

# Geoinformatics

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<b>Faculty</b>	Faculty of Mining and Geology
<b>Type of study</b>	Follow-up Master
<b>Language of instruction</b>	English
<b>Code of the programme</b>	N0532A330044
<b>Title of the programme</b>	Geoinformatics
<b>Regular period of the study</b>	2 years
<b>Coordinating department</b>	Department of Geoinformatics
<b>Coordinator</b>	doc. Ing. Michal Kačmařík, Ph.D.
<b>Key words</b>	Global Navigation Satellite Systems, spatial data; spatial data analysis, Earth Observation; drones, geoinformation technologies, spatial database systems and geoweb

## About study programme

We encounter geoinformatics every day, literally at every turn - whether it's navigation, weather forecasting, maps or gaming. During your studies, we'll teach you how to transform the world around you into a digital environment, fly drones, use state-of-the-art GPS devices, use artificial intelligence, and create 3D models. You will be able to process and analyse the results of your work, display them on maps and publish them on the internet. We will teach you not only how to work with modern applications, but also how to develop them. The study programme "Geoinformatics" prepares students not only in the fields of geoinformatics and computer science, but also does not forget about soft skills.

After graduation, you will have opened doors in large and small companies or public administration. You will find employment in positions such as web mapping application developer, data analyst, database specialist, or geodata collection and distribution expert. The most successful ones will also start their own companies.

## Professions

- Project manager
- Information systems administrator
- Expert in the field of relief modeling and processes in hydrology
- Geodata administrator
- Database systems specialist
- IT analyst
- Data scientist
- GIS application manager
- Programmer - specialist
- Specialist in science, research and development
- Geodata and metadata manager
- Geoinformatics
- Cartographer
- Expert officer in the departments of geoinformatics of municipalities and regional authorities
- Developer of web map applications
- Junior specialist for data analysis
- Expert in data collection and distribution

- Data visualization specialist
- GIS analyst
- GIS specialist
- Computer programmer

## Hard skills

- Data processing in GIS, statistics (R, IBM SPSS)
- Earth remote sensing, drones
- Algorithms and data structures
- Physical design of the database
- Website creation
- Application programming
- Development of web applications
- Modeling and simulation
- Modelling tools
- Object-oriented programming
- Python
- Knowledge of system approach
- GIT
- Meteorology and navigation
- Knowledge of technical English
- Knowledge of web applications trends
- Web map applications (GeoWeb)
- Digital image processing
- Satellite navigation systems - GNSS (GPS, Galileo)
- MS Office
- Project management
- PostgreSQL
- 3D models and modeling
- Thematic cartography
- Data analysis
- Analytical skills
- Knowledge of geographic information systems, geoinformatics, and geoinformation technologies (GIS, GIT)
- Statistical data analysis
- Object analysis
- Knowledge of English in written and spoken form
- SQL
- SW ArcGIS, QGIS
- Spatial data processing (acquisition, storage, processing, visualization, publication)
- R
- Object Oriented Technologies (UML)
- Designing
- Geographic information systems, geoinformatics and geoinformation technologies (GIS, GIT)
- SW MS Access
- Knowledge of statistical SW
- Design and implementation of a data layer
- IBM SPSS
- Creation of sensor networks

- HTML, CSS
- Databases, relational databases design, SQL
- Programming (Python)

## **Study aims**

With the continuous development of information technology, the amount of data that needs to be processed, analysed and interpreted for the broad needs of the human population is growing. These data often come from heterogeneous sources and are localised in space and time. The labour market is therefore in continuous demand for skilled graduates who have a comprehensive knowledge of working with spatial data.

The study of the programme builds on the foundations acquired by studying the Bachelor's degree in Geoinformatics, or a related bachelor's programme.

The follow-up Master's degree in Geoinformatics focuses on teaching advanced processing and analysis of spatial and non-spatial data using conventional quantitative techniques and modern approaches based on artificial intelligence. Existing geoinformatics and other applications, or self-developed applications and scripts, are used to process this data, so graduates are able to provide automation and replicability of processes. In the process of data acquisition, storage and processing, they are also able to use spatial database systems, server technologies, web services or cloud services. The emphasis is put on the ability to apply a systematic approach to problem solving, self-interpretation of results and quality presentation of the produced outputs using advanced data visualization techniques. Students also develop their knowledge and skills in Earth observation, localization and navigation in space, modeling and simulations

or soft skills.

Graduates find employment in companies operating in most industries, especially in IT, environment related sectors, the financial sector, construction, transport and integrated rescue services. A number of graduates have also successfully started their own businesses.

## **Study curriculum**

- form Full-time (en)