



AEROSPACE ENGINEERING

Combustion in Air Breathing Aero Engines

Type of Course	: New
Course Snapshot	: Elective
Pre-requisites	: Fluid Mechanics, Heat Transfer
Course Duration	: 30 hours / 12 weeks
Industry Support	: Tentatively all aero engines industry: DRDO, GTR, ISRO, GE, R&R, Power industries like GAIL.

COURSE OUTLINE:

This course will provide detailed, state of the art understanding of chemical kinetics, flames, turbulence and turbulent combustion, followed by discussions on modern aero engine combustors and how they optimize the above processes. Therefore, after successful completion of the course, the student should be well versed with the understanding of the complex, physico-chemical processes in modern air-breathing aero engines. This should allow him/her to model, design and improve combustors towards more efficient engines. Senior B. Tech, M. Tech, Ph. D students in academia and professionals working at industrial research labs, government or private, with basic background in combustion and fluid mechanics should benefit from this course.

INSTRUCTOR:

Prof. Swetaprovo Chaudhuri
Department of Aerospace Engineering
IISc Bangalore



ABOUT INSTRUCTOR:

Prof. Swetaprovo Chaudhuri is an Assistant Professor at the Department of Aerospace Engineering, Indian Institute of Science, since June 2013. Prior to this appointment he was a research staff in the Department of Mechanical and Aerospace Engineering and Combustion Energy Frontier Research Centre at Princeton University. He earned his Ph.D. from the University of Connecticut in 2010 and B.E. from Jadavpur University in 2006, both in Mechanical Engineering. His research interests and significant contributions span over fundamental and applied aspects of turbulent combustion and functional droplets. These contributions have been disseminated through over 60 publications in top journals and international conferences.

COURSE PLAN:

- Week 1 : Chemical Thermodynamics
- Week 2 : Chemical Kinetics Theory
- Week 3 : Fuel Oxidation Mechanisms
- Week 4 : Non Premixed Flames
- Week 5 : Premixed Flames
- Week 6 : Limit Phenomena
- Week 7 : Turbulence and Introduction to Turbulent Combustion
- Week 8 : Turbulent Non-premixed combustion
- Week 9 : Turbulent Premixed combustion
- Week 10 : Gas Turbine Combustors
- Week 11 : Afterburners, Ramjets and Combustion Dynamics
- Week 12 : Scramjet Combustors