

## SUBJECT TEACHING GUIDE

### G713 - Machine Dynamics and Vibrations

### Degree in Industrial Technologies Engineering

Academic year 2022-2023

1. IDENTIFYING DATA					
Degree	Degree in Industrial Technologies Engineering			Type and Year	Compulsory. Year 3
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Machine Dynamics and Vibrations Module: Selection of Specific Technologies				
Course unit title and code	G713 - Machine Dynamics and Vibrations				
Number of ECTS credits allocated	6	Term	Semester based (2)		
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	JESUS PASCUAL GARCIA JAVIER SANCHEZ ESPIGA				

### 3.1 LEARNING OUTCOMES

-A proper knowledge of the dynamical behavior of machines and mechanical systems.

#### 4. OBJECTIVES

Study of motion of mechanical systems according to the applied forces. Study of dynamic problems of mechanical systems as models of rigid or deformable solid.

Develop in students the skills to formulate and solve machine's dynamics problems such as balancing rigid rotors or flywheels.

A proper knowledge of the vibration behavior of discrete systems.

A proper knowledge of the vibration behavior of continuous systems.

#### 6. COURSE ORGANIZATION

##### CONTENTS

1	RIGID BODY DYNAMICS. Introduction to rigid body dynamics. Direct and inverse dynamic problem. Flywheels. Balancing of rigid rotors. Gear dynamics.
2	VIBRATIONS. Vibrations of discrete systems. Vibrations in one-dimensional continuous systems. Random vibrations. Vibration Control.

#### 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Laboratory practices.	Laboratory evaluation	No	No	10,00
Exercises and assignments proposed during the course.	Others	No	No	10,00
Evaluation Part I. Rigid body dynamics.	Written exam	No	Yes	25,00
Evaluation Part II. Vibrations.	Written exam	Yes	Yes	55,00
<b>TOTAL</b>				<b>100,00</b>
<b>Observations</b>				
The distance evaluation of these same works, laboratory practical exercises and written tests is foreseen, in the event that a new health alert by COVID-19 makes it impossible to carry out the evaluation in person.				
<b>Observations for part-time students</b>				
The same evaluation tests and under the same conditions as the other students.				

## 8. BIBLIOGRAPHY AND TEACHING MATERIALS

### BASIC

A. Hernández, J. Aguirrebeitia, V. Petuya, C. Pinto. Dinámica de Máquinas. Ed. Síntesis. 2019.

Wilson, C. E. y Sadler, J. P., Kinematics and Dynamics of Machinery, Pearson Education International Inc., 2003.

Norton, R. L., Diseño de Maquinaria, McGraw-Hill, 2005.

Rao, S. S., Mechanical Vibrations, Addison-Wesley, 1.995.

Argyris, J., Mlejnek, H.P., Dynamics of Structures, North-Holland, 1991.

W. Weaver, S. P. Timoshenko, D. H. Young. Vibration problems in engineering. John Wiley & Sons. 1990.