

SUBJECT TEACHING GUIDE

G755 - Machine Design and Testing

Degree in Mechanical Engineering

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Degree in Mechanical Engineering			Type and Year	Compulsory. Year 4
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Design and Testing of Machines Module: Further Mechanical Technology				
Course unit title and code	G755 - Machine Design and Testing				
Number of ECTS credits allocated	6	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	PABLO GARCIA FERNANDEZ				
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Other lecturers	JESUS PASCUAL GARCIA				

3.1 LEARNING OUTCOMES

- The student will be intellectually and conceptually trained in the fundamental aspects of machine design, will have the capacity to take on the study of the Elements of Basic Machines to subsequently study and apply technical texts, regulations, etc. necessary for the projects development of construction, maintenance or modification of machines.

4. OBJECTIVES

Acquisition of the necessary capacity to approach the study of Elements of Machines and acquire the appropriate training to proceed to the mechanical design of machines, vehicles and mechanical engineering assisted by computer.

Acquisition of technical language related to the design of machines.

Knowledge and use of the basic calculation methods used in the design of machines and their limitations.

6. COURSE ORGANIZATION

CONTENTS	
1	<p>Topic 1 Introduction to machine design</p> <ul style="list-style-type: none"> - General considerations on design - The design process - Materials for construction of machines - Factor of safety and reliability - Tribological aspects in machines
2	<p>Topic 2 Analysis of stresses, strains and displacements in mechanical parts.</p> <ul style="list-style-type: none"> - Elasticity concepts review - Analysis of stresses, strains and displacements. - Contact stresses - Stress concentration - Introduction to Finite Element Method
3	<p>Topic 3: Design under static loads</p> <ul style="list-style-type: none"> - Failure criteria. Yielding or breaking. - Buckling of axially loaded members - Introduction to Linear Elastic Fracture Mechanics - Stiffness considerations. Deformation limits.
4	<p>Topic 4 Diseño under dynamic loads</p> <ul style="list-style-type: none"> - Introduction to fatigue of materials. - Uniaxial fatigue with alternating stress. - Uniaxial fatigue with alternating and mean stresses - Multiaxial fatigue - Accumulative damage.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Computational laboratory practices exam	Written exam	No	Yes	15,00
Exam Part I	Written exam	No	Yes	40,00
Exam Part II	Written exam	Yes	Yes	40,00
Resolution of exercises proposed throughout the course	Others	No	No	5,00
TOTAL				100,00
Observations				
<p>The total score will also be calculated according to the next formula: Total score= Score Exam Part I x 0.425 + Score Exam Part II x 0.425 + Score Exam Practices x 0.15.</p> <p>If the total score is less than five points, The student can attend the extraordinary call exam. The scores of the partial exams will be kept and the student must take at least the part of the extraordinary exam corresponding to the partial exam in which he has obtained a grade of less than 5 points.</p>				
Observations for part-time students				
Part-time students may either take the exam in partial blocks like the rest of the students, or take a single exam of the entire subject in the ordinary call, which can be recovered, if necessary, in the extraordinary call.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

- Diseño en Ingeniería Mecánica , Shigley, R.G Budynas, J.K. Nisbett. Ed. McGraw Hill 2008.
- Análisis de Fatiga en Máquinas , R. Aviles Ed. Thomson 2005.
- Diseño de Elementos de Máquinas, Libardo Vicente Vanegas Useche, Ediciones UTP 2018.
- Elementos de Máquinas, G. Niemann, Ed Labor S.A
- Elementos de Máquinas B.J. Hamrock, B. Jacobson, S.R. Schmid, Ed. McGraw Hill 2000.
- Diseño de Máquinas, Robert L. Norton. Ed. Pearson Prentice Hall, 1999.
- Diseño de Maquinaria, Robert L. Norton Ed. McGraw Hill 2007.
- Fatiga según E.A.E (Instrucción de Acero Estructural EURC3)
- Paul Schimpke; Hans August Horn;" Tratado general de soldadura" Edit. Gustavo Gili
- Apuntes de la asignatura.