

CIVE 5610: Fire Dynamics I
Faculty of Engineering and Design, Carleton University
Course outline - Winter 2025

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When emailing the instructor type “CIVE5610” as your subject header and use your Carleton university account **only**. Course feedback at any time is welcomed.

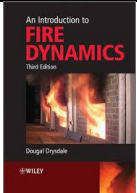
1. All teaching activities will be in-person.
2. The timetable of assessment items will be available in the calendar block on Brightspace.
3. Please use the link <https://calendar.carleton.ca/academicyear/> for important dates regarding registration.

1 Course Overview:

This course covers the following topics: fuels and the combustion process, physical chemistry of combustion, heat transfer, flammability limits and premixed flames, diffusion flames and fire plumes, steady burning of liquids and solids, ignition, smoldering combustion, and flame spread.

Textbook:

The teaching materials in this course are derived from the three textbooks.

| | | |
|---|--|--|
| 1 | An introduction to fire dynamics. 3rd ed, Drysdale D. 2011 |  |
|---|--|--|

2 Tentative Lecture Schedule:

It is expected that class topics will follow the schedule below, but adjustments will be made during the term as needed. In Table 1, the topics that will be covered in each corresponding lecture are summarized. The chapters of the book that are used in the respective lecture are shown in the last columns of the tables.

Table 1. Lectures

| Lec # | Topic | Reading sources |
|-------|--|-----------------|
| 1 | Introduction / Polymer Fuels | Ch 1 |
| 2 | Physical Chemistry & Chemical Reactions | Ch 1 |
| 3 | Combustion Dynamics & Flame Chemistry | Ch 1 |
| 4 | Heat transfer / Convection and Radiation | Ch 2 |
| 5 | Heat Transfer / Conduction | Ch 2 |
| 6 | Premixed Flames | Ch 3 |
| 7 | Diffusion Flames | Ch 4 |
| 8 | Ignition and Burning of Liquids | Ch 5 |
| 9 | Ignition and Burning of Solids | Ch 5 |
| 10 | Burning Rates of Materials & Products | Ch 5 |
| 11 | Flammability of Solids | Ch 5 |
| 12 | Exam review | |

3 Assessment:

The final grade for the course will comprise assignments, professionalism and the final exam as summarized in Table 2. For assignments, no reasons will be accepted for missing them. If you miss an assignment for any reason, the mark for the missed

assignment will be zero. The assignment will have a quite long work duration and the students should start working on them as soon as assignments are posted.

Table 2. Assessment breakdown

| # | sections | Description | Weights |
|---|---------------------------------------|--|---------|
| 1 | Assignments | Three homework assignments | 30 % |
| 2 | Participation and in-class activities | Demonstrate professionalism throughout the course (WooClap questions 10%, presentation 5%) Groups of two students will choose a major fire incident to investigate. Each group will give a 10–15-minute presentation with about 10-15 slides during class. Make sure to join your groups in Brighter Space. | 15 % |
| 4 | Project | PyroSim | 15% |
| | Final Exam | Three hours, Open book, and calculators are allowed. The exam will be in-person and formally scheduled. | 40 % |

4 Course Policies:

4.1 Communications:

Course materials will be distributed through the course's Brightspace page. Students are responsible for ensuring they are correctly registered through Brightspace, and for checking the Brightspace course management site regularly. Lecture slides will be made available before class. Professionalism is expected in all course communications; messages with informal language or improper grammar and spelling will not be replied to.

4.2 Appeals:

All grade appeals in this course must be made within **seven days** of the posting or return of the graded component. The final exam is for evaluation purposes only, and the paper will not be returned or made available to students by the instructors after it is marked. You will be able to make arrangements with the instructor or with the department office to see your marked final examination after the grades have been made available.

5 Academic Integrity:

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensure that a degree from Carleton University is a strong signal of each student's academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. Carleton University's Policy on Academic Integrity (<http://www.carleton.ca/registrar/academic-integrity>) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. It is your responsibility to be familiar with these policies. Any students who do not act with academic integrity will face severe consequences including immediate referral to the Associate Dean of Student Affairs.

6 Academic Accommodation:

Students with diverse learning styles and needs are welcome in this course. You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows. For more information, please consult: <http://students.carleton.ca/course-outline>

6.1 Pregnancy Obligation

Please contact the instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist.

6.2 Religious Obligation

Please contact the instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist.

6.3 Accommodations for Students with Disabilities

The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). Requests made within two weeks will be reviewed on a case-by-case basis. After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website (<http://www.carleton.ca/pmc>) for the deadline to request accommodations for the formally scheduled exam (if applicable).

6.4 Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working, and living environment where sexual violence will not be tolerated, and survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, please visit: <http://www.carleton.ca/sexual-violence-support>

6.5 Accommodation for Student Activities

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact the instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more information, please consult: <http://students.carleton.ca/course-outline>

7 Copyright on Materials

The materials created for this course (including the course outline and any slides, posted notes, labs, project, assignments, quizzes, exams and solutions) are intended for personal use and may not be reproduced, redistributed, or posted on any website without prior written permission from the author(s).