IC ENGINES AND GAS TURBINES

PROF. PRANAB K. MONDAL
Department of Mechanical Engineering
IIT Guwahati

PROF. VINAYAK N. KULKARNI
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TYPE OF COURSE : Rerun | Core | UG/PG
COURSE DURATION : 12 weeks (24 Jan' 22 - 15 Apr' 22)
EXAM DATE : 24 Apr 2022

PRE-REQUISITES : Basic UG-level Fluid Mechanics and Thermodynamics

INTENDED AUDIENCE : Undergraduate students of Mechanical/Chemical/Aerospace engg. (5th semester onwards) and postgraduate students specializing in the thermofluids/Fluid Mechanics/Aerospace/Automobiles; industry personnel associated with automobile and aerospace engineering; faculty members associated with Mechanical/Chemical/Aerospace engg.

INDUSTRIES APPLICABLE TO : Tata Motors, Ashok Layland, General Electric

COURSE OUTLINE :
This course deals with the gas power cycles. One part of the course is on IC engines and it focuses on the thermodynamic cycles for different fuels suitable for automobiles. Other part of the course has emphasis on thermodynamic cycle of aircraft engines and the components of the aircraft engine. Thus this course would provide an understanding on electricity generation or transportation application using gas as working medium.

ABOUT INSTRUCTOR :
Prof. Pranab K. Mondal is an Assistant Professor in the department of Mechanical Engineering at Indian Institute of Technology Guwahati since May 2015. He received his undergraduate and postgraduate degree from Jadavpur University, Kolkata, and completed his Ph.D. from Indian Institute of Technology Kharagpur in 2015. He worked as a Research Associate at IIT Khargpur for nearly one years before joining IIT Guwahati. His principal research interest, encompassing the broad area of Microfluidics, has covered various facets of microscale multiphase transport, electro kinetics microscale transport of heat and experimental microfluidics. He is currently working on stability analysis of flows with free-surfaces, experimental investigations of capillary filling of bio-fluids and droplet dynamics. He has co-authored more than 70 refereed journal and conference publications. He is a regular reviewer of many reputed international journals and also associated with several sponsored projects.

Prof. Vinayak N. Kulkarni is an Associate Professor in the Department of Mechanical Engineering of Indian Institute of Technology Guwahati since January 2015. He completed his undergraduate studies in Mechanical Engineering in the Shivaji University, Maharashtra, India. His post graduation and PhD is from Aerospace Engineering Department of Indian Institute of Science Bangalore. His teaching interests are basic and applied thermodynamics, gas dynamics, aircraft propulsion and fluid mechanics. His research interests are experimental and computational compressible flows, IC engines and non-conventional energy.

COURSE PLAN :
Week 1: Engine
Week 2: IC Engines
Week 3: Air-standard cycles
Week 4: Carburation
Week 5: Fuel injection systems
Week 6: Combustion in S.I. and C.I.engines
Week 7: Introduction to Gas Turbines
Week 8: Performance analysis of Bryton Cycle
Week 9: Aircraft propulsion
Week 10: Compressors
Week 11: Compressors and Turbines
Week 12: Nozzles and Diffusers