Modelling in Aerospace Engineering

Academic Year: (2021 / 2022) **Review date: 21-06-2021**

Department assigned to the subject: Department of Bioengineering and Aerospace Engineering

Coordinating teacher: GARCIA-VILLALBA NAVARIDAS, MANUEL

Type: Compulsory ECTS Credits : 6.0

Year : 2 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Calculus I and II
Linear Algebra
Physics I and II
Programming
Advanced Mathematics

OBJECTIVES

Knowledge and understanding of numerical modelling applied to aerospace engineering problems

Link to document

DESCRIPTION OF CONTENTS: PROGRAMME

1 Introduction to numerical modelling in aerospace engineering (structures, fluid mechanics, flight mechanics, optimization, etc)
2 Non-linear equations
3 Linear systems
4 Interpolation
5 Curve fitting
6 Numerical differentiation
7 Numerical integration
8 Ordinary differential equations
9 Introduction to optimization

LEARNING ACTIVITIES AND METHODOLOGY

Theory sessions.
Problem sessions working individually and in groups.
Lab-sessions with mathematical software.

ASSESSMENT SYSTEM

End-of-term exam (60%)
Continuous evaluation (40%)

The continuous evaluation may include lab sessions, group projects, exams in the computer room, etc.

The end-of-term exam may consist of a written part and/or exercises in the computer room.

In order to pass the subject, three requirements need to be met:

1) to have a MINIMUM mark of 4.0/10 in the end-of-term exam;

2) to have a MINIMUM mark of 2.5/10 in each of the parts of the end-of-term exam;

3) 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).

In the extraordinary call only, it is possible to pass the subject either by meeting the previous three requirements or by meeting the next two requirements:

1) to have a MINIMUM mark of 2.5/10 in each of the parts of the final exam;

2) to have a MINIMUM mark of 5.0/10 in the final exam.

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

BASIC BIBLIOGRAPHY

- J. H. Mathews, K. D. Fink Numerical methods using MATLAB, Pearson Prentice Hall, 2004
- J. Kiusalaas Numerical Methods in Engineering with Matlab (3rd edition), Cambridge Univ. Press, 2016
- U.M. Ascher, C. Greif A first course in numerical methods, siam, 2011

ADDITIONAL BIBLIOGRAPHY

- J. D. Hoffman Numerical methods for engineers and scientists, CRC Press, 2001
- R. Butt Numerical Analysis using MATLAB, Jones and Bartlett, 2010