AME 511 Syllabus - Spring 2014

[Last updated: November 4, 2013]

Thursdays 6:40-9:20 pm, RTH 115.

Instructor: Prof. Veronica Eliasson, eliasson@usc.edu.
Office phone: 213-740-7182.

Textbook: John D. Anderson, Modern Compressible Flow, 3rd Ed. McGraw-Hill, Inc.

Grading:
30% Homework
30% Midterm
40% Final Exam
All exams are open book, open notes.

Homework policy: Late homework will only be accepted in reasonable situations (i.e. ask if you are unsure). Otherwise, no late homework will be accepted. However, at the end of the course, the homework with the lowest score will be dropped from grading. Note, only **one** HW will be dropped from the grading.

Lecture	Day	Suggested Reading	Homework
1	01/16	Continuity equation; Euler equation; principles of classical thermodynamics. Ch: 1.1-1.7, 2.1-2.5	
2	01/23	Energy equation; enthalpy and entropy equation; adiabatic and isentropic processes. One-dimensional compressible flow; Mach number. Ch: 1.4.2-1.4.6, 2.6-2.7, 3-3.5	HW1 Due
3	01/30	Normal shock relations, oblique shock relations Ch: 3.6, 3.10, 3.11, 4.1-4.3.	HW2 Due
4	02/06	Oblique shocks; reflections of shocks at rigid boundaries and shock interactions. Ch: 4.4-4.6, 4.7-4.11	
5	02/13	Expansion waves; Prandtl-Meyer relation; shock-expansion procedure. Quasi-one-dimensional flows in converging-diverging ducts. Nozzles; choked flow; overexpanded and underexpanded nozzles. Ch: 4.14-4.17, 5.1-5.10,	HW3 Due
6	02/20	Nozzle example continued. Moving shocks. Ch 5, 7.1-7.3	HW4 Due
7	02/27	Reflected shocks, shock tube relations. One-dimensional flow with friction. Differential form of conservation equations. Ch: 3.9, Ch: 6, Ch 7.3, 7.7	HW5 Due
8	03/06	Midterm: 6:40-8:40pm location TBA	
9	03/13	Velocity potential equation; linearized flow. Ch: 8, 9	
10		Spring break!	
11	03/27	Method of characteristics; numerical techniques for compressible flows. 3-week project: to be announced. Ch: 11	
12	04/03	Transonic flow, Physical properties of hypersonic flow; hypersonic shock relations Ch 14, Ch: 15	HW6 Due
13	04/10	Forces on bodies in hypersonic flow; Statistical thermodynamics of high-temperature gases; translational, rotational, vibrational degrees of freedom; dissociation. Ch: 15, 16	
14	04/17	Chemical reactions; gases in statistical nonequilibrium. Ch: 16	Project Due
15	04/24	Flows of high temperature gases Ch. 17	HW7 Due
16	05/01	Current research topics. Review.	
17		Final: Thursday May 8, 7-9pm. Location TBA	

* Refer to class notes.