

## SUBJECT TEACHING GUIDE

M869 - Advanced Design in Mechanical Engineering

Master's Degree in Industrial Engineering Research

Academic year 2021-2022

1. IDENTIFYING DATA					
Degree	Master's Degree in Industrial Engineering Research			Type and Year	Optional. Year 1
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Module - Sustainable Design in Industrial Systems Electromechanic / Mechatronics Module Advanced Techniques in Mechanical Design				
Course unit title and code	M869 - Advanced Design in Mechanical Engineering				
Number of ECTS credits allocated	5	Term	Semester based (1)		
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA ESTRUCTURAL Y MECANICA
Name of lecturer	MIGUEL IGLESIAS SANTAMARIA
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Other lecturers	ANA MAGDALENA DE JUAN DE LUNA ALBERTO DIEZ IBARBIA

### 3.1 LEARNING OUTCOMES

- Understanding of the main international research fields in Mechanical Design
- Using commercial software of Finite Elements and Multibody Systems.
- Assessing new designs and technologies in Mechanical Engineering.
- Designing according to industrial specifications.

#### 4. OBJECTIVES

This course approaches Mechanical Design through both theory and practice. Particularly, it is focused on the finite element method for static and dynamic problems and kinematic and dynamic analysis of multibody systems.

Active participation of students is expected.

#### 6. COURSE ORGANIZATION

##### CONTENTS

1	Introduction to advanced design in Mechanical Engineering.
2	Static problems using finite element method.
3	Dynamic problems using finite element method.
4	Analysis of multibody systems. Kinematics and dynamics.

#### 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Theoretical exam	Written exam	No	Yes	40,00
Continuous evaluation.	Others	No	No	30,00
Practical exam.	Laboratory evaluation	No	Yes	30,00
TOTAL				100,00
Observations				
If the course is developed in English, the assessment will be in English too.				
Observations for part-time students				
Part-time students can choose between a test or continuous evaluation during the course.				

#### 8. BIBLIOGRAPHY AND TEACHING MATERIALS

##### BASIC

- Avilés, R. Métodos de análisis para diseño mecánico. Publicaciones ESI Bilbao. 2002.
- Bathe, K. J. Finite element procedures in engineering analysis. Prentice Hall, 1982.
- Clough, R. W.; Penzien, J. Dynamics of structures. Mc Graw Hill, 1975.
- García de Jalón, J. y Bayo, E., Kinematic and Dynamic Simulation of Multibody Systems. The Real-Time Challenge, Springer-Verlag, 1993.
- Petyt, M. Introduction to finite element vibration analysis, Cambridge University Press, 1990.
- Shabana, A. A., Dynamics of Multibody Systems, Cambridge University Press, 1998.