

## The Navier-Stokes Equations

EAS 6939 Class# 12858, Spring 2020, M W F, Sixth period, 12:50 PM – 1:40 PM, MCCB 1108

### Professor

Assistant Professor S. A. E. Miller, Ph.D.  
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MAE-A 306, Gainesville, FL 32611, PO Box 116250  
Preference - please contact through the canvas website <https://ufl.instructure.com>

### Office Hours

M & W, 9:30–10:30 AM, MAE-A 306 or via confirmed written appointment

### Teaching Assistants

N/A

### Course Objectives

The student will understand the history, physical meaning, and contemporary challenges within the field of theoretical fluid dynamics and turbulence.

### Course Description

Course catalogue: Navier-Stokes Equations (NSE) History, derivation, physical meaning, classical solutions, stability, dynamical systems, existence, uniqueness, regularity, scales, ladder results, dissipation rates, Serrin's blowup, capacity approaches, mild solutions (Lebesgue, Sobolev, Besov, Morrey, BMO, Koch, Tataru), weak solutions, stochastic NSE, the Russian school, and invariant measures. (Credits 3)

### Course Pre-Requisites / Co-Requisites

EGM 6812 Fluid Dynamics I or consent of professor. An appreciation of advanced mathematics.

### Recommended Textbooks and/or Software

- A complete set of course notes will be provided by the professor.
- There are no required textbooks for the class.

### Supplemental Materials

- All supplementary material will be provided through the course website.

### Materials and Supply Fees

None.

### Important Dates

N/A

### Attendance Policy

- It is required that students attend class.
- Required statement by the University of Florida: Excused absences are consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation.

### Class Expectations

- The student is solely responsible for their education. The professor is the guide to their understanding of the field.
- Cell phones, laptops, etc.: Under no circumstances will devices be used in the classroom.

### Policy on Deadlines

- Late submission of class material is not accepted.
- If a tragedy has occurred then instructor notifications are required. See <https://care.dso.ufl.edu/instructor-notifications> for details. Note that, “Professors have the right to accept or reject the notification.”

## Evaluation of Grades and Grading Policy

### Course Grade Evaluation Criteria

Student grades are derived based upon class participation and class attendance. Let  $N$  be the number of classes taught in a semester. Let  $T$  be the number of times a student attended class. Let  $P$  be the percentage of classes that the student participates. Participation is the act of being an active learner, being present, asking questions, and making comments in class. The percentage grade is derived as  $85T/N + 15P/N$ . The final grade is assigned on the straight scale: 4.00 (A) → [93.33, 100.00], 3.67 (A-) → [90.00 to 93.33), 3.33 (B+) → [86.67 to 90.00), 3.00 (B) → [83.33 to 86.67), 2.67 (B-) → [80.00 to 83.33), 2.33 (C+) → [76.67 to 80.00), 2.00 (C) → [73.33 to 76.67), 1.67 (C-) → [70.00 to 73.33), 1.33 (D+) → [66.67 to 70.00), 1.00 (D) → [63.33 to 66.67), 0.67 (D-) → [60.00 to 63.33), and 0.00 (E) → [00.00 to 60.00). Final grades are rounded to the nearest hundredths place before assignment. At the professor’s discretion, the final course grades may be curved and all students receive higher grades.

## UF Graduate School Policy

Letter grades of C-, D+, D, D- or E are not considered passing at the graduate level. Although the grade points associated with these letter grades are included in grade point average calculations, courses with these grades will not be credited towards graduation. Also, grades of B-, C+ or C count toward a graduate degree if an equal number of credits in courses numbered 5000 or higher have been earned with grades of B+, A- and A, respectively. Further explanation of graduate grading policies can be found at <http://gradcatalog.ufl.edu/content.php?catoid=12&navoid=2750#grades>.

## Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

## Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/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://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the professor or TAs in this class.

**Health and Wellness**

- U Matter, We Care: If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) or 352-392-1575 so that a team member can reach out to the student.
- Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 911 for emergencies.
- Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161.
- University Police Department at 392-1111 (or 911 for emergencies), or <http://www.police.ufl.edu/>