



# IC ENGINES AND GAS TURBINES

## **PROF. PRANAB K. MONDAL**

Department of Mechanical Engineering

IIT Guwahati

**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/Aero-spacengg.

**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 Associate 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 year before joining IIT Guwahati. He has taught several courses, including Fluid Mechanics, Applied Thermodynamics, Thermodynamics, Fundamentals of Microfluidics, Experimental Methods in Fluid Mechanics to both undergraduate and post graduate students at IIT Guwahati. Among His principal research interest, encompassing the broad area of Microfluidics has covered various facets of microscale multiphase transport, electrokinetics, microscale transport of heat and experimental microfluidics. He is currently working on droplet-based microfluidics, magnetofluidics, experimental investigations of capillary filling of bio-fluids. He has co-authored more than 140 referred journal and conference publications. He is a regular reviewer of many reputed international journals and also associated with several sponsored projects pertaining to microscale phenomena.

### **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