

Name of the course: Cognitive Data Visualization		Total credits: 6
Code:		
Type: lecture		
Total hours of per semester: 1.5 hours/week (15 weeks x 1.5h) lecture: 100% practice: consultation: Other:		
Type of testing: Other:		
Semester:		
Description		
The course introduces the basic perceptual, cognitive and affective psychological and neuropsychological processes of human visualization processes. It discusses the specific topics relevant to the use and design of graphic visualisation, in this context understood as cognitive tools (e.g. human vision and brain processes, memory, interaction, spatial reference frames, orientation and navigation, and spatial cognition). Students learn about the historic evolution and traditions of data and information visualisation. An overview is given about the main types (from graphs to interactive maps, network visualisations and interactive dashboards), the means/software of their production, as well as their applications. Through examples, students will understand the graphical principles of visualisation designs as graphical interfaces (UI), and review methods for analysing user behaviour (UX). Students can apply the knowledge acquired in their IT research and development work in a wide range of expert fields from scientific data analysis to industrial product development.		
Literature		
Compulsory - Colin Ware (2011): Information Visualization: Perception for Design. Interactive Technologies. Wiley, New York. ISBN: 1558608192 - Munzner, Tamara 2014: Visualizaion, Analysis and Design. CRC Press, ISBN: 9781466508910		
Recommended - Daniel Keim- Jörn Kohlhammer - Geoffrey Ellis Mansmann (2010): Mastering the Information Age. Solving Problems with Visual Analytics. Eurographics Association, Goslar. ISBN: 9783905673777 - Edward Tufte 2001: Envisioning information. Plenum Press, Boston, ISBN 978-0961392116 - MacEachren, A.M. 2004: How Maps Work: Representation, Visualization and Design. New York: Guilford Press. ISBN 0-89862-589-0		
Competencies		
Knowledge - Students have a research-level knowledge of the scope, cognitive foundations, general and specific features, and main directions of data visualisation. - they are familiar with data visualisation methods and tools, have basic knowledge about graphic design for their use and development		

- they have a creative understanding of the context of visual communication in the field of information technology and collaborative and data science and engineering.
- They possess the fundamental research methodological skills required for independent research in the field of data visualisation and user processes (UX).

Competencies

- The ability to develop novel, hitherto unknown applications based on the acquired solid knowledge of cognitive principles.
- Ability to design and implement new data visualisation projects, conduct research in the field and develop new techniques and approaches.
- Ability to design and evaluate visualisations and graphical interfaces (UI -UX) that effectively support human decision-making.

Attitude

- Students represent and further develops, in relation to his/her own field, the relations that contribute to the process of human self-creation by virtue of the specificity of visualisation.
- He/she will have the interest and learning capacity to identify and solve research problems in the field of data visualisation that are currently not transparent and unforeseeable.
- They will promote interdisciplinary research and development through a cognitive approach to visualisation, collaborating with professionals in research and industry.
- Their attitude is characterised by a firm professional commitment, a steadfast dedication to the search for new paths, and an acceptance of the need to work persistently.

Autonomy and responsibility

- Students develop and initiate new data visualisation knowledge areas and new practical solutions with creative autonomy.
- They show the ability to take a leading role and to engage in a high level of collaboration in the formulation of theoretical and practical data visualisation issues.
- He/she takes responsibility for raising and answering new ethical questions related to the theoretical and practical issues of his/her profession.