



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Advanced Combustion

MECHENG 7526

Credit Hours:

3.00 - 3.00

Course Levels:

Graduate (5000-8000 level)

Course Components:

Lecture

Course Description:

Advanced combustion concepts; chemical kinetics; introduction to turbulent premixed and non-premixed flames; turbulent combustion modeling; multiphase combustion; literature review of recent theoretical, computational, and experimental approaches

Prerequisites and Co-requisites:

Prereq: 6526 (726). Prereq or concur: 7513 (813), or permission of instructor.

Course Goals / Objectives:

- Development of an understanding of the fundamentals of turbulent combustion processes
 - Development of an understanding of the fundamentals of multiphase combustion processes
 - Development of an understanding of the current status of turbulent premixed and non-premixed combustion modeling
 - Development of an understanding of the current status of experimental measurements in turbulent combustion environments
 - Development of the ability to derive general scaling laws for canonical flows ; be able to apply existing computational codes and models under simple flow/flame conditions; develop the ability to analyze results
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Course Topics:

- Review of basic combustion concepts
 - Review of chemical kinetics, evaluation of fluid mechanical and chemical time scales
 - Introduction to turbulence
 - Turbulent premixed flames
 - Turbulent non-premixed flames
 - Reacting shear flows
 - Combustion modeling
 - Multiphase combustion: droplet combustion and surface reactions
 - Reduced order modeling and other contemporary computational approaches, including CHEMKIN
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Designation:

Elective