

## SUBJECT TEACHING GUIDE

### 1032 - Machine Design and Testing

Master's Degree in Industrial Engineering

Master's Degree in Industrial Engineering

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Master's Degree in Industrial Engineering Master's Degree in Industrial Engineering			Type and Year	Compulsory. Year 1 Compulsory. Year 1
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Machine Design and Testing Industrial Technology Industrial Technologies				
Course unit title and code	1032 - Machine Design and Testing				
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	FERNANDO VIADERO RUEDA				
E-mail	fernando.viadero@unican.es				
Office	E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 2. DESPACHO (S2048)				
Other lecturers	ALFONSO FERNANDEZ DEL RINCON PABLO GARCIA FERNANDEZ MIGUEL IGLESIAS SANTAMARIA				

### 3.1 LEARNING OUTCOMES

- The student will know the design of machine process as well as the methods of calculation and test to perform it.
- Knowledge of how the main machine elements work. Ability to dimension and/or select mechanical elements within a machine design process.
- Gain specific vocabulary in machine design field.
- Knowledge of mathematical foundations of Finite Element Method (FEM) and the basis to use a FEM software in a critical way.

#### 4. OBJECTIVES

The student will be able to design simple machines putting together the knowledge acquired within this course and others from related courses

The student will know the main vocabulary specific to in the machine design field

The student will know test techniques in order to improve the performance of a design.

#### 6. COURSE ORGANIZATION

##### CONTENTS

1	INTRODUCTION: General considerations for mechanical design. Safety factor and reliability
2	ELASTICITY AND FATIGUE: Static failure theories. Fatigue analysis and design
3	TRIBOLOGY
4	MACHINE ELEMENTS: Design of machine elements.

#### 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Exam of Parts I and II	Written exam	No	Yes	40,00
Exam of Parts III and IV	Written exam	Yes	Yes	40,00
Other activities outlined throughout the course	Others	No	No	5,00
Labs	Laboratory evaluation	No	No	15,00
TOTAL				100,00

##### Observations

Alteration of teaching activity as a result of the health situation:  
In case of partial or total suspension of face-to-face teaching activity, this evaluation structure will be suitably adapted according to the circumstances.

##### Non-face-to-face evaluation:

If, due to the health situation, it is not possible to carry out any evaluation activity in person, a remote evaluation modality will be adopted using telematic means.

##### Observations for part-time students

Part-time students who cannot follow the continuous evaluation and have communicated it at the beginning of the course, may be evaluated from that part through an exam.

**8. BIBLIOGRAPHY AND TEACHING MATERIALS**

## BASIC

Avilés, R., □Análisis de fatiga en máquinas□, Thomson, 2005

Besa, A. J. et al., Componentes de Máquinas. Fatiga de alto ciclo. Problemas y ejercicios resueltos. Pearson/Prentice Hall, 2003

Hamrock, B. J., et al., Elementos de máquinas, Ed. McGraw-Hill. 1999

Juvinall, R., □Fundamentos de Diseño para Ingeniería Mecánica□, Ed. Limusa.

Norton, R. L., Diseño de máquinas, Prentice Hall.

Shigley, E., Mitchell, L., □Diseño en Ingeniería Mecánica□, Ed. McGraw-Hill.