COURSE SYLLABUS

AE 412 / ME 411

Viscous Flow and Heat Transfer

Fall 2024

Time:	10:00 – 11:50 pm Tuesday Thursday
Main website:	**Canvas.illinois.edu**
	From this website, access lectures, office hours, announcements, syllabus, course discussions, etc.
Assignment website:	**Gradescope.com** join our class for the first time using the code BBBXVD
Instructor:	Prof. Theresa Saxton-Fox
	Preferred contact method: Canvas message
	Email: tsaxtonf@illinois.edu
	Office Hours: TBD
Teaching assistant:	Elizabeth Torres De Jesus
	Email: et9@illinois.edu
	Office Hours: TBD
Course goal:	Mathematically describe viscous flow and heat transfer physics. Model flow and heat transfer behavior for simple geometries. Connect course fundamentals to modern engineering problems.
Learning goals:	Connect physics understanding to mathematical tools and frameworks
	Predict key engineering features including drag and heat transfer
	Develop independent research skills
	Develop technical writing skills

Textbooks: (Available for free online through UIUC library website)

Incompressible Flow, 4th Edition. Ronald L. Panton, Wiley, 2013.

Principles of Convective Heat Transfer, 2nd Edition. Massoud Kaviany, Springer 2001, 1994.

Convective Heat Transfer, 3rd Edition. Kakac, Yener, Pramuanjaroenkij. Taylor and Francis, 2014.

Other resources:

Video Channels:

1. NSF Fluid Mechanics Series https://www.youtube.com/playlist?list=PL0EC6527BE871ABA3
2. F Yeah Fluid Mechanics https://www.youtube.com/user/fyfluiddynamics
3. Physics Girl https://www.youtube.com/user/physicswoman/playlists
4. Gallery of Fluid Motion https://gfm.aps.org/

Other useful textbooks (also on Reserve at Grainger):

1. Viscous Fluid Flow, 3rd edition, F.M. White, McGraw Hill, 2006.
2. Boundary Layer Theory, 8th edition, H. Schlichting and K. Gersten, Springer, 2000.
3. An Album of Fluid Motion, M. Van Dyke, Parabolic Press, 1982.

Pre- / co-requisites: AE 311, ME 310, or TAM 335

Grading:

Homework	40%
Project	60%

Grades of 90, 80, 70, and 60 guarantee at least an A-, B-, C-, and D- in the class.

Homework:

Due: On gradescope.com

Assigned: Approximately every other week

Late policy: 5% is dropped per late day up to a reduction of 40%.

Reasoning: Homework provides opportunities to practice skills as we go through the class and cement our understanding of core concepts.

Projects:

There will be one major project in this course with deadlines throughout the term. You will choose the topic of your project early in the term. The goal of the project is to connect the content of the course to current efforts in the fields of fluid dynamics and heat transfer.

Late policy: For writing-based assignments, 10% is dropped per late day. For presentations, if an extension is needed, it must be arranged before the day of the presentation. Not presenting on the assigned day without prior arrangements will result in a grade of 0.

Reasoning: Projects provide opportunities to connect course content to problems that students are interested in

Accommodations:

We want everyone to be able to succeed in this class. Students who require disability-related academic adjustments and / or auxiliary aids should contact Professor Saxton-Fox and the Disability Resources and Educational Services (DRES) to ensure that proper accommodations are made. To contact DRES, you can visit them at 1207 S. Oak St., Champaign, call them at 333-4603, email them at disability@illinois.edu, or go to their website at disability.illinois.edu. Please do this as early in the class as you can so that we can be set up to succeed from the start.

Belonging Statement:

The effectiveness of our course is dependent upon each of us to create a safe and encouraging learning environment that allows for the open exchange of ideas while also ensuring equitable opportunities and respect for all of us. Everyone is expected to help establish and maintain an environment where students, staff, and faculty can contribute without fear of personal ridicule, or intolerant or offensive language. Inappropriate or offensive behavior towards people based on race, ethnicity, gender, sexual orientation, age, religion, or other personal aspects of identity is not acceptable in a classroom or professional environment. University is a time of learning and growing for all of us, and we ask everyone to be ready to learn and grow in your respect and understanding of others, in addition to your understanding of the course material.

A feeling of belonging and inclusion is critical to the success and health of our community. The Aerospace Engineering department has a committee called Aero's Space to Belong. They offer office hours, one-on-one discussion, and a reporting process. If you experience conflict that undermines your or someone else's feelings of belonging, please consider using these resources: https://aerospace.illinois.edu/diversity/reporting.

Academic integrity: Each homework assignment turned in must be your work. Working with classmates to understand the problem and identify solution strategies is encouraged, as is getting help and guidance from the instructor, but any work you write down on your homework must be your own. You must understand and be able to independently replicate anything on your homework, and you must have contributed to the solution you show. You may not copy another person's work under any circumstance. Evidence of copying or other academic integrity infractions on homework will be punished according to the severity of the infraction.

Projects should reflect team work, but you should be primarily responsible for your third of the assignment (to be explained in more detail in project-specific documentation). Evidence that one member of the team did not substantially contribute to the project or did not fulfill their project role may result in significant reductions in the project grade of that team member. Evidence of copying, plagiarism, or other academic integrity infractions on a project will result in a serious academic penalty depending on the severity of the infraction.

Learning from published sources (books, papers, or websites) is encouraged for both homework and projects. Be sure to cite the source of information that you learn if you include it in your homework and / or project. Please make sure not to directly copy information from another source without putting that information in quotation marks in addition to citing it.

If you use ChatGPT or equivalent as a source, please cite it as a source and explain how it was used. You should not directly copy language from ChatGPT that does not reflect your own writing and ideas, just as you should not directly copy information from a textbook or article without quotation marks. If you use ChatGPT to check your thinking or improve your writing, please explain the manner in which it was used in your submission.

Getting help: For technical help on the course, please contact me over Canvas or email or attend one of our weekly office hours. Other useful resources for assistance include:

- Student Assistance Center
- Campus Counseling Center
- Aero's Space to Belong