



AIRCRAFT PROPULSION

PROF. VINAYAK N. KULKARNI

Department of Mechanical Engineering
IIT Guwahati

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

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

COURSE OUTLINE :

This course deals with the gas power cycles for aircraft propulsion. Therefore different types of aircraft engines, their parts and their performance parameters are discussed. Then the cycle analysis and its different attachment for improvisation are also focused. Further, different parts of aircraft engines like compressor, turbines, combustor and nozzle are discussed in detail.

ABOUT INSTRUCTOR :

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: Introduction to Gas turbines and Aircraft Propulsion

Week 2: Aircraft propulsion

Week 3: Ideal and Real cycle analysis

Week 4: Ideal and Real cycle analysis

Week 5: Real cycles

Week 6: Real cycles

Week 7: Engine performance and Engine components

Week 8: Centrifugal Compressors

Week 9: Axial Compressors

Week 10: Axial and Radial Turbines

Week 11: Turbine cooling methods and Component matching

Week 12: Blade design and cascade theory