

## [MRB101] DATA ANALYTICS

### GENERAL INFORMATION

<b>Studies</b>	Master's Degree in ROBOTICS AND CONTROL SYSTEMS		<b>Subject</b>	?
<b>Semester</b>	1	<b>Course</b>	1	<b>Mention / Field of specialisation</b>
<b>Character</b>	COMPULSORY		<b>Language</b>	CASTELLANO/EUSKARA
<b>Plan</b>	2023	<b>Modality</b>	Face-to-face	<b>Total hours</b>
<b>Credits</b>	3	<b>Hours/week</b>	0	29 class hours + 46 non-class hours = <b>75 total hours</b>

### PROFESSORS

CERNUDA GARCIA, CARLOS
BARREIRO BUEZO, UNAI

### REQUIRED PREVIOUS KNOWLEDGE

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

### LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
<b>M1R208</b> - [!] <i>Diseñar e implementar técnicas de preprocesamiento y modelado de datos para predecir, clasificar y agrupar los mismos, siendo capaz de interpretar y validar los modelos creados para la extracción del conocimiento</i>		x		2,4
<b>M1R223</b> - [!] <i>Capacidad de trabajar en equipos multidisciplinares y en un entorno multilingüe y de comunicar, tanto de forma oral como escrita, conocimientos, procedimientos, resultados e ideas relacionadas con los temas afines al máster</i>		x		0,2
<b>M1R228</b> - To communicate your conclusions and the knowledge and ultimate reasons that support them to specialized and non-specialized audiences in a clear and unambiguous way		x		0,4
<b>Total:</b>				<b>3</b>

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

### SECONDARY LEARNING RESULTS

#### **RA091** [!] *Reconoce y utiliza conceptos del aprendizaje automático para aplicarlos en el preprocesamiento de datos*

#### LEARNING ACTIVITIES

	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	2 h.	5 h.	7 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	1 h.	5 h.	6 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	4,5 h.		4,5 h.
Carrying out exercises and solving problems individually and/or in teams	5,5 h.	7 h.	12,5 h.

#### EVALUATION SYSTEM

	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	15%
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	25%
Individual written and/or oral tests or individual coding/programming tests	60%

#### MAKE-UP MECHANISMS

Individual written and/or oral tests or individual coding/programming tests

**Comments:** All activities (control points, individual and group work, etc.) must have a minimum grade of 5 and an opportunity for recovery (except the PBL). In unapproved training activities (less than 5) the recovery is compulsory and the final grade will be the grade obtained in the recovery. In the activities carried out it is necessary to obtain a minimum mark of 4 to calculate the average mark of the learning result. Otherwise, the note of the learning result will be that of the suspended activity. The system will calculate the final grade with the RA, applying the percentages defined in IKOF.

**CH - Class hours:** 13 h.
   
**NCH - Non-class hours:** 17 h.
   
**TH - Total hours:** 30 h.

**RA092** [!] *Desarrolla y propone soluciones cuya base sea el análisis de datos utilizando los conceptos del aprendizaje automático comunicando sus conclusiones de manera argumentada en un segundo idioma*

**LEARNING ACTIVITIES**

	<i>CH</i>	<i>NCH</i>	<i>TH</i>
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	2 h.	16 h.	18 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.	3 h.	5 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	2,5 h.		2,5 h.
Carrying out exercises and solving problems individually and/or in teams	9,5 h.	10 h.	19,5 h.

**EVALUATION SYSTEM**

*W*

**MAKE-UP MECHANISMS**

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	15%	Individual written and/or oral tests or individual coding/programming tests
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	25%	
Individual written and/or oral tests or individual coding/programming tests	60%	

**Comments:** All activities (control points, individual and group work, etc.) must have a minimum grade of 5 and an opportunity for recovery (except the PBL). In unapproved training activities (less than 5) the recovery is compulsory and the final grade will be the grade obtained in the recovery. In the activities carried out it is necessary to obtain a minimum mark of 4 to calculate the average mark of the learning result. Otherwise, the note of the learning result will be that of the suspended activity. The system will calculate the final grade with the RA, applying the percentages defined in IKOF.

**CH - Class hours:** 16 h.
   
**NCH - Non-class hours:** 29 h.
   
**TH - Total hours:** 45 h.

**CONTENTS**

0 Python basics for data analytics

1 Data preprocessing

1.1 Cleaning

1.2 Transformations

1.3 Missing values and outliers

1.4 Feature selection/extraction/discretization

1.5 Imbalanced data treatment

2 Data analytics

2.1 Problem types

a) Classification

b) Regression

c) Clustering

2.2 Families of models

2.3 Model selection

2.4 Model validation

## LEARNING RESOURCES AND BIBLIOGRAPHY

### Learning resources

Subject notes  
Technical articles  
Topic related web quires  
Moodle Platform  
Class presentations  
Computer practical training  
Slides of the subject  
Specific Master Software

### Bibliography

[http://katalogoa.mondragon.edu/janium-bin/janium\\_login\\_opac\\_re\\_in\\_k.pl?grupo=MASTERROBOTIKA11&ejecuta=5&\\_ST](http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_in_k.pl?grupo=MASTERROBOTIKA11&ejecuta=5&_ST)