Course Title	Course Code	Credit Hours
Space Propulsion	AE-473	3-0

Textbook:

- George P. Sutton, and Oscar Biblarz, “Rocket Propulsion Elements”, Wiley

Reference Books/Materials:

- Dieter K. Huzel, “Modern Engineering for Design of Liquid Propellant Rocket Engines”, AIAA
- Gary N. Henry, and Ronald Humble, “Space Propulsion Analysis and Design”, McGraw-Hill
- Stephen D. Heister, William E. Anderson, Timothée L. Pourpoint, Joe Cassady, R. Joseph Cassady “Rocket Propulsion”, Cambridge University Press

Course Objectives:

This course covers the fundamentals of space propulsion, focusing on rocket propulsion systems and their types. It includes problem-solving for various rocket engines, nozzle and thrust chamber design, and propellant selection, along with performance analysis using reasoning and solution techniques.

Course Outline:

- Introduction: Course Outline, Objectives, Teaching Plan, Assessment Method, Concepts Review
- Duct Jet Propulsion, Rocket Propulsion, Applications of Rocket Propulsion.
- Definitions and Fundamentals: Thrust, Exhaust Velocity, Typical Performance Values.
- Nozzle Theory and Thermodynamic Relations:
    - Ideal Rocket
    - Summary of Thermodynamic Relations
    - Isentropic Flow through Nozzles.
- Nozzle Configurations
- Chemical Rocket Propellant Performance Analysis: Background and Fundamentals
- Analysis of Chamber or Motor Case Conditions

- Analysis of Nozzle Expansion Processes
- Liquid Propellant Rocket Engines:
    - Propellant Feed Systems
    - Gas Pressure/Turbopump Feed Systems
    - Tank Pressurizations
    - Thrust Chambers.
- Solid Propellant Rocket Fundamentals:
    - Propellant Characteristics
    - Propellant Burning Rate
- Propellant Grain and Grain Configuration.