Course guide
804265 - VDC - Data Visualization

Last modified: 18/03/2025

Unit in charge: Image Processing and Multimedia Technology Centre
Teaching unit: 804 - CITM - Image Processing and Multimedia Technology Centre.

Degree: BACHELOR'S DEGREE IN MULTIMEDIA STUDIES (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN VIDEO GAME DESIGN AND DEVELOPMENT (Syllabus 2014). (Optional subject).

Academic year: 2025 **ECTS Credits:** 6.0 **Languages:** English

LECTURER

Coordinating lecturer: Molins Pitarch, Carla

Others:

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEM 18.2. Apply new theoretical and practical knowledge related to the creation of content and interactive multimedia applications for use in the areas of: training, health, leisure and entertainment and business and professional activities.
CEM 5.4. Apply the user-centred design method, the basic concepts and principles involved in the process of designing graphical user interfaces, and the implications of creating multimedia interactive computer applications for project management.
CEM 5.7. Apply the planning, inquiry, evaluation, inspection and testing techniques used in interactive multimedia application creation projects in which the user-centred design method is applied.
CEM 1. Be able to solve problems using various systems: analytical, numerical, computer simulation.
CEVJ 3. Apply graphic interface design methodologies in an interactive application based on usability and accessibility criteria, taking the various platforms to which it can be directed into account.

Generical:
CGFB6VJ. Apply the techniques of representation, spatial conception, standardisation and computer-aided design; knowledge of the basics of industrial design.
CGFC5VJ. Efficiently design and use the most appropriate types and structures of data to solve a problem related to the development of video games.
CGFC10VJ. Design and evaluate person-computer interfaces that guarantee accessibility and usability for computer systems, services and applications.

Transversal:
CT4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

06 URI N3. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.
07 AAT N3. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.

TEACHING METHODOLOGY

There are two types of classes that we call Theory and Practice.
Theory refers to reference contents, main glossary, history of the field, state of the art, resources, books, concepts, authors, etc.
Practice refers to everything related to the data visualization projects that will be developed during the semester.
There are sessions where the two types of classes co-occur.
Participation is essential, as the aim is to develop the ability to communicate ideas based on data and information.

LEARNING OBJECTIVES OF THE SUBJECT

1. Approach the discipline of data visualization from a theoretical/research point of view.
2. Approach the discipline of data visualization from a practical/professional point of view.
3. Approach the discipline of data visualization from an experimental point of view.
4. Understand the mechanisms and psychological processes of attention, perception, memory, learning, and emotions and their role in the interaction process between humans and computers.
5. Know the methodology and process of creating a data visualization.
6. Know what they are and how to work with data: collect them, transform them, represent them, and present them.
7. Critical evaluation of visualization tools
8. Identify personal knowledge needs to work in a transdisciplinary field.

STUDY LOAD

Type	Hours	Percentage
Hours medium group	40,0	26.67
Guided activities	20,0	13.33
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

PART A: Fundamentals. Analog Data Display

Description:
Course presentation. Course norms.
What is data?
Retrospective of history of data visualization.
Class dynamics: Visualization of data in space.
Analog data collection
Analog data analysis
Analog data display.

Full-or-part-time: 10h
Practical classes: 10h

PART B: Consolidation. Digital Data Display

Description:
Visual design and hierarchy.
Graphics anatomies.
Visual Keys
Encoding information.
Visualization tools.

Full-or-part-time: 46h
Practical classes: 16h
Self study : 30h

PART C: Final Project. Interactive Data Visualization

Description:
Data, Interaction and Society.
Class Dynamics: Date Viz Guerrilla
Storytelling.
Interactivity
Accessibility and responsibility.
Dashboards.

Full-or-part-time: 90h
Guided activities: 30h
Self study : 60h

ACTIVITIES

Activities

Description:
Individual class practices to work on weekly topics.
Group class exercises: Visualization of Data in space, Data Viz Guerrilla to take the subject further.

Full-or-part-time: 10h
Guided activities: 10h

Individual assignments

Description:
Analog Quantified Self Exercise
Quantified Self Digital exercise
Final Project Report.

Full-or-part-time: 50h
Self study: 30h
Practical classes: 20h

Group deliverables

Description:
Interactive Final Project

Full-or-part-time: 75h
Self study: 50h
Practical classes: 25h

GRADING SYSTEM

- Individual class practices - 10%
- Group class practices - 10%
- Analog Quantified Self Exercise: individual deliveries - 15%
- Quantified Self Digital exercise: individual delivery - 20%
- Final Project: group presentation – 25%
- Final Project: Individual Report - 10%
- Participation and learning attitude - 10%

EXAMINATION RULES.

Part of the practices and exercises can be done during classes with a teacher. Students will also have to devote time to independent work (outside class hours) to carry out these practices and exercises.
To carry out the practicals and exercises, follow the instructions given in the "Statement" document and the instructions that may be given in the corresponding class for this purpose.
The practice or solved exercise must be deposited in the CITM Virtual Campus. Each statement includes a delivery date; only those practices or exercises delivered on the delivery date and before the time marked as a limit for this will be taken into account for the evaluation.
The evaluation of the practices does not only entail the resolution of these, but also the defense of the results when the group is required for this during the classes and the creation of the corresponding documents.
Any incident that does not allow the practice to be resolved within the indicated period must be communicated to the teacher by means of a message via the Virtual Campus; after this communication, the relevance or not of the causes that motivate the non-presentation of the practice will be resolved and the alternatives will be established to complete the evaluation if the causes are justified.
The documents must be completed following the instructions given in them, especially with regard to labeling file names. Under no circumstances will the layout of the document be modified or saved in a format or version other than the one indicated. The correct management of the documentation provided is an aspect related to the skills to be acquired and is, therefore, subject to evaluation.

BIBLIOGRAPHY

Basic:

- Bremer, NAdieh ; Wu, Shirley. Data Sketches: A Journey of imagination, exploration, and beautiful data visualizations. Boca Raton: CRC Press, 2021.
- Cairo, A. Functional Art, The: An Introduction to Information Graphics and Visualization. San Francisco, US: New Riders, 2012.
- Tufte, E. R., Goeler, N. H., & Benson, R.. Envisioning information (Vol. 126). CT: Graphics press, 1990.
- Cairo, Alberto. . The Art of Insight: How Great Visualization Designers Think. John Wiley & Sons Inc, 2023.
- Cairo, Alberto. How Charts Lie: Getting smartes about Visual Information. Washington: National Geographic Books, 2020.
- Drucker Johanna. Graphesis: Visual Forms of Knowledge Production. 2014.
- Lima, Manuel. The Book of Circles. Princeton Architectural Press, 2017.
- Lima, Manuel. The Book of Trees. Princeton Architectural Press,
- Levin, Golan ; Brain, Tega. Code as Creative Medium: A Handbook for Computational Art and Design. Cambridge: MIT Press, 2021.
- Lima, Manuel. Visual Complexity: Mapping Patterns of Information. Princeton Architectural Press, 2013.
- Lupi, Georgia ; Posavec, Stefanie. Dear Data. Princeton Architectural Press, 2016.
- Rendgen, Sandra. History of Information Graphics. 2019.
- Bremer, NAdieh ; Wu, Shirley. Data Sketches: A Journey of imagination, exploration, and beautiful data visualizations. Boca Raton: CRC Press, 2021.
- Thorp, Jer. Living in Data: A Citizen's Guide to a Better Information Future. USA: Picador, 2022.
- Tufte, Edward. Beautiful Evidence. 2006.
- Tufte, Edward. Visual Explanations: Images and Quantities, Evidence and Narrative. 1997.
- Yau, Nathan. Data Points: Visualization That Means Something. Hoboken: John Wiley & Sons, 2013.

RESOURCES

Audiovisual material:

- Recursos Visualització. www.visualisingdata.com/resources
- Papers DataViz. piim.newschool.edu/research/PIIM-PAPER

Hyperlink:
- Lima, M. (2011). Visual complexity. http://www. visualcomplexity. com.
- Graphic presentation. by Brinton, Willard Cope, 1939. https://archive.org/details/graphicpresentat00brinrich/mode/2up- Catàleg visualitzacions. Resource

Other resources:
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