

# Geovisualization

## Purpose of education:

### a) knowledge

- Comprehensive knowledge of the principles, methods and procedures for the design, development and operation of geoinformatics, in particular in the following areas: operating systems and database management, design and development of web-based geoinformatics tools and services, geoinformatics-related programming principles, geospatial application development.

- He/she has a complex knowledge of the general cartographic, geographic, mathematical and informatics principles, rules and interrelationships necessary for the practice of cartography and geoinformatics, in particular in the following subjects: surveying (geodesy, topography, remote sensing, photogrammetry), map construction and design, projection, thematic cartography, geovisualisation, geoinformatics, building geographic information systems.

- Ability to create maps and geoinformatics systems that can be used by economic sectors or clients in the desired field.

### b) abilities

- Ability to interpret and formalise complex professional problems in the field of cartography and geoinformatics, to identify the necessary theoretical and practical background and to solve the problem. Ability to provide consultancy, problem-solving, design, development, operation and management of cartographic and geoinformatics systems, decision support systems and expert systems.

- Ability to interpret, plan, organise, manage and control processes in the field of cartography and geoinformatics.

- Ability to apply what has been learned in a diverse, multidisciplinary professional environment.

### c) attitude

- It monitors professional and technological developments in the field of cartography and geoinformatics and the opportunities that will enable it to work in the public sector, in various companies or to set up and run its own business.

- Shares his/her own knowledge and values the dissemination of professional results in cartography and geoinformatics.

- It is committed to meeting and enforcing quality standards (accuracy, commitment).

### d) autonomy and responsibility

- Able to work independently in IT, carrying out tasks, thinking through and developing technical issues in a self-directed manner and at a pace.

- Responsible for meeting and enforcing deadlines. Assumes responsibility for his/her own work and that of his/her colleagues working under his/her direction and with him/her (in a project).

- In the case of mission-critical mapping and geoinformatics systems, may be given development and operational responsibility appropriate with his/her professional competences.

## Content of education:

This course introduces the human segment of user cognitive visualisation skills, which is fundamental for the application of geoinformatics technology. The tools for this cognitive process are geovisualisation tools, maps and other cartographic-spatial representation formats. Topics covered during the semester:

- The concept of visualisation. Types of visualisation. Geovisualization and geovisual analysis.
- The concept of map variables and the model property of the map: a theoretical cartographic overview. The cartographic cube (MacEachren).
- Cognitive functions of map: dynamic relationship between map types and use in spatial cognition.
- The organisation of graphic space: the use of visual language and visual dynamics (Tufte). The role of colours in cartography.
- Application of graphic semiotics in data visualisation. Data relations and visual variables (Bertin).
- Interpretation and representation of time in geovisualisation. Animation and multimedia.
- The visual interface: layout and visual hierarchy. Gestalt principles. Interactive geovisualisation and visual storytelling.

- Geovisualisation and mass communication: information, propaganda, community mapping and critical cartography. The theory of the development of spatial cognition (maps for education, Piaget).
- User-oriented research in geovisualisation and geoinformatics: physiological and psychological studies. Special user groups.

**Evaluation system:** oral and/or written exam.

**Literature:**

**Obligatory:**

- Colin Ware 2011: Information Visualization: Perception for Design. Interactive Technologies. Wiley, New York. ISBN: 1558608192
- MacEachren, A.M. 2004: How Maps Work: Representation, Visualization and Design. (New York: Guilford Press. ISBN: 0898625890

**Recommended:**

- Jacques Bertin 1983: Semiology of Graphics. Diagrams, networks, maps. Univ. of Wisconsin Press, Madison, 1983. ISBN: 9780299090609.
- Edward Tufte 2001: Envisioning information. Plenum Press, Boston, ISBN: 9780961392116
- Daniel Keim, Jörn Kohlhammer, Geoffrey Ellis, Mansmann 2010: Mastering the Information Age. Solving Problems with Visual Analytics. Eurographics Association, Goslar. ISBN: 9783