

**CE 3305: Basic Fluid Mechanics
Spring 2018**

Instructor: Habib Ahmari, Ph.D., P. E.

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Office Hours: Mon/Tu/Thur 1:00 -2:00 pm

The office hours listed above are available for the instructor to assist students, and students are highly encouraged to use them. Other times are possible by appointment.

Section Information: CE 3305-001 and 101 & AREN 3305-001 and 101

Time and Place of Class Meetings: Tu & Th 3:30 - 4:50 pm, Rm: NH 203

GTA: TBA

GTA Office Hours: TBA

Description of Course Content: Fundamentals of fluid statics, kinematics of fluid flow, fluid energy, fluid forces, similitude, and dimensional analysis. Related to steady flow of incompressible fluids in confined and free surface systems.

Student Learning Outcomes:

- know the definition of fundamental concepts of fluid mechanics including density, viscosity, surface tension and pressure (absolute and gage); flow visualization using timelines, pathlines, streaklines, and streamlines; flow regimes: laminar, turbulent and transitional flows; compressibility and incompressibility; viscous and inviscid.
- have a working knowledge of hydrostatics to determine hydrostatic forces on planar and curved objects.
- understand and be able to apply Bernoulli equation and energy equation with the continuity equation to determine velocities, pressures, and accelerations for incompressible and inviscid fluids.
- use conservation law in differential forms and apply them to determine velocities, pressures and acceleration in a moving fluid. Understand the kinematics of fluid particles, including the concepts of substantive derivatives, local and convective accelerations.
- determine flow rates, pressure changes, minor and major head losses for viscous flows through pipes.

Textbooks and Other Course Materials:

The incomplete copy of the instructor's course notes will be posted on Blackboard in advance. The student may complete the course notes in the class. Additional references and reading materials may be assigned if necessary. For additional reading and exercise the following textbook is recommended:

“Fluid Mechanics”: C. Hibbeler

Descriptions of Major Assignments and Examinations:

Homework:

Reference material should be read before the class in which it will be discussed. Homework assignments will be given throughout the semester. The completion of these assignments is an essential means of achieving the learning outcomes. Problem sets are due a week later unless otherwise specified. Homework will be collected before the class starts on the due date. Late homework will not be accepted unless arrangement has been made in advance with the instructor. Solutions are to be done neatly with answers clearly indicated and with all equations used clearly written. Key assumptions must be stated. Missed homework will count as zero and may not be submitted by other students.

The in-class students must submit a hard copy of their assignments before the class starts. Online students should submit their assignments online through blackboard as a **SINGLE PDF** file in the designated area before the class starts.

Exams:

There will be two mid-term exams and the final exam.

- Mid-term exams are scheduled for **Feb 22 and April 5, 2018** during the class meeting.
- Final Exam: Date and time are based upon pre-determined University schedule. It is currently listed as **May 10, 2:00–4:30 p.m.**, but check the University schedule for any changes.
- Mid-term and Final exams are closed book; however, a single sheet of 8.5×11 inches paper with relevant formulas is permitted. No solved problems are permitted on the sheet. The formula sheet shall be submitted with the exam upon completion.

Attendance: Attendance for all class sessions is expected, although it will not be recorded as part of the grading process. For the majority of the semester, attendance will not be taken unless a change in grading policy is indicated during the course.

Requirements: Prerequisite: Grade of C or better in CE 2210; Grade of C or better in CE 2313 or concurrent enrollment; Grade of C or better in MATH 3319 or concurrent enrollment.

Grading:

Homework	10%
Mid-Term Exam #1	25% (Feb 22)
Mid-Term Exam #2	25% (April 5)
Final Exam	40% (May 10)
Total	100%

90-100%	A
80-89.5%	B
70-79.5%	C
60-69.5%	D
<60%	F

Students are expected to keep track of their performance throughout the semester and seek guidance from available sources (including the instructor) if their performance drops below satisfactory levels; see “Student Support Services,” below. All the grades will be posted on blackboard. It is student’s responsibility to make sure that his/her grades on blackboard match the grades on the homework and exam papers. Any discrepancy should be reported to the instructor within two weeks after a grade is posted.

Make-up Exams: No make-up exams will be given except for medical or similar circumstances where advanced arrangements are made with the instructor; or in case of medical emergencies with appropriate physician’s note or documentation. Other than above-mentioned circumstances failure to attend the exam session at the scheduled time will constitute a grade of zero in the exam.

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

Grade Grievances: Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current University Catalog.

Blackboard: All handouts, notes, problems, solutions and other information will be posted on Blackboard. It is the responsibility of the student to check the blackboard on a regular basis to access course materials.

Course Schedule

Week	Chapter	Section
1	1- Fundamental Concept	1.1, 1.2, 1.3, 1.6, 1.7, 1.8, 1.9, 1.10
2-4	2- Fluid Statics	2.1, 2.2, 2.3, 2.4, 2.6, 2.7, 2.8, 2.10, 2.11, 2.12, 2.13
5	3- Kinematics of Fluid Motion	3.1, 3.2, 3.3, 3.4
6	Review & Midterm Exam I	
7	4- Conservation of Mass	4.1, 4.2, 4.3, 4.4
8	5- Work and Energy of Moving Fluids	5.1, 5.2, 5.3, 5.4, 5.5
9	Spring Break	
10-11	6- Fluid Momentum	6.1, 6.2
12	Review & Midterm Exam II	
13-14	9- Viscous Flow within Enclosed Surfaces	9.1, 9.3, 9.5
14-15	10- Analysis and Design of Pipe Flow	10.1, 10.2, 10.3, 10.4
16	Review & Final Exam	

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

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

Disability Accommodations: UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including *The Americans with Disabilities Act (ADA)*, *The Americans with Disabilities Amendments Act (ADAAA)*, and *Section 504 of the Rehabilitation Act*. All instructors at UT Arlington are required by law to provide “reasonable accommodations” to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of a **letter certified** by the Office for Students with Disabilities (OSD). Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting: **The Office for Students with Disabilities, (OSD)** www.uta.edu/disability or calling 817-272-3364. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability.

Counseling and Psychological Services (CAPS) www.uta.edu/caps/ or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

Non-Discrimination Policy: *The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos.*

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

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

I pledge, on my honor, to uphold UT Arlington’s tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code in their courses by having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University. Additional information is available at <https://www.uta.edu/conduct/>.

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

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

Student Feedback Survey: At the end of each term, students enrolled in face-to-face and online classes categorized as "lecture," "seminar," or "laboratory" are directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback via the SFS database is aggregated with that of other students enrolled in the course. Students' anonymity will be protected to the extent that the law allows. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law and aggregate results are posted online. Data from SFS is also used for faculty and program evaluations. For more information, visit <http://www.uta.edu/sfs>.

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

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

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

University Tutorial & Supplemental Instruction (Ransom Hall 205): UTSI offers a variety of academic support services for undergraduate students, including: 60 minute one-on-one tutoring sessions, Start Strong Freshman tutoring program, and Supplemental Instruction. Office hours are Monday-Friday 8:00am-5:00pm. For more information visit www.uta.edu/utsi or call 817-272-2617.

The IDEAS Center (2nd Floor of Central Library) offers **FREE** tutoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. Students can drop in, or check the schedule of available peer tutors at www.uta.edu/IDEAS, or call (817) 272-6593.

The English Writing Center (411LIBR): The Writing Center offers **FREE** tutoring in 15-, 30-, 45-, and 60-minute face-to-face and online sessions to all UTA students on any phase of their UTA coursework. Register and make appointments online at <https://uta.mywconline.com>. Classroom visits, workshops, and specialized services for graduate students and faculty are also available. Please see www.uta.edu/owl for detailed information on all our programs and services.

The Library's 2nd floor Academic Plaza offers students a central hub of support services, including IDEAS Center, University Advising Services, Transfer UTA and various college/school advising hours. Services are available during the library's hours of operation. <http://library.uta.edu/academic-plaza>

Librarian to Contact: [Insert the name and contact information – look up here: <http://www.uta.edu/library/help/subject-librarians.php>]

<p>Emergency Phone Numbers: In case of an on-campus emergency, call the UT Arlington Police Department at 817-272-3003 (non-campus phone), 2-3003 (campus phone). You may also dial 911. Non-emergency number 817-272-3381</p>
