

## Aerospace Design II

Academic Year: ( 2022 / 2023 )

Review date: 23-05-2022

Department assigned to the subject: Aerospace Engineering Department

Coordinating teacher: FAJARDO PEÑA, PABLO

Type: Compulsory ECTS Credits : 6.0

Year : 4 Semester : 1

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

Introduction to Flight Mechanics  
 Aerospace Structures.  
 Aerospace Design I.

## OBJECTIVES

The goal of this course is that the student acquires a basic knowledge of aerospace design. Two main topics are covered: Structural Dynamics and vibrations and Mechanism design

## DESCRIPTION OF CONTENTS: PROGRAMME

Program:

The course is divided in two main blocks:

## BLOCK 1

1. Introduction to Structural Dynamics
2. 1 D.O.F systems
3. Multiple D.O.F.s systems
4. Continuous systems
5. Aproximated method

## BLOCK 2: Mechanisms Design

1. Planar, spherical, and spatial mechanisms.
2. CAM design.
3. Spur Gears design.
4. Helical Gears, Bevel Gears, Worms, and Worn Gear design.
5. Gear Trains.
6. Flexible Machine Elements.
7. Bearing and Shaft design.

## LEARNING ACTIVITIES AND METHODOLOGY

Theory sessions  
 Problem sessions working individually and in groups.  
 Lab-sessions.

The methodology will be done as indicated by the University and the Sanitary authorities.

## ASSESSMENT SYSTEM

<b>% end-of-term-examination:</b>	60
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	40

The two blocks are weighted a 50% of the final grade. The following requirements have to be met in order to pass the subject:

<b>% end-of-term-examination:</b>	60
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	40

- 1) to have a MINIMUM mark of 4.0/10 in the end-of-term exam (having a minimum of 2.5 in each part);
- 2) to have a minimum overall mark of 5.0/10 (weighing 60% the end-of-term exam mark and 40% the mark of the continuous evaluation).

The continuous evaluation may include reports and homework in groups, exams, ...

#### BASIC BIBLIOGRAPHY

- John J.Uicker, Jr Theory of Machines and Mechanisms, Oxford University Press, 2011
- Robert L.Norton Design of Machinery:An introduction to the synthesis and Analysis of Mechanisms and Machines, McGraw Hill, 2011
- de Jan R. Wright, Jonathan E. Cooper Introduction to Aircraft Aeroelasticity and Loads, AIAA Education Series, 2008

#### ADDITIONAL BIBLIOGRAPHY

- Bramwells, A Helicopter Dynamics, AAIA, 2001
- D. Raymer Aircraft Design - A Conceptual Approach, AIAA education series, 2012
- James Bralla Handbook of product design for manufacturing: A practical guide to low-cost production, Mc Graw-hill Book, 1986
- Johnson Helicopter Theory, Dover Publications.
- P. Fortescue, J. Stark & G. Swinerd Spacecraft Systems engineering, Wiley, 2011