

Academic Year: ( 2023 / 2024 )

Review date: 04/06/2021 14:07:39

Department assigned to the subject: null

Coordinating teacher:

Type: Electives ECTS Credits : 6.0

Year : 4 Semester :

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

Advanced Mathematics  
Fluid Mechanics  
Aerodynamics

**OBJECTIVES**

Fundamental and applied knowledge of Aerodynamics.  
Fundamental and applied knowledge of the principles that allow the prediction of forces and moments on bodies moving through a fluid. In particular, generation of lift, drag and moments on wings (subsonic and supersonic regimes) and fuselage (slender bodies).  
Understanding of the basic principles in experimental Aerodynamics: physical similarity, wind tunnels and measurements.

**DESCRIPTION OF CONTENTS: PROGRAMME**

Incompressible 3D potential flow. Basic solutions. Green's formula

Wings of finite span in incompressible flows. Lifting surface theory. Application to Slender wings. Numerical lifting surface method.

Wings of finite span in supersonic flows. Linearized potential. Supersonic source. Subsonic and supersonic edges. Evvard formulas and integration rules. Global characteristics of supersonic wings.

Wings of finite span in subsonic flows. Prandtl Glauert analogy. Swept wings.

Slender body theory. Problem formulation for revolution bodies. Transversal forces. Longitudinal forces.

Experimental aerodynamics. Similarity principles. Wind tunnel design. Measurement and visualisation techniques.

**LEARNING ACTIVITIES AND METHODOLOGY**

Theory sessions.  
Problem sessions working individually and in groups using specific software  
Lab-sessions in computer room and in the wind tunnel.

**ASSESSMENT SYSTEM**

<b>% end-of-term-examination/test:</b>	25
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	75

There are two assignments and one oral presentation during the semester.  
Each assignment represents 30% of the total grade.  
The oral presentation represents 15% of the total grade.  
Final exams correspond to the remaining 25%.

<b>% end-of-term-examination/test:</b>	25
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	75

Required minimum mark on final exam: 4/10

#### BASIC BIBLIOGRAPHY

- A. Barrero, J. Meseguer and A. Sanz Aerodinamica de altas velocidades, garceta.
- J. Katz and A. Plotkin Low-Speed Aerodynamics, Cambridge University Press.

#### ADDITIONAL BIBLIOGRAPHY

- H. Schlichting, E. Tuckebrodt. Aerodynamics of the Airplane, Mc Graw Hill., 1979
- J. Bertin, R. Cummings Aerodynamics for Engineers, Pearson Education International.