

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 |

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|------------------|--|--|--|--|--|
| 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.