

SUBJECT TEACHING GUIDE

G1961 - Mechanics

Degree in Civil Engineering First Degree in Civil Engineering

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Degree in Civil Engineering First Degree in Civil Engineering			Type and Year	Core. Year 1 Core. Year 1
Faculty	School of civil Engineering				
Discipline	PHYSICS FOR CIVIL ENGINEERING				
Course unit title and code	G1961 - Mechanics				
Number of ECTS credits allocated	6	Term	Semester based (2)		
Web	https://moodle.unican.es				
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. CIENCIA E INGENIERIA DEL TERRENO Y DE LOS MATERIALES				
Name of lecturer	MARIA CECILIA PARDO SANJURJO				
E-mail	maria.pardo@unican.es				
Office	E.T.S. de Ingenieros de Caminos, Canales y Puertos. Planta: + 1. DESPACHO DE PROFESORES (1054)				
Other lecturers	ANTONIO RODRIGUEZ YUNTA				

3.1 LEARNING OUTCOMES

- Knowledge of the fundamental concepts of mechanics.
- . Ability to raise and solve the mathematical formulation of mechanical problems.
- . Knowledge of the basic techniques of analyzing the static balance of rigid bodies.
- . Ability to apply the concepts of mechanics (kinematic, static, and dynamic) to the calculation of elementary structures.
- . Knowledge of the fundamentals of kinematics and dynamic analysis of rigid solids movement.
- . Ability to apply mass, moment, and energy conservation equations to both the material point and the solid.
- . Understanding the basics of vibrations in systems with one degree of freedom.

4. OBJECTIVES

- . Understanding and mastery of the basics of the general laws of mechanics and in particular static, dynamic and kinematics and the application to the resolution of engineering problems.
- . Ability to identify, analyze, pose, and solve applied force systems in rigid solids and somewhat more complex mechanical systems.
- . Application of acquired knowledge of mechanics and mathematics to the analysis of engineering problems in a reasoned and systematic way.
- . Assessment of the ability to explain and predict mechanics, both in static balance and dynamics,

6. COURSE ORGANIZATION

CONTENTS

1	STATICS 1 1) Introduction. Forces on rigid bodies. Equivalent systems of forces. 2) Center of gravity. Distributed forces. 3) Moments of inertia. Products of inertia. Inertia matrix. Principal axes. 4) Equilibrium of rigid bodies. Equilibrium of multiforce members.
2	STATICS 2 5) Truss Analysis 6) Cables. 7) Friction 8) Equilibrium and stability. Analytical statics
3	DYNAMICS 1 9) Frames of reference. Relative motion. 10) Kinematics of rigid bodies (2D) 11) Dynamics of rigid bodies (2D)
4	DYNAMICS 2 12) Conservation theorems: mechanical energy, linear and angular momentum 13) Impacts. Collissions. 14) Oscillation and vibrations

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Assessment in Statics	Written exam	No	Yes	40,00
Assessment in Dynamics	Written exam	Yes	Yes	30,00
Lab	Laboratory evaluation	No	No	15,00
Continuous evaluation during the course	Others	No	No	15,00
TOTAL				100,00
Observations				
<p>The laboratory practices must be carried out properly to take the final and the extraordinary reassessment examinations. Examination material will include any/all material covered in class, laboratory or assigned readings or homework. In final and extraordinary exams it will be possible to reassess the failed midterm examinations.</p> <p>According to Royal Decree RD 1125/2003 on the European credit system and the ratings system in the university degrees of an official nature and validity throughout the national territory, the results obtained by the student in each of the curriculum subjects will be graded based on the following numerical scale 0 to 10, with an expression of one decimal, to which its corresponding qualitative classification may be added: 0.0-4.9: Suspense (SS). 5.0-6.9: Approved (AP). 7.0-8.9: Notable (NT). 9.0-10: Outstanding (SB).</p> <p>Only for duly justified reasons (e.g. health restrictions) the evaluation tests may be organized remotely, subject to authorization by the Directorate of the Centre.</p>				
Observations for part-time students				
Part-time students grade will be obtained exclusively in examinations, being 60% Statics and 40% Dynamics.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC
<ul style="list-style-type: none"> • Pardo, C., Rodríguez Yunta, A. Mecánica. Grado en Ingeniería Civil, Serv. Publicaciones UC 2013 • Pardo, C., Rodríguez Yunta, A. Mecánica. Exámenes resueltos 2010/11-2019/20 Grado de Ingeniería Civil. Serv. de Publicaciones ETSI Caminos 2021 • Beer, F. P., Johnston, E. R. Mecánica vectorial para Ingenieros (2 tomos). Mac Graw Hill, 2010 • Riley ,W.F., Sturges, L.D. Ingeniería Mecánica (2 tomos). Ed. Reverté, 1995