

The Jet Engine: Introduction to Aircraft Propulsion (ENGG 203)

Credit Hours: 3

Course Pre-Requisites: None

Instructor: Talha Jamal Pirzada

Schedule: Monday to Friday (3.30 – 5.30 PM)

Course Description: This course is designed for anyone who is interested in how propulsion works in the aerospace domain, whether it is rockets, missiles, supersonic aircrafts or the commercial planes we fly in, this course will cover it all. It is a comprehensive study of different propulsion systems, focusing specifically on aircraft propulsion systems. The course will provide a background in the design and operation of different types of aerospace propulsion systems. It will focus on engineering principles, describing key functionality and mechanisms used in past and modern designs, along with providing design guidelines and fundamental performance analysis. It will explore the intricacies of a gas turbine in three main areas: materials, mechanics, and its in-flight functionality. It will begin by covering the limitations of materials that must be considered in jet engine component decision-making along with the key material science techniques used to enhance the performance. Next, it will explore how propulsion is generated and the different equations that govern aircraft's flight. The module will examine how in-flight forces can be manipulated using different aircraft's control surfaces. Building on concepts of motion control, the module will explore how an aircraft's stability impacts its movement. Furthermore, to ensure that the jet engine produces the maximum amount of thrust the course will investigate its cooling methodologies. Finally, the module will examine how jet engine performance is sustained through health monitoring. Overall, this module will provide a preliminary understanding of how aircraft propulsion works.