course notebooks of other students kept in study rooms or the like are not considered common knowledge and must be documented appropriately.
  - (e) If you copy someone else's work, the only acceptable citation is to utilize the word "copy" in the documentation (see an example in 1.) The most you can earn if you copy someone else's work is 50% of the available points for the portion copied.
12. **Printouts** of any computer codes and results used in completing any assignments must be included with your submission. Documentation of any help received with either the source code or the results must be included as parenthetical documentation within the code and/or on the printout of the results. You must print out any source code or other computer-generated products used, along with the results, and attach them to the HW.



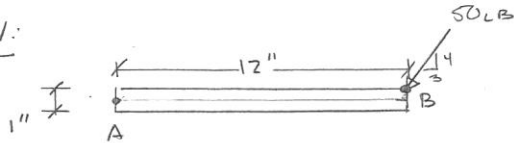
ME 250  
30 Aug 2017

PROBLEM SET #1  
PROBLEM 1

I.M. TRYING  
DR. WERE HARDER

1/1

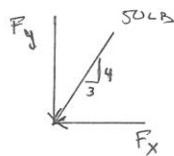
GIVEN:



FIND: THE MOMENT GENERATED AT POINT A BY THE FORCE APPLIED AT PT B.

SOLUTION:

RESOLVE FORCE AT B INTO COMPONENTS



$$F_x = \frac{3}{5} (50 \text{ LB}) = 30 \text{ LB} \leftarrow$$

$$F_y = \frac{4}{5} (50 \text{ LB}) = 40 \text{ LB} \downarrow$$

I.M. HELPFUL, ENG '20, ASSISTANCE GIVEN THE AUTHOR, 29 AUG 2017, VERBAL DISCUSSION. HELPFUL EXPLAINED WHY I SHOULD USE  $\frac{3}{5}$  FOR  $F_x$ , SO I CHANGED THE EGNS

CALCULATE MOMENTS ABOUT A

$$\begin{aligned} \sum M_A &= -F_y (12 \text{ in}) + F_x (\frac{1}{2} \text{ in}) \leftarrow \\ &= -40 \text{ LB} (12 \text{ in}) + 30 \text{ LB} (\frac{1}{2} \text{ in}) \\ &= -450 \text{ LB} \cdot \text{in} \\ &= \underline{\underline{450 \text{ LB} \cdot \text{in}}} \end{aligned}$$

Ans.

I.M. HELPFUL, ENG '20, ASSISTANCE GIVEN THE AUTHOR, 29 AUG 2017, VERBAL DISCUSSION, I WAS SO LOST SO I.M. SHOWED ME HOW TO SOLVE THE PROBLEM. I COPIED THIS EQUATION FOR  $M_A$  BUT SOLVED THE REST MYSELF.

Figure 1 Example of Properly Formatted HW Problem Submission on Engineering Paper

#### Grades:

Homework = 30%

Exams = 70%

#### Grade Scale:

A: 90-100

B: 80-89

C: 70-79

D: 60-69

F: <60

If necessary, I reserve the right to adjust the grade scale at the end of the semester to your benefit.

#### \*\*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.

**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/calculators. 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.

**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/](http://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 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.

**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:** It is important to take the necessary precautions to ensure a healthy and successful year. UT Tyler continues to urge you to protect yourselves against the flu, COVID and any new threats that may be developing. Be diligent about preventive measures such as washing hands, covering sneezes/coughs, social distancing and vaccinations, which have proven to be successful in slowing the spread of viruses. Encourage those who don't feel well to stay home, and if they show symptoms, ask them to get tested for the flu or COVID. Self-isolation is important to reduce exposure ([CDC quarantine/isolation guidelines](#)). Please work with your faculty members to maintain coursework and please consult [existing campus resources](#) for support.

**Academic Misconduct:** Plagiarism of homework and cheating on examinations will be interpreted as academic misconduct and will not be tolerated. 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 provides no protection from the consequences.

**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 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 Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center 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 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;
  - 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 Canvas. UT Tyler Resources for Students
  - [UT Tyler Writing Center](https://www.uttyler.edu/writingcenter) (903.565.5995), [writingcenter@uttyler.edu](mailto:writingcenter@uttyler.edu)
  - [UT Tyler Tutoring Center](https://www.uttyler.edu/tutoring) (903.565.5964), [tutoring@uttyler.edu](mailto: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](https://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](http://www.uttyler.edu/tobacco-free).

**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>.

Prepared by: Kostas Kalfas, Ph.D.  
Assistant Professor  
Department of Civil Engineering



**Enclosure 1: Standard for Homework Submissions and Design Problem Sample Calculations.**

Engineering Paper  
Required

Page #\_\_ of x pages total.  
(Place on all pages of the  
problem set)

	CMGT4313 Assignment # (on first page only)	Date Due: DD MMM YY (on first page only)	Name (on all pages)	1/x
<input type="radio"/>	<p><b><u>GIVEN:</u></b> Write a brief description of the information given in the problem statement.</p> <p><b><u>FIND:</u></b> Indicate the information you are to find for this problem. When you finish the problem, check this line to make sure you found all the things you were supposed to find.</p> <div> </div> <p><b><u>SOL'N:</u></b> Indicates where the solution starts. Good solutions are neat and clearly written, reference equation numbers where necessary, and include notes of explanation. Drawings are neat and contain clear labels and dimensions.</p> <p>Put only one problem per page. Do not start a new problem in the middle of a page.</p> <p>Sloppy work or work which does not follow this format may result in a point cut.</p> <p>Use parenthetical documentation to indicate where you received assistance or information from others. For example: (Helpful, I.M., '20 instructed me to check the slab in shear, not just bending and where to find the shear equation in the ACI 318-19.)</p> <p><b><u>“XXXXXXX ANS”</u></b> indicates your answer and the end of the problem. This should match the FIND line from above.</p>			
<input type="radio"/>				
<input type="radio"/>				