UNIVERSITY OF ALABAMA IN HUNTSVILLE
DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING

Course Information - Spring Semester 2023
MAE 620 - COMPRESSIBLE FLOW

Course Meeting Times: On-line and Monday, Wednesday 2:40 to 4:00 PM

Location: On-line and TECHNOLOGY HALL N142

Instructor: Phil Ligrani, Professor, MAE, PRC. Email: pml0006@uah.edu.

Office Location and Office Hours: OKT S236: Tuesday, Thursday 3:00-4:00 P.M., and by appointment.

Prerequisites: Undergraduate Fluid Mechanics, Undergraduate Thermodynamics, Undergraduate Mathematics (Calculus, Differential Equations, Linear Algebra) or by consent of instructor.

Semester Credit Hours: 3

Course Content: Compressible subsonic, transonic and supersonic flows, including normal and oblique shock waves, shock wave reflections, shock wave interactions, expansion fans, and related phenomena. The course will cover portions of the first 7 Chapters of "Modern Compressible Flow With Historical Perspective," along with Special Topics.

Textbook: "Modern Compressible Flow With Historical Perspective," First Edition, 1982, by John D. Anderson (Publisher: McGraw Hill).

Grading:		
	Homework	30%
	Midterm Exam	30%
	Final Exam	40%
	TOTAL	100%

Required Homework Problems: (30%)
Each written assignment is hand-graded. Homework due dates are determined on a class-by-class basis. All homework is accessed and submitted, using CANVAS on-line tools. Each student should employ the latest version of Google Chrome for on-line homework submissions. Students may collaborate with other class members as homework assignments are undertaken. Students may not contact or collaborate with past course-takers in order to complete homework assignments.

Mid-Term Exam: (30%)
The midterm exam will address most of the material which has been covered in lectures up to the time of the midterm exam.

Final Exam: (40%)
The final exam will be COMPREHENSIVE. The exam will cover all material from the entire semester.

Grading: Mid-Term Exam, Final Exam, and homework assignments are generally graded within one week of submission.

Useful Tidbit About Memory Retention: When you sleep at night, your brain downloads 1/3 of your short term memory to long term memory. Thus, if you see something 3 times on three days, you improve your chances of remembering something to 90%. Read the relevant text before class. See the material in class. Review your lecture notes later. You should then remember 90% of what you read/heard/reviewed.

Have Test Anxiety?:
http://www.uah.edu/ssc/programs/academic-coaching
Click on Academic Coaching where you can make an appointment.

From the UAH Provost: All University faculty, staff, and students are expected to maintain a commitment to the health and safety of our campus community. Because of the current COVID-19 pandemic, specific health and safety standards are in place to minimize exposure and community spread on campus. In the interest of your health and safety and that of all UAH students, faculty and staff, the University reserves the right to change the mode of instruction or schedule of instruction at any time, based upon prevailing public health and other guidance. While the method of delivery may change, educational instruction and opportunities will continue.

● The UA System Task Force is concerned about the rise in cases and the Delta variant, and will remain active and continue to monitor data on campus and in the community; safety requirements are subject to change.

● Traditional courses must be taught in person on campus as planned.

● Face coverings will be required indoors on campus, effective Monday, August 9. This requirement applies to everyone, regardless of vaccination status. Exceptions include: when alone in offices and private workspaces, when in residence hall rooms, while actively eating or drinking, or while actively engaged in exercise. UAH will continue to monitor key data and public health guidance and will work in conjunction with the UA System Health and Safety Task Force to evaluate this temporary guidance.

● Disposable facemasks will be available in each classroom building for those who need them in instructional spaces.

● Faculty will be required to provide remote access to all course materials and lecture recordings (if the assigned classroom has recording capability) in Canvas so that students can stay on track if they must quarantine.

● Faculty should not penalize students for non-attendance when absence is necessary for health and safety reasons.

● The Pass/Withdraw Grading Option is no longer offered. That option ended with the Spring 2021 semester.

● All students must be familiar with and abide by the requirements outlined in the UAH Return to Campus Plan, UA System Comprehensive Health and Safety Plan, and Interim Policy 02.01.71 Safety and Health Requirements for Presence on UAH's Campus During the COVID-19 Pandemic. Students must (1) wear a mask or face covering at all times while participating in face-to-face class and while in all University buildings; (2) adhere to social distancing standards; and (3) comply with all other health and safety restrictions.

● You are expected to comply with all noted requirements related to in-person class attendance.

Academic Misconduct: Any issues of academic misconduct, including exam cheating in any form, will result in a grade of zero for the course, with no withdrawal option allowed for the course. Any access or use of CHEGG materials during an exam is an example of serious academic misconduct. Any materials or information provided by another student or individual during an exam is another example of serious academic misconduct.

All students attending UAH are expected to abide by an Academic Honor Code as reflected by the following pledge. "I promise or affirm that I will not at any time be involved in cheating, plagiarism, fabrication, misrepresentation, or any other form of academic misconduct as outlined in the UAH policy on Academic Misconduct and Student Handbook while I am enrolled as a student at UAH. I understand that violating this promise will result in penalties as severe as expulsion from UAH."

Class Policies:
(1) Cell phones and any other electronic devices **must be turned OFF** during class times.
(2) Grading errors should be reported within 48 hours.
(3) Only simple scientific calculators are allowed during exams.

University Wide Policies: Safety and Emergency Information: Any emergency situation that impacts class will be announced through the emergency notification system, UAlert. Please be sure you have UAlert configured to use your preferred method of contact. Visit ualert.uah.edu for more information and to learn how to edit your UAH emergency notification contact information. Full details on UAH Emergency Procedures can be found at www.uah.edu/emergency. If an event such as a tornado warning or fire alarm, the instructor will provide guidance on evacuation measures.

Americans with Disabilities Act: The University of Alabama in Huntsville is committed to providing equal educational opportunities for all qualified students with documented disabilities. Students with disabilities must notify their course instructor during the first week of class, and contact the DSS office (256-824-6203) with requests for accommodations no less than two weeks prior to the start of term. Refer to the following website for further details: http://www.uah.edu/health-and-wellness/disability-support.

Netiquette SUGGESTIONS:
Every student is expected to follow these guidelines when interacting with your instructor and classmates online in our class.
- Be respectful of your instructor and fellow students. Be careful with your language.
- Do not share inappropriate material or material not related to the topic.
- DO NOT TYPE IN ALL CAPS!
- Be careful with the use of emojis - they are a friendly and informal style of communication that is easily misinterpreted.

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Week	Date	Lecture Material	Textbook Section
1	Jan. 9	Introduction, Notation	1.2-1.5
	Jan. 11	Integral Conservation Equations	2.1-2.6
2	Jan. 16	No Class	
	Jan. 18	Integral Conservation Equations	2.1-2.6
3	Jan. 23	Classification of PDE's, Differential Conservation Equations	6.1-6.5
	Jan. 25	Differential Conservation Equations	6.1-6.5
4	Jan. 30	Equations of State for Different Fluids	
	Feb. 1	One-Dimensional Flow	3.1-3.7
5	Feb. 6	One-Dimensional Flow	3.1-3.7
	Feb. 8	One-Dimensional Flow	3.1-3.7
6	Feb. 13	Oblique Shock and Expansion Waves	4.1-4.14
	Feb. 15	Oblique Shock and Expansion Waves	4.1-4.14
7	Feb. 20	Oblique Shock and Expansion Waves	4.1-4.14
	Feb. 22	Oblique Shock and Expansion Waves	4.1-4.14
8	Feb. 27	Oblique Shock and Expansion Waves	4.1-4.14
	Mar. 1	Oblique Shock and Expansion Waves	4.1-4.14
9	Mar. 6	Review	
	Mar. 8	MIDTERM EXAM	
10	Mar. 13	No Class	
	Mar. 15	No Class	
11	Mar. 20	Quasi-One-Dimensional Flow	5.1-5.6
	Mar. 22	Quasi-One-Dimensional Flow	5.1-5.6
12	Mar. 27	Unsteady Wave Motion	7.1-7.4
	Mar. 29	Unsteady Wave Motion	7.1-7.4
13	Apr. 3	Special Topic – Shock Wave Unsteadiness and Normal Shock Wave Structure	
	Apr. 5	Special Topic – Transonic Turbine Blade Tip Flows and Surface Heat Transfer	
14	Apr. 10	Special Topic – Scramjet Isolator Shock Wave Train	
	Apr. 12	Special Topic – Shock Wave Boundary Layer Interactions	

15	Apr. 17	Special Topic – Method of Characteristics and Supersonic Nozzle Design
	Apr. 19	Review
16	Apr. 26	FINAL EXAM 3:00 PM – 5:30 PM