

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF INFORMATION SCIENCES & TECHNOLOGY		
ACADEMIC UNIT	DEPARTMENT OF STATISTICS		
LEVEL OF STUDIES	1st Cycle (UNDERGRADUATE)		
COURSE CODE	6316	SEMESTER	6th
COURSE TITLE	STSP: Visualization and Data Story Telling		
INDEPENDENT TEACHING ACTIVITIES		WEEKLY TEACHING HOURS	CREDITS
Lectures		4	7
Workshops			
Labs			
COURSE TYPE	Elective		
PREREQUISITE COURSES:	Basic knowledge of statistics and programming will be useful.		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO		
COURSE WEBSITE (URL)	https://www.dept.aueb.gr/en/stat/content/special-topics-statistics-and-probability-visualization-and-data-story-telling-7-ects		

(2) LEARNING OUTCOMES

Learning outcomes
Upon successful completion the students will be able to: • understand how data visualization works in terms of human visual perception and cognition; • understand the importance of effective visualizations for making use of data; • understand good and bad practices in the design of data visualizations; • learn about practical data visualization, including methods for visualizing different types of data, interaction techniques, methods for processing massive volumes of data, the grammar of graphics, etc.; • create data visualizations using a programming language; • develop an application using Shiny.
General Competences

(3) SYLLABUS

- Foundations of Data Visualization: Core concepts, "best vs. worst" practices, and fundamental principles for creating effective and honest charts.
- Visual Perception and Design: Exploring the psychology of vision, the "Data-to-Ink Ratio" (minimizing clutter to maximize information), and strategic selection of color palettes.
- The Grammar of Graphics: Understanding the layered structure of visualizations (data, mappings, scales, layers, and coordinates).
- Visualization Taxonomy: Selecting the right chart types for specific data structures and purposes. Topics include flow visualizations, Trellis (facet) plots, and geospatial map types.
- Dashboards and Infographics: Designing organized, multi-view displays and information-dense graphics.
- Interactive Graphics: Implementing interactivity through animation, tooltips (hovering), and filtering.
- Technical Application: Implementing interactive visualizations using tools like Shiny (R).
- Data Storytelling: Narrative structures for data-driven stories and techniques for effective visual communication.
- Ethics in Visualization: Principles for the deontological (ethical) use of visual information to avoid bias and misleading representations.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Face-to-face	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	YES	
TEACHING METHODS	Activity	Semester workload
	Class Lectures	
	Lab Exercise	
	Project	
	Course total	
STUDENT PERFORMANCE EVALUATION	Written examination at the end of the semester. Project. Information is available at eclass	

(5) ATTACHED BIBLIOGRAPHY

Suggested bibliography:

- Chen, C., Hardle, W. K., & Unwin, A. (2007). Handbook of data visualization. Springer Science & Business Media.
- Tufte, E.R., 2001. The Visual Display of Quantitative Information 2nd ed., Graphics Press.
- Cleveland, W.S., 1994. The Elements of Graphing Data 2nd ed., Summit, NJ, USA: Hobart Press
- Eckert, H. (2022). *Storytelling with data*. Springer.
- Resnizky, H. G. (2015). *Learning Shiny*. Packt Publishing Ltd.
- Healy, K. (2024). *Data visualization: a practical introduction*. Princeton University Press.

Related journals

- Journal of Data Science, Statistics, and Visualisation
- Journal of Computational and Graphical Statistics
- Journal of Visualization