ME 6601 – Graduate Introduction to Fluid Mechanics

Course Syllabus

Fall 2026
Sections: B, Q
Last Updated: April 1, 2026

Instructor Information

Instructor: David L. Hu
Office: Love 124
Email: hu@me.gatech.edu
General Questions: Homework questions should be posted to the class GroupMe
Private Questions: Email or GroupMe DM

Office Hours:

- Monday & Wednesday, 11:00 am – 12:00 pm (Love 124)
- Tuesday & Thursday, 7:30 pm (online via Zoom)
  If groups are large, meetings may move to the Love Building second-floor atrium.

Lecture Schedule:

- Monday & Wednesday, 9:30–10:45 am
- Ford L1116

Online Class: Zoom link available on Canvas (Media Gallery)

General Course Information

Course Description

This course provides a graduate-level introduction to fluid mechanics with emphasis on continuum mechanics, conservation laws, tensor formulation, and analytical solutions of the Navier–Stokes equations. Topics include kinematics, stress, conservation of mass, momentum, angular momentum, and energy, dimensional analysis, unidirectional and irrotational flows, potential flow, lubrication theory, and Stokes flow. The course combines lectures, homework,

quizzes, journal club discussions, and a course project to develop physical intuition, mathematical rigor, and research readiness in fluid mechanics.

Course Objectives / Learning Outcomes

Students completing this course will be able to:

- Explain fluid mechanics problems physically
- Start and complete fluid mechanics problems mathematically and present concise explanations
- Use tools of fluid mechanics including dimensional arguments, velocity–pressure relations, control-volume analysis, and differential formulations
- Check solutions for correctness and physical plausibility

Prerequisites

No formal prerequisites. Students are expected to be comfortable with multivariable calculus, ordinary and partial differential equations. Taking Classical Math Methods in Engineering (MATH 4581) is recommended.

Required and Suggested Course Materials

Class Notes and Media

- Lecture notes (OneNote)
- 2023 recorded lectures (YouTube playlist)
- 2023 lecture notes archive
- Journal club and course project signup spreadsheets

Suggested Textbooks

- Leal, *Advanced Transport Phenomena*
- Panton & Andreopoulos, *Incompressible Flow*
- Acheson, *Elementary Fluid Dynamics*
- Faber, *Fluid Dynamics for Physicists*
- Whitaker, *Fundamental Principles of Heat Transfer*

Advanced Texts

- Batchelor, *An Introduction to Fluid Dynamics*
- Landau & Lifshitz, *Fluid Mechanics*
- Tritton, *Physical Fluid Dynamics*

Grading Policy and Weighting

Component	Weight
Quizzes	50%
Course Project	20%
Homework	20%
Participation (journal club, attendance, engagement)	10%
Total	**100%**

Final grades are generally not curved.
(90–100 = A, etc.)

Attendance Policy

Attendance is expected and tracked. Participation credit is earned through active engagement during lectures, journal club, and preparedness for class and office hours.

Additional Criteria for Successful Completion

To complete the course successfully, students must:

- Complete all homework assignments, quizzes, and the course project
- Participate in journal club and discussions
- Demonstrate individual understanding on quizzes and assessments
- Communicate professionally and clearly

Homework

Homework is graded for correctness and effort. Assignments are submitted on Gradescope by 11:00 pm. Late homework loses 1% per hour past the deadline.

Quizzes

In-class quizzes are used to synchronize learning. One new cheat sheet (front and back) is allowed per quiz; no worked problems are permitted. Cumulative cheat sheets may be reused for later quizzes.

Online Students

- Proctored quizzes must be taken the same week as the in-person class when possible
- Makeup quizzes require Zoom self-proctoring with recorded submission
- Journal club and project presentations may be submitted via video when needed

Journal Club

Journal club occurs during the first 10 minutes of class and includes a short presentation and discussion. Topics should be engaging, accessible, and distinct from the student's primary research area. Journal club supports idea development for the course project.

Course Project

Students work in groups of 2–3 on an experimental, theoretical, computational, or demonstration-based project in fluid mechanics. Projects emphasize originality, research exploration, and clear communication. Two proposal phases are required, followed by a recorded presentation and in-class demonstration.

Academic Integrity

This course follows the Georgia Tech Academic Honor Code (Link). Any suspected violations will be reported to the Office of Student Integrity.

AI Use:

If AI tools assist with coursework, their use must be acknowledged. When in doubt, consult the instructor before submitting work.

Student Conduct (Student-Faculty Expectations Agreement)

Students are expected to uphold professional behavior, mutual respect, and responsibility in accordance with the Student-Faculty Expectations Agreement.

Disability Services Statement

Students requiring accommodations should contact the Office of Disability Services (ODS) at disabilityservices.gatech.edu and provide accommodation letters early in the semester.

Campus Resources

Students are encouraged to make use of Georgia Tech resources supporting academic success and well-being, including CARE, Health Initiatives, and the Division of Student Life.