

## [MHB203] MODELLING AND SIMULATION

### GENERAL INFORMATION

<b>Studies</b>	UNIVERSITY MASTER IN INDUSTRIAL ENGINEERING	<b>Subject</b>	?
<b>Semester</b>	1	<b>Course</b>	2
<b>Character</b>	OPTIONAL	<b>Mention / Field of specialisation</b>	???
<b>Plan</b>	2022	<b>Modality</b>	Face-to-face
<b>Credits</b>	3	<b>Hours/week</b>	2.83
		<b>Language</b>	CASTELLANO
		<b>Total hours</b>	51 class hours + 24 non-class hours = <b>75 total hours</b>

### PROFESSORS

EGUREN EGUIGUREN, JOSE ALBERTO
UNZUETA ARANGUREN, GORKA

### REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
(No specific previous subjects required)	(No previous knowledge required)

### LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
<b>MHRA19</b> - To demonstrate capacity for the management of technological Research, Development and Innovation		x		1,5
<b>MHR125</b> - To possess and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context		x		1,5
<b>Total:</b>				3

*KC: Knowledge or Content / SK: Skills / AB: Abilities*

#### ENAE LEARNING RESULTS

ENAE LEARNING RESULTS	ECTS
<b>ENA126</b> - Knowledge and comprehension: Critical knowledge of the broad multidisciplinary context of engineering and the interrelations existing between the knowledge of the different fields.	0,5
<b>ENA128</b> - Analysis in engineering: Ability to conceive new products, processes, and systems.	0,5
<b>ENA131</b> - Engineering projects: Ability to project, develop and design new complex products (parts, components, finished products, etc.), processes and systems with specifications defined incompletely and/or with conflicts, which require the integration of knowledge from different disciplines, and consider social, health and safety, environmental, economic and industrial aspects; to select and apply the appropriate methodologies or employ creativity to develop new project methodologies.	0,5
<b>ENA136</b> - Research and innovation: High-level capacity and ability to project and carry out experimental investigations, interpret data with criteria, and draw conclusions.	1
<b>ENA144</b> - Preparation of judgements: Ability to integrate knowledge and handle complex concepts and formulate judgements with limited or incomplete information, including reflection on ethical and social responsibility related to the application of their knowledge and opinion.	0,5
<b>Total:</b>	3

### SECONDARY LEARNING RESULTS

#### **RAH212** [!] *Demostrar capacidad para la gestión de la Investigación, Desarrollo e Innovación tecnológica*

#### LEARNING ACTIVITIES

LEARNING ACTIVITIES	CH	NCH	TH
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	8,5 h.	8 h.	16,5 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	12 h.		12 h.
Carrying out exercises and solving problems individually and/or in teams	5 h.	4 h.	9 h.

#### EVALUATION SYSTEM

Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems

**W**

100%

#### MAKE-UP MECHANISMS

Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems

**CH - Class hours:** 25,5 h.

**NCH - Non-class hours:** 12 h.

**TH - Total hours:** 37,5 h.

**RAH213** [!] *Poseer y comprender conocimientos que aporten una base u oportunidad de ser originales en el desarrollo y/o aplicación de ideas, a menudo en un contexto de investigación*

LEARNING ACTIVITIES	CH	NCH	TH
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	8,5 h.	8 h.	16,5 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	12 h.		12 h.
Carrying out exercises and solving problems individually and/or in teams	5 h.	4 h.	9 h.
EVALUATION SYSTEM	W	MAKE-UP MECHANISMS	
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	100%	Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	

**CH - Class hours:** 25,5 h.  
**NCH - Non-class hours:** 12 h.  
**TH - Total hours:** 37,5 h.

## CONTENTS

1. INTRODUCTION TO DOE  
 2. FULL FACTORIAL DESIGN  
 3. FRACTIONAL FACTORIAL DESIGN  
 4. TAGUCHI METHOD

## LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Subject notes	BOX, GEORGE E.P.; HUNTER, WILLIAM G.; HUNTER, J. STUART. Estadística para investigadores. Ed. Reverté, Barcelona, 1988 PRAT, ALBERT; TORT-MARTORELL, XAVIER; GRIMA, PERE; POZUETA, LOURDES. Métodos Estadísticos. Control y mejora de la calidad. Ed. UPC, Barcelona, 1997. ISBN 84-8301-222-7 PHADKE, MADHAV S. Quality Engineering using robust design. Ed. AT&T Bell Laboratories, 1989. ISBN 0-13-745167-9. TAGUCHI G.; ELSAYED A. E.; HSIANG T. Quality Engineering in Production Systems. Mc Graw Hill, 1989. ISBN 0-07-062830-0. HIRANO, Hiriyuki. Poka Yoke. Mejorando la calidad del producto evitando los defectos. Productivity Press, Inc. ISBN: 84-87022-73-1