

COURSE SYLLABUS 2019-20

Basic information on the course			
Course:	Data Visualization		
Course code:	71144209	Plan:	Máster en Tecnologías y Aplicaciones en Ingeniería Informática
Academic Year:	2019-20	Undergraduate/Graduate:	
Degree Year:	1	Type:	
Duration:			
TIME DISTRIBUTION ACCORDING TO REGULATIONS			
Credits:	4		
Total time:	100		
USE OF LEARNING PLATFORM:			

TEACHERS			
Name	Bosch Arán, Alfonso José		
Departement	Informatics		
Building	Edificio Edificio Científico Técnico III Matemáticas e Informática (CITE III). Planta 2		
Office	210		
Telephone	+34 950 015524	E-mail (institutional)	abosch@ual.es
Website	http://cms.ual.es/UAL/personas/persona.htm?id=505553485049554878		
Name			
Departement			
Building			
Office			
Telephone		E-mail (institutional)	
Website			
Name			
Department			
Building			
Office			
Telephone		E-mail (institutional)	
Website			
Name			
Department			
Building			

Office			
Telephone		E-mail (institutional)	
Website			

OTHER IMPORTANT INFORMATION

Content justification

Presentation of a data analysis result is basic to communicate the message aiming to be transmitted. Thus, the receiver can get it in an easy and unequivocal way. We need also take care of the inverse process: starting with raw data visualization, try if conclusions could be inferred, or choose a set of analysis to carry out or discard. Key Performance Indicators (KPI) and Dashboards are other visualization tools that shown at a glance the state and performance of an organization. These considerations justify its inclusion into this Master.

Courses related in Study Plan

Data Visualization is related to the subjects included in Big Data branch, specially Big Data Analysis.

Pre-required knowledge

None

COMPETENCES

Basic and general competences

- *Knowledge application*
- *Communication abilities and social aptitude*

General competences

- *Capacity for problem solving*

Specific competences

CE01 - Capacity to project, calculate and design products, processes facilities in all Informatics Engineering areas.

TI09 – Capacity to apply mathematic, statistic and artificial intelligence methods for modelling, designing and developping applications, services, intelligent systems and knowledge based systems.

TI10 – Capacity for use and develop methodologies, methods, techniques specific programs and standards for graphic computing.

LEARNING OUTCOMES

1. Student will be able to apply acquired knowledge and solve problems in new or not well-known situations, into broader (or multidisciplinary) contexts, related to data visualization.
2. Student will be able to create visual representations in all areas of Computer Science.
3. Student will be able to solve problems related to Data Visualization.
4. Student will be able to apply mathematic, statistic and artificial intelligence methods for modelling, designing and developing Big Data Visualizations.
5. Student will be able to use and develop methodologies and methods for Big Data Visualization.

PLANNING

Contents

1. Introduction to data visualization.
 - 1.1 Perception aspects
 - 1.2 Criteria for designing data visualization
2. Raw Data Visualization
 - 2.1 Techniques and tools for raw data visualization
 - 2.2 Results and interpretation of raw data visualization
3. Processed Data Graphical Plotting
 - 3.1 Selecting datasets and processes
 - 3.2 Classification of representation techniques. Tools
4. Visual Aids for Decision Making
 - 4.1 Models and tools for decision making support.
 - 4.2 Indicators (KPI). Definition and extracting process.
5. Dashboards
 - 5.1 Dashboard definition and objectives.
 - 5.2 Dashboard design. Tools.

Methodologie and Training Activities

- Theoretical and practical classes: participatory master classes with exposition of key points
- Preparation and writing of practical works
- Tutoring for supporting student autonomous work

Teaching innovation activities

As a complementary teaching innovation activity into the IA2 group project, we'll start selecting teaching materials to be used as base for editing a book for the course. In which we'll use the methodology developed by the group.

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.

COMPETENCES ASSESSMENT PROCEDURES

Assessment Criteria and Instruments

Assessment instruments used in the course are:

Tests, exercises and problems.

Reports, activities, and projects.

The degree of development of competences achieved by the student throughout the course will be evaluated as follows:

60% in a final exam (evaluating competencies CT01, TI09, TI10), which may contain both theoretical and fundamental questions as well as questions about problems

Remaining 40% (CT01, CB9, CE01, TI09), will be based on continuous evaluation, taking into account all aspects of the student's work: resolution of practices and problems and delivery in the Virtual Classroom (30%), observation (systematic collection of) information in the context of learning) and attendance and participation in class (10%).

To pass the course, it is necessary to overcome the continuous evaluation and the final exam.

- Follow-Up Mechanisms

- Attendance to tutoring
- Use of virtual classroom
- Participation into communication tools (discussion forums, messages)
- Assignments uploading to virtual classroom

COURSE MATERIALS

Recommended course materials

Basic

- Nathan Yau. Visualize This: The FlowingData Guide to Design, Visualization, and Statistics. Wiley. 2011.
- Garrett Grolemund, Hadley Wickham. R for Data Science. O'Reilly. 2017.
- Ben Jones. Communicating Data with Tableau. O'Reilly. 2014.

Complementary

Other materials

Course materials available in UAL's library

Puede ver la bibliografía existente en la actualidad en el Sistema de Gestión de Biblioteca consultando en la siguiente dirección:

[http://almirez.ual.es/search/e?SEARCH=VISUALIZACION DE DATOS](http://almirez.ual.es/search/e?SEARCH=VISUALIZACION+DE+DATOS)

WEBSITES

- <http://www.tableau.com/>
Tableau data visualization tool web site.
- <http://d3js.org>
D3 Javascript data visualization tool web site.
- <https://www.r-project.org/>
R environment for data analysis and representation web site.
- <https://powerbi.microsoft.com/es-es/desktop/>
Power BI Desktop web site.