

# Fluid Mechanics (With Laboratory & Egypt Virtual Exchange)

EGN 3353C - Section 20640 (123A)  
**Class Periods:** M, W, F, Period 3, 9:35 – 10:25am  
**Location:** Florida Gym 0270  
**Academic Term:** Fall 2025

*Last Updated 8/18/2025*

*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 Canvas page & MS Teams site e and announced in class.*

## **Instructor:**

Name: Matthew J. Traum, Ph.D., F.ΣΕ  
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Office Phone Number: (352) 294-6897  
Office Hours: Thursdays, 10:40 – 11:59am, MAE-C-103; and by appointment



## **Teaching Assistant/Peer Mentor/Supervised Teaching Student:**

Please contact through the course MS Teams Channel to arrange meetings

- Nicole “Nikki” Kershner, [nkershner@ufl.edu](mailto:nkershner@ufl.edu), Graduate Assistant – Research  
Office Hours: Mondays, 10:40 – 11:30am, Location TBA
- Jackson Sammartino, [j.sammartino@ufl.edu](mailto:j.sammartino@ufl.edu), Grader & Graduate Learning Assistant  
Office Hours: Thursdays, 10:40 – 11:59am, MAE-C-103
- Chadi Rachid, [c.rachid@ufl.edu](mailto:c.rachid@ufl.edu), Post-Graduate Learning Assistant  
Office Hours: Wednesdays: 1:55 - 2:45pm, Location TBA

## **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**

None

## **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**

October 13, 2025: In-Person Midterm Exam (8:20 – 10:10pm, Location TBA)

December 10, 2025: In-Person Final Exam (10:00am – 12:00noon, Location TBA)

### **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](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 an 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.

### **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 an in-person 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
<b>Individual Assignments</b>		
Informed Consent Forms & Media Waiver	2	1.0
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	6	3.0
Homework (13X, Drop 2)	22	11.0
<b>Quizzes &amp; Exams</b>		
Video Explanation Quizzes (3X)	30	15.0
Midterm Exam	30	15.0
Final Exam	46	23.0
<b>Virtual Exchange &amp; Lab Reports</b>		
VE Intro Workshop Participation	1	0.5
Icebreaker Participation	1	0.5
Padlet Self Introduction	2	1.0
Padlet World Dam Post	5	2.5
Joint Written Lab Report - Hydrostatic Column	10	5.0
Joint Video Lab Report - Pump Curve	10	5.0
Joint Video Lab Report - Torricelli Fountain	10	5.0
Photo / Screen Capture (3X)	6	3.0
Lab Kit Inventory & Return	6	3.0
<b>Total</b>	<b>200</b>	<b>100</b>

*Any changes in evaluation of grades will be posted on the course Canvas page & MS Teams site and announced in class.*

## 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.a.ufl.edu/students/>. Students will be notified when the evaluation period opens. Summaries of course evaluation results are available to students at <https://gatorevals.a.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](mailto:student-support-hr@eng.ufl.edu)
- Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, [pld@ufl.edu](mailto: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	Synchronous Content	Assignment Due
1	22-Aug	F	Course Introduction, Pressure Gauge Tear Down	
2	25-Aug	M	Experimental Techniques & Error Analysis (Error Propagation)	• HW#1
	27-Aug	W	Error Analysis (Statistical Approach)	
	29-Aug	F	Dimensional Analysis, Buckingham-Pi Theorem	<ul style="list-style-type: none"> <li>• Entry Resume + AI Score</li> <li>• Informed Consent Forms</li> <li>• Media Waiver</li> <li>• Local Affinity Survey</li> <li>• IntCRIT &amp; IntComm Pre-VE Surveys</li> </ul>
3	1-Sep	M	Nondimensional Equations & Numbers, Modeling with Similarity	• Pressure Gauge Teardown
	3-Sep	W	Fluid Properties: Pressure, Compressibility, Surface Tension	• HW#2
	5-Sep	F	Fluid Properties: Viscosity & Density	• Quiz #1
4	8-Sep	M	Absolute & Gauge Pressure, Pressure Variation in Static Fluids	• HW#3
	10-Sep	W	Hydrostatic Metrology (Virtual - Traum at NACE)	
	12-Sep	F	Forces on Submerged Objects & Surfaces	
5	15-Sep	M	Buoyancy, Stability, Fluids in Translational/Rotational Acceleration	• HW#4
	17-Sep	W	Reynolds Transport Theorem: Eulerian vs. Lagrangian Reference Frames	• Quiz #2
	19-Sep	F	Reynolds Transport Theorem - Mass Conservation	
6	22-Sep	M	Reynolds Transport Theorem - Linear Momentum Conservation	• HW#5
	24-Sep	W	Reynolds Transport Theorem - Energy Equation	
	26-Sep	F	Bernoulli's Equation (Energy Equation without Losses)	
7	29-Sep	M	Bernoulli's Equation Examples	• HW#6
	1-Oct	W	<b>No Class</b> <b>Career Showcase</b>	• Quiz #3
	3-Oct	F	Reynolds Transport Theorem - Angular Momentum Conservation	
8	6-Oct	M	Differential Analysis - Acceleration Field & Mass Conservation	• HW#7
	8-Oct	W	Differential Analysis - Linear & Angular Momentum Conservation	
	10-Oct	F	Euler's Equation & Navier-Stokes Equation	
9	13-Oct	M	Midterm Exam Review Session	• HW#8
	13-Oct	M	<b>Midterm Exam: 8:20 - 10:10pm, Location Pugh Hall 170</b>	
	15-Oct	W	Introduction to Virtual Exchange & Guest Lecture	• VE Intro Attendance
10	17-Oct	F	<b>No Class</b> <b>Homecoming</b>	
	20-Oct	M	Virtual Exchange: Introductions	• HW#9
	22-Oct	W	Viscous Flow in Pipes & Ducts, Reynolds Number Regimes	• VE Icebreaker Participation
11	24-Oct	F	Boundary Layer, Fully Developed Flow	• Padlet Self Introduction
	27-Oct	M	Virtual Exchange: Hydrostatic Standpipe	• HW#10
	29-Oct	W	Internal Flow, Major Losses, Moody Diagram, Haaland Equation	
12	31-Oct	F	Minor Losses, Multi-Pipe Systems	• Padlet World Dam Assignment
	3-Nov	M	Virtual Exchange: Pump Curve	• HW#11
	5-Nov	W	Design of Pipe Systems, Non-Circular Ducts	
13	7-Nov	F	External Flow - External Flow - Boundary Layer Development	<ul style="list-style-type: none"> <li>• Joint Written Lab Report - Hydrostatic Column</li> <li>• Built Lab Kit Screen Capture 1</li> </ul>
	10-Nov	M	Virtual Exchange: Torricelli Fountain	• HW#12
	12-Nov	W	External Flow - Drag on Immersed Bodies (Virtual - Traum at PitchGNV)	
14	14-Nov	F	External Flow - Flow Over Plates	<ul style="list-style-type: none"> <li>• Joint Video Lab Report - Pump Curve</li> <li>• Built Lab Kit Screen Capture 2</li> </ul>
	17-Nov	M	Virtual Exchange: Farewells & Survey	• HW#13
	19-Nov	W	Compressible Flow, Speed of Sound, Shock Waves	
15	21-Nov	F	Adiabatic & Isentropic Steady Flow (Virtual - Traum at MIT)	<ul style="list-style-type: none"> <li>• IntCRIT &amp; IntComm Post-VE Surveys</li> <li>• Joint Video Lab Report - Torricelli Fountain</li> <li>• Built Lab Kit Screen Capture 3</li> <li>• SI Post-VE Survey</li> </ul>
	24-Nov	M	<b>No Class</b> <b>Thanksgiving</b>	
	26-Nov	W	<b>No Class</b> <b>Thanksgiving</b>	
16	28-Nov	F	<b>No Class</b> <b>Thanksgiving</b>	
	1-Dec	M	Final Exam Review Session or Hurricane Makeup Day	<ul style="list-style-type: none"> <li>• Exit Resume + AI Score</li> <li>• Lab Kit Inventory &amp; Return</li> </ul>
	3-Dec	W	Final Exam Review Session or Hurricane Makeup Day	
17	5-Dec	F	<b>No Class</b> <b>Reading Day</b>	
	10-Dec	W	<b>Final Exam: 10am-12noon, Location TBA</b>	