

AME 511 – Compressible Gas Dynamics

Spring 2017

Units: 3.0

Lecture hours: Thursday, 6:40-9:20pm,

Lecture location: OHE 132

Instructor: Prof. Iván Bermejo-Moreno (email: bermejom@usc.edu)

Office hours: Monday and Tuesday, 3-5pm (office: RRB 215).

TA: Stylianos Koumlis (email: koumlis@usc.edu)

Office hours: Wednesday, 4:30-6:00pm (VHE 202).

Recommended Textbooks:

- John D. Anderson “Modern Compressible Flow,” 3rd Ed, McGraw-Hill, Inc.
- Liepmann & Roshko “Elements of Gas Dynamics,” Dover Publications

Grade breakdown:

- Homework: 30% of final grade.
- Midterm exam: 30% of final grade.
- Final exam: 40% of final grade.

Assignment Submission Policy

- No late homework will be accepted.
- Discussion of homework assignments with your classmates is allowed but each student should develop and write their own original solution.
- Assignments should be submitted electronically as a PDF file via the course D2L DEN website, with legible and logically organized solutions that explicitly include all necessary steps and assumptions (if any) made.

Academic Conduct

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Section 11, Behavior Violating University Standards <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions>. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the Office of Equity and Diversity <http://equity.usc.edu> or to the Department of Public Safety <http://adminopsnet.usc.edu/department/department-public-safety>. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. The Center for Women and Men <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage <http://sarc.usc.edu> describes reporting options and other resources.

Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the American Language Institute <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. The Office of Disability Services and Programs http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, USC Emergency Information <http://emergency.usc.edu> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

Course schedule – Weekly breakdown (HW = homework, PR = Project report)

W	Date	Topics	Assignment
1	Jan 12	Introduction; concepts from classical thermodynamics Conservation of mass and momentum in integral form	
2	Jan 19	Conservation of energy in integral form; enthalpy and entropy equations.	HW1 due
3	Jan 26	Equations of fluid motion in differential form; mass, momentum and energy conservation; entropy and vorticity equations; Crocco's theorem.	
4	Feb 2	One-dimensional compressible flow; sound speed, Mach number; normal shock relations	HW2 due
5	Feb 9	Oblique shocks	
6	Feb 16	Expansion waves; shock-expansion theory	HW3 due
7	Feb 23	Quasi-one-dimensional flow; nozzle flow	
8	Mar 2	Midterm	HW4 due
9	Mar 9	Unsteady wave motion	
10	Mar 16	Spring recess (no class)	
11	Mar 23	Potential flow and linearized potential theory	HW5 due
12	Mar 30	Method of characteristics	
13	Apr 6	Transonic flow	HW6 due
14	Apr 13	Hypersonic flow	
15	Apr 20	High-temperature gases; non-equilibrium	HW7 due
16	Apr 27	Effects of viscosity and conductivity; turbulence	
17	May 4, 7-9pm	Final Exam	

Academic Dishonesty Sanction Guidelines

Violation	USC – Recommended sanction	AME – Recommended sanction
Copying answers from other students on any course work **	F for course	First offense: F on assignment Second offense: F for course
One person allowing another to cheat from his/her exam or assignment	F for course for both persons	If assignment: First offense: F on assignment Second offense: F for course If exam: F for course
Possessing or using material during exam (crib sheets, notes, books, etc.) which is not expressly permitted by the instructor.	F for course.	First offense: F on exam. Second offense: F for course.
Continuing to write after exam has ended.	F for course.	F on exam
Taking exam from room and later claiming that the instructor lost it.	F for course and recommendation for further disciplinary action (possible suspension).	F for course
Changing answers after exam has been returned.	F for course and recommendation for further disciplinary action (possible suspension).	F for course
Fraudulent possession of exam prior to administration.	F for course and recommendation for suspension.	F for course
Obtaining a copy of an exam or answer key prior to administration.	Suspension or expulsion from the university; F for course.	F for course
Having someone else complete course work for oneself.	Suspension or expulsion from the university for both students; F for course.	F for course
Plagiarism — Submitting other’s work as one’s own or giving an improper citation.	F for course.	First offense: F on assignment. Second offense: F for course.
Submission of purchased term papers or papers done by others.	F for course and recommendation for further disciplinary action (possible suspension).	F for course
Submission of the same assignment to more than one instructor, where no previous approval has been given.	F for both courses.	F for both courses
Unauthorized collaboration on an assignment.	F for the course for both students.	First offense: F on assignment. Second offense: F for course.
Falsification of information in admission applications (including supporting documentation).	Revocation of university admission without opportunity to reapply.	Revocation of university admission without opportunity to reapply.
Documentary falsification (e.g., petitions and supporting materials; medical documentation.)	Suspension or expulsion from the university; F for course when related to a specific course.	Suspension or expulsion from the university; F for course when related to a specific course.
Plagiarism in a graduate thesis or dissertation.	Expulsion from the university when discovered prior to graduation; revocation of degree when discovered subsequent to graduation.***	Expulsion from the university when discovered prior to graduation; revocation of degree when discovered subsequent to graduation.***

*Assuming first offense; **Exam, quiz, tests, assignments or other course work; ***Applies to graduate students