

Academic Year: ( 2021 / 2022 )

Review date: 11-06-2021

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

Coordinating teacher: FAJARDO PEÑA, PABLO

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 2

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

A basic knowledge of aeroelastic phenomena

**OBJECTIVES**

Good knowledge of the different aeroelastic phenomena and dynamics loads, with special emphasis on their computation using aeroelastic codes as MSC NASTRAN

Link to document

**DESCRIPTION OF CONTENTS: PROGRAMME**

1. Advanced Aeroelasticity. Getting Started.
2. Environmental Vibration
3. Powerplant Dynamics
4. Impacts
5. Normal Modes
6. 3D unsteady aerodynamics: DLM
7. Static Aeroelasticity. Trim Solution. Control Surface Effectiveness.
8. Flutter
9. Dynamic Landing
10. Discrete Tuned Gust (DTG)
11. Continuous Turbulence (CT)
12. Dynamic case or buffet

**LEARNING ACTIVITIES AND METHODOLOGY**

Theory sessions and case studies (root cause analysis).  
 Lab-sessions with computational aeroelasticity software.

**ASSESSMENT SYSTEM**

End-of-term exam (25%)  
 Assignments, Quiz (75%)

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

- 1) to have a MINIMUM mark of 4.0 in the end-of-term exam and the quizzes
- 2) to have a minimum overall mark of 5.0/10 (weighing 25% the end-of-term exam mark and 75% the mark of the continuous evaluation).

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

**BASIC BIBLIOGRAPHY**

- Wright, J.R. and Cooper, J.E. Introduction to Aircraft Aeroelasticity and Loads, John Wiley &amp; Sons Ltd., 2007

**ADDITIONAL BIBLIOGRAPHY**

- Bisplinghoff, R. L., Ashley, H., and Halfman, R.L. Aeroelasticity, Addison-Wesley, Reading, 1955
- Bisplinghoff, R., and Ashley, H. Principles of Aeroelasticity, Dover Publications Inc. , 1962
- Fung, Y.C. An Introduction to the Theory of Aeroelasticity, John Wiley and Sons, 1955
- Rodden, W.P. Theoretical and Computational Aeroelasticity, UBuildABook, 2011
- Rodden, W.P. and Johnson, E.H. MSC/NASTRAN Aeroelastic Analysis User's guide, The MacNeal-

