Fluid Mechanics, EGN 3353C
Academic Term: Fall 2022

Class Periods: T, period 4 (10:40AM-11:30AM) and R, period 4-5 (10:40AM-12:35PM)
Location: TUR L005

(Modifications to this syllabus may be required during the semester. Any changes to the syllabus will be posted on the course web site and announced in class.)

Instructor:
Name: Kamran Mohseni
Email Address: mohseni@ufl.edu Please allow 48 hours for response. For problem solving, please first try to come to my office hours.
Office Hours: Monday, Wednesday, Friday. from 1:25-1:55 pm and 2:45-3:15pm in room CSE E121
Tuesdays, from 10:15-10:40am and 11:30-12:00 noon in room TUR L005
Thursdays, from 10:15-10:40am and 12:20-12:40 in room TUR L005

Teaching Assistant/Peer Mentor/Supervised Teaching Student:
The MAE department did not assign any teaching assistant/peer mentor/supervised teaching student to this course. Some graders are available for HW grading.

Course Description
Statics and dynamics of incompressible fluids. Application to viscous and inviscid flows. Dimensional analysis. Compressible flow. Credits: 3

Course Pre-Requisites / Co-Requisites
MAC2313 with a minimum grade of C and EGM2511 and (EML3100 or EML3007 or BME3060)

Course Objectives
This course provides an introduction to fluid mechanics. It stresses fundamental engineering science principles applied to fluid mechanical systems. Students will learn the governing integral and differential equations for viscous and inviscid fluids and will apply these equations to internal and external flows. Upon completion of this course, students are expected to have developed a working understanding of the basic theory of incompressible and compressible fluid mechanics. Students will learn problem-solving techniques and have the opportunity to apply these techniques to a variety of problems.

Relation to Program Outcomes (ABET):
The table below is an example. Please consult with your department's ABET coordinator when filling this out.

Outcome	**Coverage***
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	high
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	medium
3. An ability to communicate effectively with a range of audiences	low
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	medium

5. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	Medium

Required Textbooks and Software

- Title: Fundamentals of Fluid Mechanics
- Author: Munson, Young, and Okiishi
- Publication date and edition: 9th ed
- ISBN number 978-1-119-68365

Recommended Materials

- Title: Introduction to Fluid Mechanics
- Author: Fox & McDonald
- Publication date and edition: 10th ed.
- ISBN number: 978-1119721024

Course Schedule

See the table at the end of this file

Attendance Policy, Class Expectations, and Make-Up Policy

1. Attendance: required.
2. No cell phones are allowed during the class time.
3. All HW sets must be submitted online via Canvas, even if you attend the class in person.
4. **Assignments:** Homework will be assigned approximately weekly and it is due at the start of the class period on the day specified. **All homework submission will be done online in Canvas. Late homework will NOT be accepted and will receive a zero.** These rules apply unless advance written notice has been submitted to the instructor for a valid excuse. All homework must follow the format below. Illegible homework is subject to being rejected by the T.A.'s for grading purposes.
5. **Homework Submission Instructions:**
6. All HW sets must be submitted online via Canvas, even if you attend the class in person.

- All homework must be written on standard papers and scanned in PDF format for canvas submission.
- Student's name and UF ID number should be recorded on every page.
- Work should be organized and neat. Assumptions should be clearly stated, appropriate units should be noted on answers and answers should be boxed, underlined or otherwise appropriately labeled. If your answer is not clear you will not receive credit.
- Enough space should be provided between problems to clearly identify each one.
- Numerical answers should be given with an appropriate number of significant digits.
- Unit for any answers must be provided.
- Illegible homework is subject to being rejected by the T.A.'s for grading purposes.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies:
https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

Make-up Policy: Late HW is not accepted. Makeup exams are not normally allowed. If you cannot attend an exam, you must contact the instructor prior to the exam with proper documentation for the reason. Arrangements will be made for students on a case by case basis and based on proper and justify documentation. (Failure to contact the instructor prior to the exam will result in a zero on that exam.).

Evaluation of Grades

There are three equally weighted exams during the semester. There is no final exam. The dates and time for the exams are:

- Exam I on Monday September 26, 8:20-10:10 PM. Location TBD.
- Exam II on Monday October 31, 8:20-10:10PM. Location TBD.
- Exam III on Wednesday December 7, 8:20-10:10PM. Location TBD

Please do record the exam date and time on your calendar. There will be no retakes for the exams except in very special cases such as medical emergency. In such cases, formal letter from UF medical services is required.

If a student feels that there is an error in the grading, it should be brought to the attention of the instructor within one weeks after the graded material is handed back. Scores will not be reconsidered beyond the one-week period.

Assignment	**Total Points**	**Percentage of Final Grade**
Homework Sets	10 each	10%
Exam I	30	30%
Exam II	30	30%
Exam III	30	30%
	100	100%

Grading Policy

The following is given as an example only.

Percent	**Grade**	**Grade Points**
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

In-Class Recording
Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

University Honesty Policy
UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Conduct Code (https://sccr.dso.ufl.edu/process/student-conduct-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment
The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:
- Your academic advisor or Graduate Program Coordinator
- Jennifer Nappo, Director of Human Resources, 352-392-0904, jpennacc@ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use
All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy
There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: https://registrar.ufl.edu/ferpa.html

Campus Resources:

Health and Wellness

U Matter, We Care:
Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: https://counseling.ufl.edu, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence
If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

COVID-19
- You are expected to wear approved face coverings at all times during class and within buildings even if you are vaccinated.
- If you are sick, stay home and self-quarantine. Please visit the UF Health Screen, Test & Protect website about next steps, retake the questionnaire and schedule your test for no sooner than 24 hours after your symptoms began. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 (or email covid@shcc.ufl.edu) to be evaluated for testing and to receive further instructions about returning to campus.
- If you are withheld from campus by the Department of Health through Screen, Test & Protect, you are not permitted to use any on campus facilities. Students attempting to attend campus activities when withheld from campus will be referred to the Dean of Students Office.
- UF Health Screen, Test & Protect offers guidance when you are sick, have been exposed to someone who has tested positive or have tested positive yourself. Visit the UF Health Screen, Test & Protect website for more information.

- Please continue to follow healthy habits, including best practices like frequent hand washing. Following these practices is our responsibility as Gators.

Academic Resources

E-learning technical suppor*t*, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling; https://career.ufl.edu.

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

Student Complaints Campus*:* https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/;https://care.dso.ufl.edu.

On-Line Students Complaints*:* http://www.distance.ufl.edu/student-complaint-process.

ENG 3353C Fluid Mechanics *Tentative* Schedule				
Week	**Dates**	**Topics**	**Reading**	**Assignments**
1	Aug 22	• Course introduction • Fundamental concepts • Pressure and hydrostatic forces	Chapter 1 & 2	
2	Aug 29	• Hydrostatic forces (continued) • Manometers • Buoyancy, stability • Translational & rotational acceleration	Chapter 2	HW 1
3	Sept 5	• F=ma along and normal to a streamline • Bernoulli equation	Chapter 3	HW 2
4	Sept 12	• Static, stagnation, dynamic, total pressure • Pitot tube • Restrictions on use of the Bernoulli eq.	Chapter 3	HW 3
5	Sept 19	• Fluid Kinematics • Velocity and acceleration fields • Material derivative	Chapter 4	
6	Sept 26	• Reynolds Transport	Chapter 4	HW 4 **EXAM I**
7	Oct 3	• Finite Control Volume • Mass conservation • Linear and angular momentum conservation	Chapter 5	HW 5
8	Oct 10	• Angular momentum conservation • Energy conservation • Differential Analysis of Fluid Flow • Differential form of mass conservation	Chapter 5 & 6	HW 6
9	Oct 17	• Differential form of momentum and energy conservation • Inviscid flows	Chapter 6	HW 7
10	Oct 24	• Potential flow • Solutions to laminar, viscous, incompressible flows	Chapter 6	
11	Oct 31	• Dimensional analysis and similitude	Chapter 7	HW 8 **EXAM II**
12	Nov 7	• Viscous pipe flow;	Chapter 8	HW 9
13	Nov 14	• laminar and turbulent • External flows • Laminar and turbulent boundary layer • Lift and drag	Chapter 9	HW 10
14	Nov 21	• Compressible flows	Chapter 11	HW 11 Thanks giving
15	Nov 28	• Compressible flows continued • Normal shock • Isentropic flow	Chapter 11	HW 12
16	Dec 5	• Review		**Exam III**