[MSB002] Data analytics and fundamentals of machine learning

GENERAL INFORMATION

Studies	MASTER DEGREE IN SMART ENERGY SYSTEMS			**Subject**	Monitoring and diagnosis
Semester	1	**Course**	1	**Mention / Field of specialisation**	
Character	COMPULSORY				
Plan	2022	**Modality**	Face-to-face	**Language**	CASTELLANO
Credits	4,5	**Hours/week**	0	**Total hours**	75.5 class hours + 37 non-class hours = **112.5 total hours**

PROFESSORS

AGUIRRE ORTUZAR, AITOR
GARAYALDE PEREZ, ERIK

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
(No specific previous subjects required)	[!]
	[!]
	[!]

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
MSR061 - Recognise and use machine learning concepts to apply them in data modelling to predict, classify and cluster data	x			4,04
MSR171 - Ability to work in multidisciplinary teams and in a multilingual environment	x		x	0,16
MSR222 - Exhibits, argues and defends the results obtained in the work carried out before a panel of judges			x	0,14
MSR251 - Develops a project in the field of energy systems in a practical application context		x		0,16
			Total:	**4,5**

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

SECONDARY LEARNING RESULTS

RMS112 **[!]** ***Reconocer y utilizar conceptos del aprendizaje automático para aplicarlos en el modelado de datos para predecir, clasificar y agrupar los mismos***

LEARNING ACTIVITIES	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	9 h.		9 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	35 h.	19 h.	54 h.
Carrying out exercises and solving problems individually and/or in teams	20 h.	18 h.	38 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	33%
Individual written and/or oral tests or individual coding/programming tests	67%

MAKE-UP MECHANISMS
Individual written and/or oral tests or individual coding/programming tests

CH - Class hours: 64 h.
NCH - Non-class hours: 37 h.
TH - Total hours: 101 h.

RMS171 **[!]** ***Es capaz de trabajar en equipos multidisciplinares y en un entorno multilingüe***

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	4 h.		4 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	100%	Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems

CH - Class hours: 4 h.
NCH - Non-class hours: 0 h.
TH - Total hours: 4 h.

RMS222 **[!]** ***Expone, argumenta y defiende ante un tribunal los resultados obtenidos en el trabajo desarrollado***

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	3,5 h.		3,5 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: 3,5 h.
NCH - Non-class hours: 0 h.
TH - Total hours: 3,5 h.

RMS251 **[!]** ***Desarrolla un proyecto del ámbito de los sistemas energéticos en un contexto de aplicación práctica***

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	4 h.		4 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	50%	Individual written and/or oral tests or individual coding/programming tests
Individual written and/or oral tests or individual coding/programming tests	50%	

CH - Class hours: 4 h.
NCH - Non-class hours: 0 h.
TH - Total hours: 4 h.

CONTENTS

- Introduction- Exploratory analysis- Statistical bases- Pandas + numpyData pre-processing- Fundamentals for model validation- Supervised learning- Classification

- Regression

- Unsupervised learning

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Moodle Platform
Class presentations
Computer practical training
Specific Master Software
Slides of the subject

Bibliography

Feature engineering and selection [Libro] : a practical approach for predictive models / Max Kuhn, Kjell Johnson

Statistics for machine learning : techniques for exporling supervised, unsupervised, and reinforcement learning models using both Python and R [Libro] / Dangeti, Pratap

Python for data analysis [Libro] : data wrangling with Pandas, NumPy, and IPython / Wes McKinney

Data science from scratch : first principles with Python [Libro] / Grus, Joel

Acceso online a bibliografía: https://labur.eus/ReBm1