

Carleton University
Department of Civil and Environmental Engineering

CIVE 5610
Fire Dynamics I
Fall 2018

SYLLABUS¹

Time: Thur. 18:05 - 20:55, Sep. 10, 2018 - Dec. 7, 2018
Location: Southam Hall, Room 404
Instructor: Yoon Ko, Ph.D.
Research Officer, NRC
Contract Instructor, Carleton University
E-mail: yoon.ko@carleton.ca²
Office time: by appointment

Course Description

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.

This course requires knowledge of chemistry, thermodynamics, fluid dynamics and heat transfer. Mathematical models for combustions chemistry, ignition and fire growth will be introduced. Flame structures and fire plumes will be discussed. The course forms the basis of fire science, technology and engineering, and the course is the first step toward fire related scientific research and engineering practice.

Recommended Books

Textbook

Drysdale D. 2011. An introduction to fire dynamics. 3rd ed. Chichester (UK): Wiley.

Recommended References

¹ The course outline subjects to minor changes as the lecture develops.

² Preferred contact method. Please use the email for general communication only. The electronic version of solutions to problem sets is required to be submitted on the culearn website.

SFPE handbook of fire protection engineering. 5th ed. (3rd ed. Available at the library)

Grading

- Class Participation: 15%
- Problem Sets: 40%
- Final Exam (in class): 50%

Final Exam

- Open book, notes // calculators permitted
(Solutions to the final exam are used for assessment only and will not be returned.)

Tentative Course Outline

No.	Date	Topics
1	Sep. 10	Introduction / Fuels and combustion process
2	Sep. 17	No Class
3	Sep. 24	Combustion chemistry
4	Oct. 01	Combustion dynamics and Flame chemistry
5	Oct. 08	Holiday
6	Oct. 15	Heat Transfer (1/2)
7	Oct. 22	Fall Break
8	Oct. 29	Heat Transfer (2/2)
9	Nov. 05	Premixed Flames/ Flammability Limits
10	Nov. 12	Diffusion Flames and Fire Plumes
11	Nov. 19	Steady burning of liquid and solid fuels
12	Nov. 26	Ignition and burning
13	Dec. 03	Flame Spread/ Fire growth and Other topics
14	Dec. 07	Final Exam (in class)

Website

- This course uses cuLearn, Carleton's learning management system. To access your course materials, go to carleton.ca/culearn.
- Please check your email linked to the culearn regularly for update information.
- All course materials including the syllabus, course slides, problem sets, and grading can be accessed through the website only.

- The course materials may be updated for error corrections, typographies, or other reasons. The name of updated files will contain an edition number for easy identification.
- A pdf version of the solutions to the problem sets are required to be submitted on the website by the due date.

Academic Integrity

- Academic integrity is strictly required. Any kind of academic misconducts will not be tolerated and can lead to serious consequences. Please refer to *Academic Integrity Policy* (2006) of Carleton University for more details.
- **ALL PROBLEM SETS MUST BE COMPLETED INDEPENDENTLY, WHILE DISCUSSION IS ALLOWED.**
- Plagiarism, collaboration between individuals other than discussion, submitting or copying answers completed by others, assisting others to violate academic integrity requirements, and other academic misconducts are against *Academic Integrity Policy* (2006) of Carleton University and will be reported to the Faculty Dean without prior warning.
- Appropriate acknowledgements of sources cited in solutions to the problem sets are required.

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Accommodations

“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 (www.carleton.ca/pmc) for the deadline to request accommodations for the formally-scheduled exam (*if applicable*). “