Fakultät für Informatik
Facoltà di Scienze e Tecnologie informatiche
Faculty of Computer Science

COURSE DESCRIPTION – ACADEMIC YEAR 2018/2019

Course title	**Data Visualization and Exploration**
Course code	73001
Scientific sector	INF/01
Degree	Master in Computational Data Science (LM-18)
Semester	1
Year	1
Credits	6
Modular	No

Total lecturing hours	40
Total lab hours	20
Attendance	Not compulsory. Non attending students have to agree with the lecturer on the modalities of independent study at the beginning of the course.
Prerequisites	
Course page	https://ole.unibz.it/

Specific educational objectives	The course belongs to the type "caratterizzanti – discipline informatiche" in the curriculum "Data Analytics".
	The course is designed to acquire professional skills and knowledge useful when exploring datasets. In particular, the student will be able to visualize datasets choosing the most appropriate technique for the data at hand, and will be able to get insights from the data supported by the visualizations, using basic statistical tools. The student will also learn to avoid the common pitfalls in visualization that can mislead the analysis. Visualization and data handling are done using the R programming language, following the best practices of reproducible research.

Lecturer	Matteo Ceccarello
Contact	Piazza Domenicani 3, Room 1.17, matteo.ceccarello@unibz.it,
Scientific sector of lecturer	INF/01
Teaching language	English
Office hours	Arranged beforehand by email
Lecturing Assistant (if any)	--
Contact LA	--
Office hours LA	--
List of topics	● Human psychology and perception ● Data and image models ● Visualization software and tools ● Visual Diagnostics ● Exploratory data analytics ● Discovery methods
Teaching format	Frontal lectures, lab assignments, project.

Learning outcomes	Knowledge and understanding:

	- D1.1 - Knowledge of the key concepts and technologies of data science disciplines - D1.2 - Understanding of the skills, tools and techniques required for an effective use of data science - D1.3 - Knowledge of principles, methods and techniques for processing data in order to make them usable for practical purposes, and understanding of the challenges in this field - D1.9 - Knowledge of the challenges in the field of man-machine interface and of the methods and techniques for overcoming these challenges Applying knowledge and understanding: - D2.1 - Practical application and evaluation of tools and techniques in the field of data science - D2.9 - Design, application and evaluation of technologies and tools for human-machine interaction, data exploration and data visualization Making judgments - D3.2 - Ability to autonomously select the documentation (in the form of books, web, magazines, etc.) needed to keep up to date in a given sector. Communication skills - D4.1 - Ability to use English at an advanced level with particular reference to disciplinary terminology - D4.2 - Ability to present one's work in a clear and comprehensible way in front of an audience, including non-specialists - D4.3 - Ability to structure and draft scientific and technical documentation

Assessment	Project work in groups and final computer-based exam
Assessment language	English
Assessment Typology	Monocratic
Evaluation criteria and criteria for awarding marks	30% group project work, 70% computer-based exam - Relevant for project work: ability to work in team, clarity of presentation, ability to gain useful and novel insights from data, creativity, critical thinking, ability to adhere to reproducible research best practices - Relevant for written assessment: ability to use R software to perform basic data preparation tasks, ability to properly use R plotting facilities, ability to summarize the concepts of the Grammar of Graphics and of human perception, ability to choose the best type of graphical representation for different types of data, correct usage of basic statistical tools Non attending students take the same exam as all the other students.

Required readings	The following required readings are all available online for free Data Visualization. A practical introduction. Haley. Available online

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	• R for Data Science. Wickham. [Available online](#) • A layered grammar of graphics. Wickham. [Available online](#) Subject Librarian: David Gebhardi, David.Gebhardi@unibz.it
Supplementary readings	• Fundamentals of Data Visualization*. Wilke. [Available online](#)* • Visualization Analysis and Design*. Munzer. [Amazon](#)* • Data Visualization: Charts, Maps, and Interactive Graphics. *Grant. [Amazon](#)*
Software used	Rstudio https://www.rstudio.com/