Fluid Mechanics
(With Laboratory Kits & Egypt Virtual Exchange)

EGN 3353C - Section 11728 (12B7)
Class Periods: M, W, F, Period 3, 9:35 – 10:25am
Location: Williamson Hall, Room 0100
Academic Term: Spring 2026

Last Updated 1/7/2026

EGN3353C is a dynamic course due to deployment of educational lab kits and virtual exchange with an international partner institution. Modifications to this syllabus may be required during the semester. Any changes to the syllabus will be posted on the course MS Teams site and announced in class.

Instructor:
Name: Matthew J. Traum, Ph.D., F.ΣΞ
Email Address: mtraum@ufl.edu
Office Phone Number: (352) 294-6897
Office Hours: Tuesdays, Period 8: 3:00 – 3:50pm, MAE-C-103; and by appointment, https://ufl.zoom.us/j/4748729312

Teaching Assistant/Peer Mentor/Supervised Teaching Student:
Please contact through the course MS Teams Channel to arrange meetings

- Nicole "Nikki" Kershner, nkershner@ufl.edu, Graduate Assistant – Research
  Office Hours: TBA, https://ufl.zoom.us/j/93899876869
- Jackson Sammartino, j.sammartino@ufl.edu, Post-Graduate Learning Assistant
  Office Hours: TBA, https://ufl.zoom.us/j/4748729312
- Carlos Rios, rioscarlos@ufl.edu, Grader & Graduate Learning Assistant
  Office Hours: Tuesdays, 3:00 – 3:50pm, MAE-C-103, https://ufl.zoom.us/j/4748729312

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
MAC 2313 with a minimum grade of C, EGM 2511 and (EML 3100 or EML 3007 or BME 3060)

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.

Materials and Supply Fees
$50.00 (Verified 1/7/2026)

Relation to Program Outcomes (ABET):

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	Low
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	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative environment, establish goals, plan tasks, and meet objectives	
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

Required Textbooks, Software, and Lab Kits

1. Andrew L. Gerhart, John I. Hochstein, Philip M. Gerhart, "Munson, Young, and Okishii's Fundamentals of Fluid Mechanics," 9th Edition, Wiley, ISBN-9781119598114
   - This course participates in UF All Access, which is a program designed to provide the most affordable option for students: https://www.bsd.ufl.edu/allaccess. The required course material is delivered digitally through WileyPlus, containing a fully searchable e-text and the required homework for this course. Students purchase an access code at a discounted price through UF All Access.
   - This link authorizes the cost of the access code to be charged directly to each student's UF financial account.

2. Educational Fluids Laboratory Kits will be provided to enrolled students during the semester to complete hands-on assignments and experiments.

Recommended Materials

1. "Less Boring Lectures" YouTube channel, A. Rubiano [Free To Access]: https://www.youtube.com/c/LessBoringLectures

2. C. C. Ngo and K. C. Gramol, "Multimedia Engineering Fluid Mechanics," University of Oklahoma Engineering Media Lab, 2019 [Free OER Access]: https://www.ecoursesbook.com/cgi-bin/eBook.cgi?topic=fl

Required Computer

Students must have their own computer whose specifications meet or exceed the capabilities recommended by the University (https://it.ufl.edu/get-help/student-computer-recommendations/), required by the College (https://www.eng.ufl.edu/students/advising/fall-semester-checklist/computer-requirements/), and required by the MAE Department (https://mae.ufl.edu/academics/prospective/undergraduate/computer-requirements/).

Important Dates

March 9, 2026: In-Person Midterm Exam (8:20 – 10:10pm, Turlington Hall L007)
April 29, 2026: In-Person Final Exam (3:00pm – 5:00pm, Williamson Hall 0100)

Attendance Policy, Class Expectations, and Make-Up Policy
It is important to attend class regularly. If you miss a class, you are responsible for acquiring notes or other resources covered. The Teaching Team will endeavor to make all course materials available through the Learning Management System. However, some experiences cannot be replicated asynchronously. Students are held responsible for knowledge of all scheduling and policy announcements made in class. Excused absences must be consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/) and require appropriate documentation and advance communication with the instructor.

Policies on Sources of Truth, Communication Channels, Use of AI, TurnItIn, Laboratory Access, & Assignment Grade Disputes:
1. Online platforms, notably GroupMe, provide venues for course discussion that exclude the instructor and EGN3353C Teaching Team. Discussion platforms beyond UF-sanctioned Learning Management Systems will not be monitored or curated by the instructor. Thus, information propagated through these platforms can be incorrect. It is each student's responsibility to verify information obtained from these external discussion services with reputable reference sources or UF-affiliated subject matter experts. Erroneous information obtained from external discussion platforms used in EGN3353C will be marked incorrect on graded assignments and assessments.

2. The EGN3353C MS Teams General Channel is shared by the whole class and the Teaching Team for information dissemination. Individuals or teams who post comments or files not relevant to EGN3353C in the General Channel will be penalized one letter grade for each infraction.

3. Students taking this course consent to allowing all assignments to be submitted by the instructor on their behalf for textual similarity review to Turnitin.com via the Canvas learning management system for the detection of plagiarism and unattributed AI use. All submitted materials will be added as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site.

4. Use of Generative AI is accepted and encouraged in EGN3353C provided a} it occurs exclusively through UF's NaviGator Chat portal (https://it.ufl.edu/ai/navigator-chat/) and b} AI use is clearly identified and attributed in all submissions. AI generated content created outside the UF NaviGator Chat platform and/or that is not clearly identified and attributed is cheating under the UF Honor Code, section (a)2, https://regulations.ufl.edu/wp-content/uploads/2021/12/4-040_2021-12-06.pdf :

"(a) Cheating. A Student shall not use or attempt to use unauthorized materials or resources in any academic activity for academic advantage or benefit. Cheating includes but is not limited to:
2. Using any materials or resources, through any medium, which the Faculty has not given express permission to use and that may confer an academic benefit to the Student."

Unattributed material suspected of being AI-generated will be vetted through a detection algorithm. If this tool deems the material to be AI-generated, a 0 will be given on the suspected assignment.

5. EGN3353C students receive priority access to and use of the MAE-C-010 design lab space from 9:35 to 10:25am on Mondays to set up and run lab kit experiments. Outside these hours, other users including senior design class and UF MAE Design Teams have priority use of the space.

6. If an individual or group has as assignment grading dispute, the issue must first be addressed with the Teaching Team member who did the grading. If individuals/groups can show where grading errors occurred, Teaching Team members will correct grades accordingly. Only after communication with a Teaching Team member fails to resolve a grading dispute may the individual/group bring the dispute to an instructor.

7. EGN3353C includes high-stakes exams announced in advance in the syllabus and schedule. Students missing exams without an excused absence receive 0 on the exam, and no makeup will be given. Students with an excused absence (e.g., a doctor's note for illness) must schedule a makeup exam with the instructor within one week of the missed exam. Failure to appear at a scheduled makeup exam, even if due to an excused absence, results in a 0 on the exam, and no additional makeup will be given.

8. Grade disputes must be communicated to the Teaching Team in writing within 7 calendar days of the assignment's return to students. Any grade disputes lodged after the 7-day window will be ignored.

Laboratory Safety:

EGN3353C is a laboratory course. While lab kits enable students to conduct experiments remotely, students can access MAE-C-010 during the course's priority access time if they wish to run experiments in a brick-and-mortar setting. To ensure safety of all participants, appropriate attire, personal protective equipment (PPE), and common-sense behavior are always required in the lab. Failure to follow lab safety rules will result in students' immediate removal from the lab and forfeiture of course points at the instructor's discretion.

1. Lab Attire
- No open-toed shoes are permitted in the lab.
- No shorts are permitted in the lab.

2. PPE
- Sanitizing supplies are available in the lab to wipe down desks prior to sitting and at the end of class if needed.
- Eye protection is required in the laboratory for proximity to hands-on activities.
- Respiratory protection is required in the laboratory for proximity to activities producing harmful fumes.
- Ear protection is required in the laboratory for proximity to activities 85 decibels or louder.

3. Behavior
- Disruptive or destructive behavior will not be tolerated.
- No food or drink is allowed in the machine shop, 3D print farm, or metrology areas of the lab.
- Food & drink are allowed at work desks, in conference rooms, at the coffee bar / kitchen area

4. Emergencies
- Inform Teaching Team members immediately of injury or exposure.

Evaluation of Grades

Assignment	Points	Percent
Individual Assignments		
Informed Consent Forms & Media Waiver	1	0.5
Local Affinity Survey	1	0.5
IntCRIT & IntComm Pre/Post-VE Surveys	8	4.0
Stevens Initiative Post-VE Survey	4	2.0
Pre/Post Resume Assignments	4	2.0
LinkedIn Profile AI Evaluation	1	0.5
Pick Up Midterm Exam	1	0.5
Homework (15X, Drop 2)	26	13.0
Quizzes & Exams		
Video Explanation Quizzes (4X)	36	18.0
Midterm Exam	29	14.5
Final Exam	40	20.0
Virtual Exchange & Lab Reports		
VE Intro Workshop Participation	1	0.5

Icebreaker Participation	1	0.5
Padlet Self Introduction	2	1.0
Padlet World Dam Post	3	1.5
Joint Written Lab Report - Hydrostatic Column	8	4.0
Joint Video Lab Report - Pump Curve	8	4.0
Joint Video Lab Report - Torricelli Fountain	8	4.0
Photo / Screen Capture (3X)	6	3.0
Group Peer Evaluation	7	3.5
Lab Kit Inventory & Return	5	2.5
Total	**200**	**100**

Any change in grading evaluation will be posted on the course MS Teams site.

Grading Policy

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

Grade Definitions
A : Student demonstrated course mastery in all regards and with distinction.
A- : Student performed outstandingly in all regards and is exceptional.
B+ : Student performed with excellence in the course.
B : Student showed high command of course content.
B- : Student has done a commendable job with course content.
C+ : Student demonstrated ample grasp of course content.
C : Student demonstrated adequate grasp of course content.
C- : Student demonstrated fair grasp of course content.
D+ : Student met fair course expectations.
D : Student attained below average expectations.
D- : Student met minimal expectations to pass.
E : Student failed to meet minimal expectations to pass.

Academic Policies & Resources
To support consistent and accessible communication of university-wide student resources, instructors must include this link to academic policies and campus resources: https://go.ufl.edu/syllabuspolicies. Instructor-specific guidelines for courses must accommodate these policies.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online. Students can complete evaluations in three ways:

1) The email they receive from GatorEvals,
2) Their Canvas course menu under GatorEvals, or
3) The central portal at https://my-ufl.bluera.com

Guidance on how to provide constructive feedback is available at https://gatorevals.aa.ufl.edu/students/ . Students will be notified when the evaluation period opens. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/ .

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 Honor 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. Furthermore, students are obligated to report any condition that facilitates academic misconduct to appropriate personnel. Please refer questions or concerns to the course instructor.

Commitment to a Positive Learning Environment

The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University's core values.

If you feel like your performance in class is being impacted, please contact your instructor or any of the following:

- Your academic advisor or Undergraduate Coordinator
- HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
- Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@ufl.edu

Sponsorship Acknowledgement

Educational laboratory kits deployed in this course are supported by the J. Christopher Stevens Virtual Exchange Initiative (JCSVEI). JCSVEI is a U.S. Department of State's Bureau of Educational and Cultural Affairs program administered by the Aspen Institute.


Stevens Initiative


UF Herbert Wertheim College of Engineering UNIVERSITY of FLORIDA

"Nature always tends to act in the simplest way."

--D. Bernoulli

Course Schedule

Week #	Date	Day	Lecture Content	Textbook Reading	Assignment Due
1	12-Jan	M	Introduction, Mechanical Pressure Measurement	2.7	
	14-Jan	W	Experimental Techniques: Error Analysis, & Error Propagation	Cimbala (2011) Experimental Uncertainty Analysis	
	16-Jan	F	Metrology, Hydrostatic Measurement, Standard Atmosphere, Pitot-Static Probe, Flow Metering	2.3, 2.4, 2.5, 2.6, 3.5, 3.6.3, 8.6	HW#1: Pressure Gauge Teardown & Human Reaction Time
2	19-Jan	M	**No Class** **Martin Luther King, Jr. Holiday**		
	21-Jan	W	Dimensional Analysis, Buckingham-Pi Theorem	7.1, 7.2, 7.3, 7.4, 7.5	
	23-Jan	F	Nondimensional Equations & Numbers, Modeling with Similarity	7.6, 7.7, 7.8, 7.9	• Entry Resume + AI Score • LinkedIn Profile AI Evaluation • Informed Consent Forms • Media Waiver • Local Affinity Survey • IntCRIT & IntComm Pre-VE Surveys
3	26-Jan	M	Fluid Properties: Pressure, Compressibility, Vapor Pressure, Surface Tension	1.5, 1.7, 1.8, 1.9, 2.1, 2.2	• HW#2: Dimensional Analysis & Similarity
	28-Jan	W	Fluid Properties: Density & Viscosity, No Slip Condition	1.4, 1.6	• Quiz #1
	30-Jan	F	Forces on Submerged Objects & Surfaces, Pressure Prism	2.8, 2.9, 2.10	
4	2-Feb	M	Buoyancy & Stability (Asynchronous Video - Career Showcase Prep)	2.11	• HW#3: Fluids Properties
	4-Feb	W	Fluids in Rigid Body Motion (Asynchronous Video - Attend Career Showcase)	2.12	
	6-Feb	F	Free Jets, Cavitation, Eulerian vs. Lagrangian Reference Frames, Velocity & Acceleration Field	3.6, 4.1, 4,2	
5	9-Feb	M	Control Volume, Control System, RTT: Mass Conservation	4.3, 4.4, 5.1	• HW#4: Hydrostatic Pressure & Floating Object Stability
	11-Feb	W	RTT: Linear Momentum Conservation	5.2.1, 5.2.2	• Quiz #2
	13-Feb	F	RTT: Moment-of-Momentum	5.2.3, 5.2.4	
6	16-Feb	M	RTT: Energy Conservation	5.3.1, 5.3.2	• HW#5: Reynolds Transport Theorem - Mass Conservation
	18-Feb	W	Bernou-LIES Equation; Static, Stagnation, Dynamic, and Total Pressure	3.1, 3.2, 3.3, 3.4, 3.5, 3.8, 5.3.3	
	20-Feb	F	Application of the Energy Equation to Nonuniform Flows	5.3.4, 5.3.5	
7	23-Feb	M	Differential Analysis - Acceleration & Mass	6.1, 6.2	• HW#6: RTT - Momentum & Energy Conservation
	25-Feb	W	Differential Analysis -Euler's Equations, Navier Stokes Equations	6.3, 6.4, 6.8	• Quiz #3
	27-Feb	F	Navier-Stokes Solutions & Velocity Profiles	6.9	
8	2-Mar	M	Internal Flow Reynolds Number Regimes, Entry Length, Fully Developed Flow, Laminar Pipe Flow	8.1, 8.2	• HW#7: Bernoulli's Eq. & RTT - Moment of Momentum Cons.
	4-Mar	W	Turbulent Pipe Flow, Moody Diagram, Turbulent Boundary Layer	8.3, 8.4.1	
	6-Mar	F	Minor Losses, Multi-Pipe Systems, Non-Circular Ducts	8.4.2, 8.4.3, 8.5	
9	9-Mar	M	Midterm Exam Review Session		• HW#8: Differential Analysis
	9-Mar	M	**Midterm Exam: 8:20 - 10:10pm, Location Turlington Hall L007**		
	11-Mar	W	Drag Coefficient on Cylinders, Spheres & Bodies	9.1, 9.2.6, 9.3	• VE Intro Attendance
	13-Mar	F	Introduction to Virtual Exchange & Guest Lecture		• HW#9: Euler's & Navier Stokes Equations
10	16-Mar	M	**No Class** **Spring Break**		
	18-Mar	W	**No Class** **Spring Break**		
	20-Mar	F	**No Class** **Spring Break**		
11	16-Mar	M	Virtual Exchange: Introductions		• HW#10: Viscous Flow, Reynolds Number Regimes • VE Icebreaker Participation
	18-Mar	W	Boundary Layer Development	9.2.1, 9.2.2, 9.2.3, 9.2.4, 9.2.5	• Pick Up Midterm Exam
	20-Mar	F	Flow Over Plates & Airfoil Wings	9.4	• Padlet Self Introduction
12	23-Mar	M	Virtual Exchange: Hydrostatic Standpipe		• HW#11: Major & Minor Losses
	25-Mar	W	Froude Number, Surface Waves, Wave Speed, Energy, Uniform Flow	10.1, 10.2, 10.3, 10.4	• Quiz #4
	27-Mar	F	Gradually/Rapidly Varied Flow, Hydraulic Jump	10.5	• Padlet World Dam Assignment
13	30-Mar	M	Virtual Exchange: Pump Curve		• HW#12: External Flow
	1-Apr	W	Weirs & Gates	10.6	
	3-Apr	F	Stagnation, Mach Number & Shockwaves	11.1, 11.2, 11.3, 11.4, 11.5	• Joint Written Lab Report - Hydrostatic Column • Built Lab Kit Screen Capture 1
14	6-Apr	M	Virtual Exchange: Torricelli Fountain		• HW#13: Open Channel Flow
	8-Apr	W	Isentropic Flow, Critical State, Choked Flow, & Rayleigh Pitot-Tube	11.6	
	10-Apr	F	Compressible Flow with Area Change, Converging/Diverging Nozzle	11.7	• Joint Video Lab Report - Pump Curve • Built Lab Kit Screen Capture 2
15	13-Apr	M	Virtual Exchange: Farewells & Survey		• HW#14: Compressible Flow
	15-Apr	W	Duct Flow with Friction, Fanno Line, Rayleigh Flow	11.8, 11.9	• Virtual Exchange Group Peer Evaluation
	17-Apr	F	2-D Compressible Flow, External Compressible Flow	11.11, 11.12	• IntCRIT & IntComm Post-VE Surveys • Joint Video Lab Report - Torricelli Fountain • Built Lab Kit Screen Capture 3 • SI Post-VE Survey
16	20-Apr	M	Turbomachine Design: Windmills, Fans, & Turbines	12.1, 12.2, 12.3, 12.7, 12.8	• Exit Resume + AI Score • Lab Kit Inventory & Return
	22-Apr	W	Turbomachine Design: Pumps & Compressors	12.4, 12.5, 12.6	• HW#15: Turbomachine Design
	24-Apr	F	**No Class** **Reading Day**		
17	29-Apr	W	**Final Exam: 3-5pm, Location: Williamson Hall 0100**		