



Fundamentals of Combustion (Part 2)

Aerospace Engineering

Instructor Name: Dr. D.P. Mishra

Institute: IIT Kanpur

Department: Aerospace Engineering

Course Intro: : This is an introductory course on Fundamentals of Combustion. The objective of this course is to impart knowledge on fundamentals of combustion to both UG and PG students. In this course, fundamentals aspects of combustion namely premixed flame, Gaseous Jet diffusion flame, Liquid fuel combustion are to be covered extensively. Besides this, chemical Emission from combustion, Quantification of emission, Emission control methods are to be covered briefly.

Pre Requisites: : Thermodynamics

Core/Elective: : Elective

UG/PG: : Both

Industry Support : nil

Reference : 1. D. P. Mishra, Fundamentals of Combustion, Prentice Hall of India, New Delhi, 2008. 2. Kuo K.K. "Principles of Combustion" John Wiley and Sons, 2005. 3. Strehlow R A., "Fundamentals of combustion" McGraw Hill Book Company, 1984. 4. Stephen R Turns, "An Introduction to Combustion", McGraw Hill Book Company, 1996.

About Instructor: Dr. D.P. Mishra is a professor in the Department of Aerospace Engineering at Indian Institute of Technology (IIT) Kanpur, India where he was instrumental in establishing a combustion laboratory. He currently holds the Indian Oil Golden Jubilee Professional Chair in IIT Kanpur. He was a Visiting Professor in 2002 at the Tokyo-Denki University, Japan. His areas of research interest include combustion, computational fluid dynamics, atomization, etc. He is the recipient of the Young Scientist Award in 1991 from the Ministry of New and Renewable Energy, Government of India. He was conferred the INSA-JSPS Fellowship in 2002. In recognition of his research, Dr. Mishra received Sir Rajendranath Mookerjee Memorial Award from the Institution of Engineers (India). Dr. Mishra is a recipient of the Samanta Chadrsekhar Award for his contributions to science and technology. For technological contribution for the common people, he has been conferred with the Vikash Prerak Sanman in 2010.



COURSE PLAN

SL.NO	Week	Module Name
1	1	Introduction
2	2	Introduction to Flame, One dimensional combustion wave
3	3	Laminar premixed flame, Burning velocity measurement methods, Effects of chemical and physical variables on Burning velocity
4	4	Flame extinction, Ignition, Flame stabilizations, Turbulent Premixed flame
5	5	Diffusion Flame: Gaseous Jet diffusion flame
6	6	Liquid fuel combustion, Droplet combustion, Spray Combustion
7	7	Solid fuel combustion
8	8	Combustion and Emission: Atmosphere, Chemical Emission from combustion, Quantification of emission, Emission control methods