

Course Title	Course Code	Credit Hours
Propulsion and Power Plants	AE- 344	3-1

Textbooks:

- Philip Graham Hill and Carl R. Peterson, "Mechanics and Thermodynamics of Propulsion," Addison-Wesley
- Thomas W. Wild and Michael J. Kroes, "Aircraft Powerplants", McGraw-Hill Education

Reference Books/Materials:

- S M Yahya, "Turbines Compressors and Fans", Mac-Graw Hill Tata
- H. I. H. Saravanamuttoo, G. F. C. Rogers, Henry Cohen, Paul Straznicky and Andrew Nix, "Gas Turbine Theory", Pearson
- S L Dixon, "Fluid Mechanics Thermodynamics of Turbomachinery", Pergamon Press
- George P. Sutton and Oscar Biblarz, "Rocket Propulsion Elements", John Wiley
- EASA Part-66 Category B1 Maintenance License Module 1, "Gas Turbine Engine"
- EASA Part-66 Category B1 Maintenance License Module 1, "Propulsion"

Course Objectives:

This course aims to help students understand Aerospace Propulsion Systems, focusing on air-breathing and Rocket engines, particularly Jet engines and Turbomachinery. It combines theoretical study with practical lab experiments.

Course Outline:

- Introduction to Propulsion Systems and their Significance
- Overview of different types of Propulsion Systems
- Detailed study of Air-Breathing Engines and their Operational Limitations
- Construction, Working Principles, and Four-Stroke Cycle of Engines
- Engine Performance Parameters and Stream Tube Flow Patterns
- Installed vs. Uninstalled Engine Thrust and Additive Drag
- Thrust Power, Engine Power, and Thrust Equation

- Propulsive, Thermal, and Overall Efficiency; Aircraft Range and Take-off Thrust
- Analysis of Ramjet, Turbojet, Turbofan, and Turboprop Engines
- Introduction to Turbomachinery and Energy Transfer in Turbomachines
- Euler's Energy Equation for Turbomachinery
- Axial Compressor Velocity Triangles, Work, and Compression
- Centrifugal Compressor Stage Elements, Impeller Configurations, and Flow Analysis
- Performance Parameters, Slip Factor Determination, and Losses in Centrifugal Compressors
- Radial Turbine Stage Elements, Velocity Triangles, and Work Output
- Incidence Losses and Efficiency in Radial Turbines
- Types of Rocket Propulsion, Static Performance, Thrust, Specific Impulse, and Vehicle Acceleration