

# Theoretical and Kinetics Aspects of Combustion

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## Overview

Combustion science can be considered as fluid dynamics of reactive flows. Combustion is important in many industrial and engineering processes. Knowledge of combustion is required to improve design and performance of internal combustion engines, gas turbine engines for power generation, and propulsion of air breathing aircraft engines and chemical rockets. Knowledge of combustion is required to predict pollutant formation. As public concern about environmental pollution, energy security and global warming increases, there is a need to develop alternative non-petroleum based sources of energy. Studies in combustion are key to addressing these critical problems. Understanding combustion processes requires knowledge of chemical thermodynamics, laminar and turbulent fluid dynamics, heat and mass transfer processes, and chemical kinetics. This course will be focused on fundamentals of combustion. There are three modules, theoretical fundamentals, chemical kinetics, and analytical methods. The **primary objectives** of this course are: to impart fundamental knowledge of chemical and physical aspects of combustion, to reveal the role of chemical kinetics to the combustion phenomena, and to understand and use the basic mathematical concepts in solving combustion problems.

<b>Dates for the Course</b>	<b>16<sup>th</sup> August, 2016 to 22<sup>nd</sup> August, 2016</b>
<b>Host Institute</b>	<b>IIT Madras</b>
<b>No. of Credits</b>	<b>1</b>
<b>Maximum No. of Participants</b>	<b>30</b>
<b>You Should Attend If you are</b>	<b>A student in thermal-fluidics and energy area, research scholar in combustion field from mechanical, aerospace and chemical engineering and industrial practitioner from energy and power plant industries that deals with combustion</b>
<b>Course Registration Fees</b>	<p>The participation fees for taking the course is as follows:</p> <p><b>Student Participants: Rs. 1000</b> <b>Faculty Participants: Rs. 2000</b> <b>Government Research Organization Participants: Rs. 2000</b> <b>Industry Participants: Rs. 10000</b></p> <p>The above fee is towards participation in the course and the course material</p> <p><b>Mode of payment: Demand draft in favor of “Registrar, IIT Madras” payable at Chennai.</b></p> <p>The demand draft is to be sent to the Course Coordinator at the address given below on or before <b>July 22, 2016</b>.</p>
<b>Accommodation</b>	The participants may be provided with hostel accommodation, depending on the availability, on payment basis. Request for hostel accommodation may be submitted through the link: <a href="http://hosteldine.iitm.ac.in/iitmhostel">http://hosteldine.iitm.ac.in/iitmhostel</a>

## Course Faculty



**Professor Kalyan Seshadri** received his BE degree from Coimbatore Institute of Technology (India) in 1970, his MS degree from the State University of New York at Stony Brook in 1973, and his PhD degree from the University of California, San

Diego in 1977. After completing his PhD he was a postdoctoral research staff member at Yale University, member of the technical staff at TRW, and assistant professor of mechanical engineering at the University of Southern California. He joined the UCSD faculty in 1982. He has over 100 archival publications and over 150 presentations at scientific meetings.



**Dr. Krithika Narayanaswamy** received her PhD from Stanford University in 2013. She worked as a Post Doctoral Research Fellow at Cornell University until mid 2015

before joining IIT Madras. Her research interest centers on development of chemical kinetic schemes to describe the oxidation of real fuels using mechanism reduction methods. She is interested in predicting global combustion characteristics of conventional and alternative fuels and interpreting these observations based on insights gained from molecular level kinetic descriptions.

## Course Coordinators

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