

## **Tárgy neve: GIS software (ArcGIS)**

**Tárgyfelelős neve:** dr. Pál Márton

**Tárgyfelelős tudományos fokozata:** PhD

**Tárgyfelelős MAB szerinti akkreditációs státusza:** AT

### **The aim of education:**

#### **a) knowledge**

- 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.
- 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.
- Knowledge of the specific tools of the field of cartography and geoinformatics, the mathematical and cartographic principles of editing maps for different purposes, the ability to apply survey procedures, representational solutions and various reproduction technologies.
- They have the basic organisational, managerial and leadership skills to perform managerial tasks related to their field of specialisation and the entrepreneurial skills to provide business consultancy, set up and run a business in the field of cartography and geoinformatics.

#### **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 work pro-actively, in project (team) work with specialists in cartography and geoinformatics, co-disciplines and other disciplines (e.g. geodesy, geology, geophysics, geography, meteorology, astronomy, statistics, history, archaeology, linguistics).

#### **c) attitude**

- He/She 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.
- He/She is committed to meeting and enforcing quality standards (accuracy, commitment).

#### **d) autonomy and responsibility**

- 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:**

During the semester, the student will learn in detail about ESRI's geospatial solutions. In addition to the basic and theoretical knowledge of geospatial computing, the student will gain a deeper insight into the use of the software tools provided by ArcGIS. You will confidently apply these in database management, database building, mapping, spatial analysis, data mining, field survey, geospatial application development, process model building, remote sensing data processing and 3D visualisation analysis. Assessment will consist of five assignments over the semester.

Course outline:

- Practice assignments in ArcGIS Pro - a refresher of basic or prior knowledge.

- Database management and construction, the possibilities offered by ArcGIS.
- Map editing using ESRI tools. Online and analogue visualisation options.
- Geospatial, economic and social data analysis. Geostatistics in ArcGIS.
- Field survey software components.
- Applications of ArcPy in cartography.
- Analysis of remote sensing data. Artificial intelligence in ArcGIS.
- 3D capabilities of ESRI.

**Evaluation system:** practical course mark based on assignments.

**Literature:**

**Obligatory**

- Field, K. (2018). Cartography. ISBN: 9781589484399.
- Bonnie Shrewsbury & Barry Waite (2023). Top 20 Essential Skills for ArcGIS Pro. ISBN: 9781589487505
- Wilpen L. Gorr & Kristen S. Kurland (2023). GIS Tutorial for ArcGIS Pro 3.1. ISBN: 9781589487390

**Recommended**

- ESRI Map Book (2023). Vol. 38. ISBN: 9781589487444
- Field, K. (2021). Thematic Mapping: 101 Inspiring Ways to Visualise Empirical Data. ISBN: 9781589485570
- Lauren Bennett & Flora Vale (2023). Spatial Statistics Illustrated. ISBN: 9781589485709