COURSE SYLLABUS 2019-20

Basic information on the course			
Course:	Big Data Analytics		
Course code:	71144207	Plan:	Máster en Tecnologías y Aplicaciones en Ingeniería Informática
Academic Year:	2019-20	Undergraduate/Graduate:	Official master's degree
Degree Year:	1	Type:	Elective
Duration:	Second term		

TIME DISTRIBUTION ACCORDING TO REGULATIONS	
Credits:	4
Total time:	100
USE OF LEARNING PLATFORM:	Multimodal

TEACHERS			
Name	José del Sagrado Martínez		
Departement	Informatics Dpt.		
Building	Edificio Científico Técnico III Matemáticas e Informática (CITE III) 2		
Office	2.16.1		
Telephone	+34 950 015086	E-mail (institutional)	jsagrado@ual.es
Website	Sagrado Martínez, José_ del's website		

OTHER IMPORTANT INFORMATION

Content justification

An avalanche of data is generated daily, both by companies and individuals. The analysis of data and business are disciplines that have experienced a remarkable growth in organizations and companies, due to their need of having tools to analyze data and make efficient decission based on these analysis.
The analysis of large volumes of data has evolved as the volume of data grew. Business intelligence tools have been gathering the technologies of online analytical processing (OLAP), reporting and query (reporting and query), visualization and data mining with the application of Web mining, text mining and innovative social mining (with the analysis of data in social media) and opinion mining (responsible for analyzing opinion). Nowadays, these are some of the reasons why is so important for companies to acquire skills based on the analysis of large volumes of data.

At the time of performing the analysis, we will use R and its integrated development environment, RStudio. R is a programming language and, at the same time, it provides a wide range of tools. All this, together with its graphic and integration capabilities, makes it the ideal environment to develop the tasks involved in the analysis of large volumes of data.

Courses related in Study Plan
This subject is related to those that make up Module 4. Specialization in Big Data, within the Master's Program.
Pre-required knowledge
Those which are needed to gain access to the Master.

COMPETENCES
Basic and general competences
Basic competences Application of knowledge
General competences Ability to solve problems
Key competences University of Almeria
Specific competences
[TI07:] Ability to understand and apply advanced knowledge of high performance computing and numerical or computational methods to engineering problems. [TI09:] Ability to apply mathematical, statistical and artificial intelligence methods to model, design and develop applications, services, intelligent systems and systems based on knowledge. [CE04:] Ability for mathematical modeling, calculation and simulation in technological centers and business engineering, jointly in tasks of research, development and innovation in all areas related to Computer Engineering. [CE07:] Capacity for the start-up, direction and management of computer equipment manufacturing processes, with guarantee of safety for people and goods, the final quality of the products and their homologation.
LEARNING OUTCOMES
1. Apply the learning skills acquired to solve problems in the environment of the analysis of large volumes of data. 2. Carry out mathematical modeling, calculation and analysis of large volumes of data. 3. Solve problems in the field of data analysis. 4. Understand and apply numerical and computational methods to problems of analyzing large volumes of data. 5. Apply mathematical, statistical and artificial intelligence methods to model, design and develop applications / systems for analyzing large volumes of data.
COURSE SYLLABUS
Topic 1 - Introduction to the Analysis Big Data • The life cycle of a large volume data analysis project. • Type problems.

Topic 2 - Loading, Exploration and Data Management
- Working with data sources.
- Data exploration: data summaries and visualization.
- Data management: cleaning and sampling for modeling and validation

Topic 3 - Analysis of Big Data with Machine Learning
- Supervised algorithms.
- Unsupervised algorithms.
- Algorithms for recommendation.
- Selection and evaluation.

Topic 4 - Strategy for the Integration of Analysis of Big Data in the Company
- Strategy design.
- Analysis of large volumes of data good practices

Methodology and learning activities

• Lectures that are devoted to the exposition of the theoretical-practical keys.
• Tutorials to support and reinforce the theoretical-practical keys exposed.
• Problem resolution. The student must face the resolution of the problems and apply the acquired knowledge.
• Preparation and writing of practical work, where the student demonstrates the application of the acquired knowledge and specific procedures.

COMPETENCY ASSESSMENT

Criteria and assessment tools

Evaluation instruments used:
• Tests, exercises, problems (CT01, TI07, TI09).
• Final evaluation of reports, works and / or projects (CE04, CE07, TI07, TI09).
The degree of development of competences reached by the student throughout the course will take into account all aspects of the student's work (ability to learn to work autonomously). Therefore, it will be subject to continuous evaluation and will be evaluated as follows:
• 70% Make online tests, in which the student's ability to solve the proposed practices and problems, previously sent through the virtual classroom, will be assessed. In each of the units presented:
- Exercises will be presented focusing on the fundamental aspects (CT01, TI07, TI09)
- Projects will be proposed to put into practice the student’s acquired knowledge (TI07, TI09, CE04, CE07)
• 20% Access and exercises in the virtual classroom: paying special attention to active participation through email and forums, as well as to the sending of activities and proposed problems through the virtual classroom (the originality of the solution, choice of methodologies and techniques, preparation of report and interpretation of results).
• 10% Observation (systematic collection of information in the context of learning) and participation in class.

Follow-Up Mechanisms

- Virtual classrom registration and access to.
- Virtual classrom activities sent.

Functional diversity / Functional disability.

- Those students with disabilities or special educational needs can get in contact with the Delegation of the Rector for the Functional Diversity (http://www.ual.es/discapacidad) to receive the appropriate guidance and advice in order to facilitate their instructional, learning and training processes. Likewise, these students may request the implementation of the necessary and suitable adaptations of content, methodology and evaluation that guarantee equal opportunities in their academic development. The processing of any personal data or aggregated information regarding these aforementioned students, in fully compliance with the GDPR, is strictly confidential. Faculties and academic staff lecturing the course referenced by this guide/document will be in charge of applying the recommended adaptations approved by the Delegation of the Rector for the Functional Diversity, this fact will be, therefore, notified to the School or Faculty as well as to the coordinator of the academic course.

COURSE MATERIALS

Recommended course materials

- EMC Education Services. Data science & big data analytics : discovering, analyzing, visualizing and presenting data. John Wiley and Sons. 2015.

Complementary

- Saumyadipta Pyne, B.L.S. Prakasa Rao, S.B. Rao (Eds.). Big Data Analytics: Methods and Applications . Springer. 2016.
- Michael Manoochehri. Data just right : introduction to large-scale data & analytics . Addison-Wesley. 2014.
- Frank Ohlhorst. Big data analytics: turning big data into big money. Wiley. 2013.
- Michael Minelli, Michele Chambers, Ambiga Dhiraj. Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses . John Wiley and Sons. 2013.
- Luis Joyanes Aguilar. Big Data : an_lisis de grandes vol_menes de datos en organizaciones. Marcombo. 2014.

Other materials

- Bart Baesens . Analytics in a Big Data World : The Essential Guide to Data Science and Its Applications. John Wiley & Sons, Incorporated . 2014.

Couse materials available in UAL’s library

You can check the existing references in the Library Management System by clicking on the next link: http://almirez.ual.es/search/x?SEARCH=71144207

WEBSITE