

EAS301 Aerospace Dynamics

Level: 3

Credit Units: 5 Credit Units

Language: ENGLISH

Presentation Pattern: EVERY JULY

Synopsis:

The module provides students with a fundamental understanding of the principles of aerospace dynamics and flight mechanics. In the first part, properties of the atmosphere and subsonic and supersonic aerodynamic flow theory are introduced. Aerofoil and wing theory are considered together with the integrated effects of aerofoils in lifting surfaces. Important contributions to drag are described along with simplified methods of estimating clean aircraft drag polars. After introducing basic concepts of the jet engine, the fundamental flight mechanics for unpowered and powered steady symmetrical flight are discussed. Topics such as climb performance and speed, take-off and landing analysis and range and endurance are also introduced along with basic static and dynamic handling qualities.

Topics:

- Fundamental Concepts I
- Basic Aerodynamics
- Forces and Moments
- Airfoils and wings
- Airplane performance
- Stability and control

Textbooks:

John D. Anderson: Introduction to Flight (eTextbook) 8th Edition McGraw-Hill
ISBN-13: 9781259191671

Learning Outcome:

- Apply common terms and fundamental principles & equations used in aerodynamics.
- Verify fundamentals of fluid flow and appraise the revolution in design of airfoils and wings.
- Analyse flight dynamics which covers the elements of airplane performance and the principles of stability & control. Relate the theories to designs of modern aircraft.
- Apply learnt content to airfoils and wings design.
- Appraise key considerations in airplane design.
- Analyse airplane performance.
- Set up computer simulation programs to perform data analyses.
- Analyse airplane performance data.

Assessment Strategies (Evening Class):

Components	Description	Weightage Allocation (%)
Overall Continuous Assessment	QUIZ 1	10
	LAB REPORT 1	12
	TUTOR-MARKED ASSIGNMENT 1	8
Overall Examinable Components	Written Exam	70
Total		100