

## Helicopters and other aircrafts

Academic Year: ( 2024 / 2025 )

Review date: 21-01-2025

Department assigned to the subject: Aerospace Engineering Department

Coordinating teacher: DESSENA , GABRIELE

Type: Electives ECTS Credits : 3.0

Year : 4 Semester :

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

Aerodynamics; Mechanics of Flight; Stability and Integrity of Aerospace Structures;

## SKILLS AND LEARNING OUTCOMES

CE.TE.VA2: Adequate and applied engineering knowledge of: The fundamentals of sustainability, maintainability and operability of aerospace vehicles.

CE.TE.VA4: Adequate and applied engineering knowledge of: The physical phenomena of flight, its qualities and control, aerodynamic, and propulsive forces, performances, stability.

CE.TE.VA7: Applied knowledge of: aerodynamics; mechanics and thermodynamics, flight mechanics, aircraft engineering (fixed wing and rotary wing), theory of structures.

RA4: Graduates will be able to carry out initial research methods approaches commensurate with their level of knowledge involving literature searches, design and execution of experiments, data interpretation, selection of the best proposal and computer simulation.

RA5: Be able to apply their knowledge and understanding to solve problems and design devices or processes in the field of aerospace engineering in accordance with criteria of cost, quality, safety, efficiency and respect for the environment.

## OBJECTIVES

The goal of this course is to introduce student to the concepts of rotary wing aerodynamics and aeromechanics; helicopter flight mechanics; helicopter operations; and helicopter design. Additionally the description of other types of aircrafts will be addressed and an introduction to the main aspects of helicopters technology.

## DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to V/STOL Aircrafts
2. Introduction Momentum Theory and Blade Element Theory
3. Axial Flight
4. Forward Flight
5. Helicopter Performances
6. Stability and Control
7. Blade aero-mechanics
8. Helicopter Design

## LEARNING ACTIVITIES AND METHODOLOGY

Theory sessions.  
Problems and Projects based learning.

## ASSESSMENT SYSTEM

<b>% end-of-term-examination:</b>	30
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	70
Final Exam 30% - Assignments and in-class assessments 70%:	
30% - Final Exam	

<b>% end-of-term-examination:</b>	30
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	70

35% - Design Project

20% - Weekly quiz on Aula Global (two theory multiple choice questions and a short problem)

13% - Weekly short in-class question (5 min)

2% - Syllabus acceptance and signature

#### BASIC BIBLIOGRAPHY

- J. Gordon Leishman Principles of Helicopter Aerodynamics, Cambridge University Press, 2002

- J. Seddon & S. Newman Basic Helicopter Aerodynamics, John Wiley & Sons, 2011

#### ADDITIONAL BIBLIOGRAPHY

- A.R.S. Bramwell George Done David Balmford Bramwell's Helicopter Dynamics, Butterworth-Heinemann, 2001