

AER 1306 Special Topics in Reacting Flows Reading Course - Winter 2024

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Course Objectives	This course provides the students who are intending a career in reacting flows, fluid mechanics or propulsion an opportunity to do an in-depth study of some of the current academic research areas with implications of practical importance. It will also be suitable for graduate students who have a good background in essentials of their research area, but need a specialized course to cover material not available in other graduate courses. Intention is not to replace or to overlap with the literature review of the students theses work. The course is not suitable for MEng students and is not recommended. However, those MEng students who satisfy prerequisite requirements and would like to take the course should see me before signing up for the course.
Class Hours	<u>Tuesdays at 13:00 – 15:00, In-person / Library Classroom AS121B</u> Note that attendance is mandatory. First meeting: Tuesday, January 16, 2024 at 13:00.
Office Hours	I am in my office or at the Combustion Lab most of the time. My office door is open when I am in. If you wish, you can arrange an appointment or ask for an online meeting. Electronic-communication is encouraged.
Class Members	I will contact you via email/Quercus in case of class rescheduling and new assignments, and any other matters related to the course.
Prerequisites	AER 1304 Fundamentals of Combustion: A- or better standing (or equivalent subjects, with the consent of the instructor). <u>You need to contact me before registering for this course.</u>
Grading	Will be based on assignments, and oral/written exams, as well as discussion of reading assignments.
Assignments	Reading/study material as well as problem sets will be assigned periodically on selected topics.
Course Material	Chapters from specialized monographs; review papers as well as recent research papers published in archival journals.

COURSE DESCRIPTION

The course will cover 3 to 4 topics from the following list. Selection of one or two of the topics could be aligned with the interests of the students taking the course. Similar topics will be added as needed.

- Non-intrusive experimental techniques in reacting flows
- Sustainable aviation fuels
- High-speed combustion
- Metal combustion in propulsion
- Thermo-acoustics in propulsion systems
- Soot formation and oxidation
- Non-premixed and partially-premixed turbulent combustion
- High-pressure combustion
- Turbulent premixed combustion
- Microscale combustion