Fuel/ Engine Interactions in Practical Internal Combustion Engines for Future Emission Compliances and Efficiency Improvements (Online)

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Overview

There is great pressure to change energy systems across the world driven by concerns about climate change, energy security and air quality, amongst other concerns. Transport, which accounts for around 20% of global energy use, is no exception to these concerns. Currently, 95% of all transport energy comes from petroleum-derived fuels powering internal combustion engines. Alternatives to conventional systems start from a low base and face significant barriers to rapid and large-scale deployment. Hence internal combustion engines and conventional fuels will continue to be the major source of power for global transport for decades to come. Hence, such systems must be improved in terms of efficiency and environmental impact. In the first instance, there is much scope for improving conventional engines using fuels existing in the market through better combustion, after-treatment and control systems allied with partial electrification. In the medium term, developing fuel/engine systems using fuels currently not in the market offers further scope for improvement. In the long term, as all energy systems are decarbonized and battery and fuel cell technology improve, there is much more scope for power sources like batteries and fuel cells to replace internal combustion engines and for new fuels like hydrogen and so-called electro-fuels to come into play.

Course participants will learn these topics through online lectures and soft copies of materials. Also, case studies and assignments will be shared to stimulate the research motivation of participants.

Modules	**A: Transport Fuels: November 17 – November 26, 2023** **Number of participants for the course will be limited to fifty.**
You Should Attend If…	▪ You are a Mechanical engineer or research scientist interested in engine research for improving engine efficiency and lowering emissions. ▪ You are an industry person working on emissions compliance. ▪ You are a student or faculty from an academic institution interested in learning how to do research on engines to improve the powertrain.
Fees	The participation fees for taking the course are as follows: **Student/ Academic Participants: 2000 Rs. + 18% GST** **Industry/ Research Organizations: 25000 Rs. + 18% GST** The above fee includes all instructional materials, tutorials, and assignments.

The Faculty

Dr. Gautam Kalghatgi worked for 31 years at Shell Research, U.K., followed by 8 years in Saudi Aramco before retiring in June 2018. He has been a Visiting Professor at Oxford University, Imperial College, London, KTH Stockholm, TU Eindhoven and Sheffield University. He is a Fellow of the Royal Academy of Engineering, SAE, I.Mech.E. and Combustion Institute and an Honorary Fellow of the International Society for Energy Environment and Sustainability (ISEES). He is on the International Board of Directors of the Combustion Institute and on the editorial boards of several journals. He has published around 140 papers and a book on combustion, fuels and engine research and on transport energy. He has received several awards for his work including the 2021 ASME Internal Combustion Engines award, Huw Edwards award of the Institute of Physics, SAE Horning Award, and the Sugden award of the Combustion Institute. He has a B.Tech. from Indian Institute of Technology (IIT) Bombay (1972) and Ph.D. from Bristol University (1975) in Aeronautical Engineering.

Prof. Avinash Kumar Agarwal obtained his Undergraduate Degree in Mechanical Engineering (1994) from Malviya Regional Engineering College, Jaipur and his MTech (Energy, 1996) and PhD (Energy, 1999) from the Indian Institute of Technology (IIT) Delhi. After his Post-Doctoral Fellowship (1999 – 2001) at the ERC, UW, Madison, USA, he returned to India in 2001 and joined IIT Kanpur. He was a Visiting Professor at the University of Loughborough, UK; Photonics Institute, University of Vienna, Austria; Hanyang University and KAIST, South Korea. Prof. Agarwal is interested in research in IC engines, combustion, conventional and alternative fuels, Methanol/ DME/ Hydrogen/ HCNG fuelled engine development, LCA and TCO analyses, Fuel sprays, Lubricating oil tribology, optical diagnostics, laser ignition, HCCI, particulates and emission control, and large bore engines. Prof. Agarwal is developing Methanol and DME-fuelled engines/ vehicles for the automotive/ agricultural sectors. Prof. Agarwal has published over 520 peer-reviewed international journal and conference papers, 63 edited books, and 129 book chapters, attracting 16000+ Scopus and 24000+ Google Scholar citations.

Course Co-ordinator

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