



Programme of Course "Data Analytics and Data Driven Decision"

- Code: DT0440
- Type of course unit: Elective (Master Degree in Computer Science curriculum GSEEM), Compulsory (Master Degree in Computer Science curriculum NEDAS), Elective (Master Degree in Computer Science curriculum SEAS), Elective (Master Degree in Computer Science curriculum UBIDIS), Compulsory (Master Degree in Mathematics curriculum Generale)
- Level of course unit: Postgraduate Degrees
- Semester: 2

Number of ects credits: (Master Degree in Mathematics) 6 (workload 150 hours), (Master Degree in Computer Science) 6 (workload 150 hours)

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1	<b>Course objectives</b>	Learn fundamental techniques to examine raw data with the purpose of drawing data-driven decisions. The Data Driven Decision module deals with the main methods for supervised and non-supervised learning. Particular attention will be given to the statistical foundations of learning. The most established techniques to extract information from data to orient decisions will be treated both in their theoretical motivations and in their practical details. Open source tools will support the course step by step, providing continuous verification of the material.
2	<b>Course content and learning outcomes (dublin descriptors)</b>	<p>Topics of the module include:</p> <ul style="list-style-type: none"> <li>• Introduction to analytics</li> <li>• Data collection, cleaning and preprocessing</li> <li>• Exploratory Data Analysis &amp; Visualization</li> <li>• Statistical inference and regression models</li> <li>• Optimization formulations of data analysis and learning problems</li> <li>• Statistical foundations of learning</li> <li>• Clustering and other non-supervised methods</li> <li>• Decision trees - Logic methods</li> <li>• Support vector machines - Feature selection</li> <li>• Methods and tools for supervised and non-supervised learning</li> </ul> <p>On successful completion of this module, the student should :</p> <ul style="list-style-type: none"> <li>• know the main aspects and issues related with the content of the course</li> <li>• know how methods for non supervised learning work</li> <li>• know how methods for supervised learning work</li> <li>• know how to identify, among the methods considered, the one most suited for a given problem</li> <li>• being able to use software system that implement the methods studied</li> </ul>
3	<b>Course prerequisites</b>	Basic programming skills, introductory statistic, linear optimization
4	<b>Teaching methods and language</b>	Lectures and practical training <b>Language:</b> English
5	<b>Assessment methods</b>	Assignment