

## EML 4930 /EML 5131: Combustion Syllabus -- Fall 2020

(Modifications to this syllabus may be required during the semester. Any changes to the syllabus will be posted on the course web site and announced in class.)

- 1. Course Objectives:** Chemical Thermodynamics, chemical kinetics, flame propagation, detonation and explosion, combustion of droplets and spray.  
*Prerequisites:* Thermodynamics.
- 2. Contribution of course to meeting the professional component:** This course is designed primarily for students of mechanical and aerospace disciplines. The course content is 100% engineering science.
- 3. Instructor:**  
Corin Segal.  
Office location: 320 MAE-A  
Office hours: MWF 9:30 – 10:30 am via Zoom meeting.  
Teaching Assistants:  
TBA
- 4. Meeting Times and Location:**
  - MWF 6<sup>th</sup> period, 12:30 – 1:40 via Zoom.
- 5. Textbook Required:** *S. Turns, An Introduction to Combustion, 2012, 3<sup>rd</sup> Edition, ISBN: 978-0-07-338019-3*
- 6. Course Outline:**  
This course introduces basic combustion concepts and relates the theoretical analyses to a range of practical applications. The lectures will cover the following topics:
  1. Combustion and thermochemistry (ch. 2)
  2. Introduction to mass transfer (ch 3)
  3. Chemical kinetics (ch. 4)
  4. Chemical reaction mechanisms (ch. 5)
  5. Laminar premixed flames (ch. 8)
  6. Laminar diffusion flames (ch. 9)
  7. Turbulent premixed flames (ch. 12)
  8. Turbulent non-premixed flames (ch. 13)
  9. Detonations (ch. 16)
  10. Special topics (droplet burning, solids burning, etc.)
- 7. Attendance and Expectations:** Lecture attendance is imperative. Although attendance will not be taken or used in assigning grades, students will be held responsible for knowing all changes made to scheduling and all class announcements.  
Note:
  1. Although information will be posted on Canvas, class announcements prevail in case there are discrepancies.
  2. Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all

courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

## 8. Assessment Methods and Grading:

### a. Homework:

Homework will be assigned periodically during the semester. Homework will not be graded. Selected solutions will be posted online.

The HW problems may be downloaded from Canvas. **Please submit your solutions ONLY via Canvas.**

Late assignments will not be accepted. The lowest grade for the HW problems will be dropped.

### b. Exams:

There will be four exams during the semester in class. All exams will be cumulative but will emphasize the most recently covered material. The exams will be during the regular class period. Exam dates will be announced at least two weeks ahead.

In general, each exam will have two (2) problems each. When a single problem will be assigned it will include several questions. PLEASE WRITE DETAILED ANSWERS FOR THE SOLUTIONS: THEY WILL BE THE BASE FOR PARTIAL CREDIT.

### c. EML 5131 Students only: One additional Final Project will be assigned due on December 9. Project format is indicated below.

The relative weighting of the HW Problems and Exams in the final grade will be as follows:

#### EAS 4930:

a. HW	25%
b. Exams	75%

#### EML 5131:

a. HW	25%	
b. Exams	50%	
c. Final Project	25%	- See project requirement below.

## 9. Grading Policy and Scale:

Your lowest score on HW and exams will be dropped with your grade being based on the rest of the assignments.

**Dropped exam and HW grades are designed to mitigate exceptional conditions; consequently there will be NO make-up exams** – see below for more details.

If a student feels that an exam or homework is graded unfairly, or if there is an error in the grading, please bring it to the instructor attention within a week after the graded material is handed back. Scores will not be reconsidered beyond the one week period.

#### Grading Scale:

93 – 100: A	87 – 89.9: B+	77 – 79.9: C+	60 – 69.9: D	0 – 59.9: E
90 – 92.9: A-	83 – 86.9: B	73 – 76.9: C		
	80 – 82.9: B-	70 – 72.9: C-		

## 10. Make-up Policy: No late assignments will be accepted. There will be no Make-up exams

**Note: The lowest EXAM grade will be dropped. This has the ONLY purpose to accommodate exceptional situations that may appear during the semester. It is NOT meant to eliminate low grades.**

11. **Honesty Policy and Ethical Considerations:** All students admitted to the University of Florida have signed a statement of academic honesty committing to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.
12. **Accommodation for Students with Disabilities:** Students requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.
13. **UF Counseling Services:** Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
  - UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
  - Career Resource Center, Reitz Union, 392-1601, career and job search services.
14. **Software Use:** All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

### **Project Format (EML 5131 only)**

Select a technical publication that treats a problem of compressible flow. Examples of possible sources are the *AIAA Journal*, the *AIAA Journal of Propulsion and Power*, *Combustion and Flame*.

Summarize the results in the following format:

1. Summary – one or two sentences summarizing the study content.
2. Introduction – a brief discussion of the technical issues.
3. Discussion of the study content and results.
4. Conclusions – MOST IMPORTANT PART OF THE REPORT – summarize the main findings of the study.

Note: Limit the report to five (5) pages including figures and references.

Please submit all reports via uploaded files on the course web site.