

**Introduction to Combustion**  
**MCEN 4152/5152**  
Course Information

**Instructor:** Nicole J. Labbe  
ECME 210  
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**Course:** MCEN 4152/5152- Introduction to Combustion  
Prerequisite: MCEN 3012 Thermodynamics (minimum grade C).  
Restricted to students with 87-180 credits (4152: Seniors / 5152: Fifth Year Seniors & Graduate Students).

**Course Description:** Focuses on the mechanisms by which fuel and oxidizers are converted into combustion products. Application to practical combustion devices such as Otto, Diesel, gas turbine and power plant combustion systems. Consideration of combustion-generated air pollution, fire safety and combustion efficiency. Recommended prerequisites: MCEN 3021 and MCEN 3022.

**Course Topics:** Conservation equations for multi-component systems, kinetics and ignition behavior, SI & CI engines, turbines, laminar premixed flames, laminar diffusion flames, droplet burning, solid fuels, explosions and rockets, pollutants and emissions, turbulent combustion

**Text:** An Introduction to Combustion Concepts and Applications 3<sup>rd</sup> Ed.  
Stephen R. Turns, McGraw Hill 2012

**Slack Channel:** CUcombustion2017.slack.com

**Class Meets:** TTh 3:30-4:45, FLMG 156

**Final Exam:** TBD

<b>Grading:</b>	<b><u>4152</u></b>		<b><u>5152</u></b>	
	Take-home work	40%	Take-home work:	20%
	Exam I	20%	Project	20%
	Exam II	20%	Exam I	20%
	Final	20%	Exam II	20%
	<b>Total</b>	<b>100%</b>	Final	20%
		<b>Total</b>	<b>100%</b>	

**\*\* This course is a brand-new course, and therefore, this syllabus is subject to change. Any changes will be announced to the class and updated on the course webpage as they occur.**

## **Introduction to Combustion**

### **MCEN 4152/5152**

#### Course Information

A primary objective of the Mechanical Engineering Department is to prepare each of our students for careers in the engineering profession. As professionals, engineers must meet high standards of technical competence and ethical behavior. According to the Accreditation Board of Engineering and Technology (ABET) code of ethics, engineers uphold and advance the integrity, honor and dignity of the engineering profession by:

1. Using their knowledge and skill for the enhancement of human welfare;
2. Being honest and impartial, and serving with fidelity the public, their employers and clients;
3. Striving to increase the competence and prestige of the engineering profession.

The Department of Mechanical Engineering (ME) believes that it is essential for each of you to learn the professional behavior that will prepare you for your career after grad school. Therefore, in each mechanical engineering course you will be required to practice the professional behavior that will be expected by your future employers. This syllabus clearly outlines the ME policy regarding academic integrity and academic climate. These policies will be upheld in each of your courses throughout the mechanical engineering curriculum. However, we also expect that this culture of professionalism will pervade all of your University of Colorado experiences.

#### **Academic Integrity:**

You will be asked to complete individual homework assignments in this course. Though you may work in groups to discuss and solve problems, it is expected that you will abide by the University of Colorado at Boulder honor code at all times. Therefore, you may not plagiarize a problem set or allow another student to plagiarize your answers to a problem set. Examples of plagiarism include: copying from a solution manual, copying from Internet sites, copying from previous academic year homework sets, and copying directly from classmates. If you have any doubt that you are using sanctioned materials to assist with your homework solution, please ask your current instructor/professor. On assignments that require you to use supplemental materials, it is also essential that you properly document the sources of information you use.

Any instances of dishonesty on homework or tests will result in a minimum sanction for your first violation of the honor code of a zero score and an entry in your department file. Additional sanctions will be imposed by the ME Department for subsequent violations, possibly including expulsion from the ME program. You may contest any accusation according the campus honor code system.

University of Colorado at Boulder Honor Code Policy: All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council ([honor@colorado.edu](mailto:honor@colorado.edu); 303-725-

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2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at <http://www.colorado.edu/policies/honor.html>

### **Academic Climate:**

In Class Expectations: It is our expectation that each of you will be respectful to your fellow classmates and instructors at all times. In an effort to create a professional atmosphere within the classroom, it is requested that you:

- Arrive to class on time
- Turn off your cell phone
- Limit use of your laptop computer to class purposes
- Put away newspapers and magazines
- Refrain from having disruptive conversations during class
- Remain for the whole class, or if you must leave early do so without disrupting others
- Display professional courtesy and respect in all interactions related to this class

Compliance with these expectations will assist us with the creation of a learning community and a high quality educational experience. The University of Colorado Classroom behavior policy will complement the outlined classroom expectations.

University of Colorado Classroom Behavior Policy: Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See policies at <http://www.colorado.edu/policies/honor.html>

Discrimination and Harassment: Discriminatory and harassing behavior will not be tolerated in the Department of Mechanical Engineering. A safe and inclusive environment will be created and maintained by the students and instructing faculty member. Students with concerns about discrimination or harassment actions should immediately contact the instructor, the Department Chair or their academic advisor, or contact the Office of Institutional Equity and Compliance (below).

Examples that may be considered harassment:

- A teaching assistant or instructor asking a student for a date.
- Displaying sexually explicit material in an academic setting (including laptop wallpaper).

- Persisting in asking a classmate for a date after being turned down.
- Using degrading terminology in referring to others, including peers.

University of Colorado Discrimination and Harassment Policy: The University of Colorado at Boulder policy on Discrimination and Harassment, the University of Colorado policy on Sexual Harassment and the University of Colorado policy on Amorous Relationships apply to all students, staff and faculty. Any student, staff or faculty member who believes s/he has been the subject of discrimination or harassment based upon race, color, national origin, sex, age, disability, religion, sexual orientation, or veteran status should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or the Office of Judicial Affairs at 303- 492-5550. Information about the OIEC, the above referenced policies and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at <http://www.colorado.edu/policies/honor.html>

**Accommodation of Disabilities or Religious Commitments:**

If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact: 303-492-8671, Willard 322, and <http://www.Colorado.EDU/disabilityservices>

If you have a temporary medical condition or injury, see guidelines at <http://www.colorado.edu/disabilityservices/students/temporary-medical-conditions>

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, please contact the instructor to make appropriate accommodations.