Combustion: Science, Technology, and Processes

Overview

Combustion is still the world's dominant energy conversion technology. The fundamental knowledge of combustion is expected to improve the design of the industrial combustion systems by enhancing the flame stability, improving the combustion efficiency, and reduction in pollutant formation. This course will enable engineers and research specialists with knowledge of fluid mechanics and thermodynamics to move to an integrated understanding of theoretical, experimental and numerical aspects of combustion especially in the field of unsteady turbulent combustion. It will present basic techniques and recent progress in the fields of experimental diagnostics and numerical combustion while establishing important connections with the underlying combustion basics. Further, it will present and explore examples of turbulent combustion and combustion instabilities in real combustors.

Course Information	**Duration:** May 9 – May 18, 2016 **Total Contact Hours:** 40 hours: 4 hours lectures/day, 1 hour tutorial/day, over 1-week **Number of participants for the course will be limited to fifty.** Course participants will learn these topics through lectures and interactive sessions.
Modules	**Module A. Theory of turbulent combustion** (May 9 – May 13, 2016) • Introduction to combustion • Numerical combustion • Experimental techniques in combustion **Module B. Turbulent combustion in real engines** (May 14 – May 18, 2016) • Novel high fidelity codes for turbulent combustion • Ignition, wall cooling and flame/wall interaction in turbulent flames • Combustion Instabilities and Control • Practical examples of LES application to real engines • Experimental applications to real engines
You Should Attend If…	▪ Executives, engineers and researchers from academia, industry and government organizations including R&D laboratories with a background in aerospace, automotive, mechanical, and chemical engineering. ▪ Postgraduate students (MSc/MTech/PhD) and faculty from reputed academic institutions. **Pre-reuisite:** Prior knowledge in Fluid Mechanics, Thermodynamics and Heat Transfer is needed. Understanding/knowledge of Combustion is desirable.
Fees	The participation fees for taking the course is as follows: **Participants from abroad**: US $800 for both modules **Industry/ Research Organizations**: ₹25,000 per module and ₹40,000 for both modules **Academic Institutions**: ₹10000 for both modules The above fee includes all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.

The Faculty

Prof. Thierry Poinsot is the research director at Institut de Mécanique des Fluides de Toulouse, CNRS, France. His research interests include theory, simulations and experiments on laminar and turbulent combustion, combustion instabilities, simulation and control of two-phase flows, and passive and active control methods for flow and combustion instabilities.

Prof. Avinash Kumar Agarwal is a professor of Mechanical Engineering at Indian Institute of Technology, Kanpur. His research interests include IC engines, alternate fuels, vehicular pollution, laser diagonistic techniques, micro-sensor development and lubricating oil tribology.

Prof. Abhijit Kushari is a professor of Aerospace Engineering at Indian Institute of Technology, Kanpur. His research interests are rocket and gas turbine propulsion, instrumentation in combustion and fluid mechanics, liquid atomization and liquid combustion, active flow control, combustion instability, experimental fluid mechanics, high speed flows.

Dr. Ashoke De is an assistant professor of Aerospace Engineering at Indian Institute of Technology, Kanpur. His research interests are CFD, turbulent combustion, turbulent flows in gas turbines, hydrogen combustion, stochastic PDF based combustion modeling, high speed aerodynamics, high performance computing.

Dr. Santanu De is an assistant professor of Mechanical Engineering at Indian Institute of Technology, Kanpur. His research interests are modeling of turbulent combustion, flame stabilization, droplet and spray combustion.

Course Co-ordinator

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