Aerospace Design II

Academic Year: (2019 / 2020) **Review date: 30-04-2019**

Department assigned to the subject: Bioengineering and Aeroespace 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.
Aerodynamics

OBJECTIVES

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

DESCRIPTION OF CONTENTS: PROGRAMME

Program:
The course is divided in two main blocks:
BLOCK 1 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.

BLOCK 2 Structural dynamics

8. Introduction to Structural Dynamics
9. 1 D.O.F systems
10. Multiple D.O.F.s systems
11. Continuous systems

LEARNING ACTIVITIES AND METHODOLOGY

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

ASSESSMENT SYSTEM

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

1) to have a MINIMUM mark of 4.0/10 in the end-of-term exam (having a minimum of 2 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).

% end-of-term-examination:	60
% of continuous assessment (assigments, laboratory, practicals…):	40

BASIC BIBLIOGRAPHY

- J. Seddon and S. Newman Basic Helicopter Aerodynamics, Wiley.

- John J.Uicker, Jr Theory of Machines and Mechanisms, Oxford Uniersity Press, 2011

- Leishman J. G Principles of helicopter aerodynamics, Cambridge University Press , 2006

- Robert L.Norton Design of Machinery:An introduction to the synthesis and Analysis of Mechanisms and Machines, McGraw Hill, 2011

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