

Course Syllabus

(This is a preliminary document, the final version will be provided on the first week of the spring 2025 semester)

1. Course Information

AE/ME 6766	Combustion (~ 3hrs/week)	Spring Term 2025
Mondays	: (to be confirmed)	
Wednesdays	: (to be confirmed)	

2. Instructor & Grader Information

Instructor & Grader:	Dr. Louis SATYANARAYAN Ph.D.		
Email :	Louis.Satyanarayan@georgiatech-metz.fr		
Office Room Number:	226		
Office Hours (by appointment):	Tuesdays:	11:00AM – 12:00PM	To be confirmed
	Thursdays:	11:00 AM – 12:00 PM	

I am always available for short questions or concerns just after class.

If required you may also send an email to make an appointment or come directly to my office in the slots given above.

3. Pre &/or CoRequisites

Pre-requisites:

- Consult GTA academic office

4. Textbook:

1. Stephen Turns, An Introduction to Combustion: Concepts and Applications, 3rd edition

Additional Texts:

2. Irvin Glassman et al., Combustion, 3rd -5th editions

5. Syllabus/Topics covered/Scheme

Course Overview

No.	Chapter / Title	Description
1	Chapter 1	Introduction to Combustion + Overview
2	Chapter 2	Chemical Kinetics
3	Chapter 3	Coupled Chemical and Thermal Analysis
4	Chapter 4	Conservation (Transport) Equations, Multi-Component, Reacting Fluids
5	Chapter 5	Premixed Combustion: 1-d Combustion Waves
6	Chapter 6	Planar Detonations
7	Chapter 7	Laminar Premixed Flames (Deflagrations)
8	Chapter 8	Ignition
9	Chapter 9	Laminar Nonpremixed Combustion
10	Chapter 10	Introduction to Turbulent Combustion
11	Chapter 11(optional)	Experimental Combustion & analysis

6. Course Outcomes:

Outcome 1: To develop a student’s understanding of the fundamentals of combustion.

Outcome 2: To develop a student’s skills in analyzing premixed and non pre-mixed combustion processes

Outcome 3: To develop a student’s skills in analyzing laminar and turbulent combustion processes

7. Correlation between Course Outcomes and Student Outcomes:

ME3340 FLUID MECHANICS											
	Mechanical Engineering Student Outcomes										
Course Outcomes	a	b	c	d	e	f	g	h	i	j	k
Outcome 1.1	x				x						x
Outcome 1.2	x				x						x
Outcome 2.1	x				x						x
Outcome 2.2	x				x						x
Outcome 3.1	x				x						x
Outcome 3.2	x				x						x

8. GWW School of Mechanical Engineering Student Outcomes:

- a. an ability to apply knowledge of mathematics, science and engineering
- b. an ability to design and conduct experiments, as well as to analyze and interpret data
- c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- d. an ability to function on multidisciplinary teams
- e. an ability to identify, formulate, and solve engineering problems
- f. an understanding of professional and ethical responsibility
- g. an ability to communicate effectively
- h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- i. a recognition of the need for, and an ability to engage in life-long learning
- j. a knowledge of contemporary issues

- k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

9. GT Academic Honor Code

As usual the GT Academic Honor Code is followed for this class. Please check this link for clear information : <http://www.honor.gatech.edu/plugins/content/index.php?id=9>

10. Canvas

Your instructor uses CANVAS to send you messages and your results of homeworks and quizzes. You are supposed to check your ME3340 messages and announcements every day to make sure you don't miss anything. It is not guaranteed that the system will email you messages after being posted.

11. GRADING

a. WEIGHT:

- Quiz 1 : 20% (closed book, closed notes, will include Chapters 1-4, more info below)
- Quiz 2 : 20% (closed book, closed notes, will include Chapters 5-6, more info below)
- Quiz 3 : 20% (closed book, closed notes, will include Chapters 7-8, more info below)
- Final Exam: 25% (closed book, closed notes, All chapters from 1-10, more info below)
- Homework: 15% (each hw has the same weight, although some may take more time to solve than others)

You are however allowed to bring a calculator, a unit conversion sheet and also a cheat sheet maximum 2 sides of one A4-size sheet of paper, normal size letter type

Note: 1 cheat sheet can be made for each quiz and they can all be brought to the final exam (more precisely: 3 quizzes and one extra cheat sheet, i.e., 4 cheat sheets in total)

For each item or assignment, you will receive a numerical grade on canvas. These numbers must be interpreted as :

90%-100% : A

80%-89.99%: B

70%-79.99%: C

60%-69.99%: D

below 60% : F

Should canvas make any calculation for you, ignore it, because it does not count the above-mentioned weights for each task.

b. GRADING OF HOMEWORK:

- Homework is graded as follows: For each homework problem, you receive full marks when solved 100% correctly, 50% when solved incorrectly and 0% when not solved.
- They will all be graded on 100% and will therefore have an equal weight.
- You will receive 4 Homeworks (I will grade all the 4 HW but will take your 3 top performances)
- More precisely: Practically it means that I will ignore, for each student separately, his/her homework with the lowest marks.

c. About Homeworks, Quizzes

- All tasks will be submitted through CANVAS. The standard procedure is to upload pictures of your HW.
- A HW can be short or extensive, however each HW will have the same weight.
- A QUIZ will be turned in on paper when the exam is done.
- For homeworks you are allowed to work together and discuss with your colleagues, but you must turn in your own homework and not copy that of your colleagues or a solutions manual.

12. Course Expectations & Guidelines

a. BEHAVIOR IN CLASS :

Class participation (being present, paying attention, asking questions if needed, ...) is perfect. What is not OK is “noise”. Noise means that you disturb your teacher and also your colleague students who equally paid their tuition fees and have the right to follow my class. For urgent matters, you are excused to leave class briefly and then to return (bathroom, water fountain, something urgent, ...) – do it quietly please.

b. Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit

<http://www.catalog.gatech.edu/policies/honor-code/> or

<http://www.catalog.gatech.edu/rules/18/>.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

c. Attendance and/or Participation

Attendance and participation in class is required. If you miss class for any reason, it is your responsibility to obtain the notes for that day from a fellow student. This includes any announcements, concerns, helpful hints, etc. given by the instructor to the class.

d. Collaboration & Group Work

- Discussions between students on homework problems outside of class and during in-class problem solving sessions is encouraged.
- However, quizzes and exams must be written and submitted by each student independently.
- Copying and/or cutting and pasting someone else's work and submitting it as your own is not permitted.

e. Extensions, Late Assignments, & Re-Scheduled/Missed Exams

- No credit will be given for the late submission of any course work.
- It is your responsibility to ensure that your work is submitted to Canvas by the appropriate time.

Any work missed because of Institute-approved activities (e.g., field trips and athletic events) can be made up.