



# Faculty of Civil Engineering

# Geodesy

at Faculty of Civil Engineering, 73 Bulevar kralja Aleksandra, 11000 Belgrade, [www.grf.bg.ac.rs](http://www.grf.bg.ac.rs)

ECTS: 120/ LANGUAGE OF INSTRUCTION: SERBIAN/ DEGREE: MASTER

## Study program content

The master studies in Geodesy are perceived to upgrade academic competences of students who have completed the first-degree academic studies in geodesy. Courses in all modules cover specific problems of geodesy that require additional knowledge and capabilities for their analysis.

## Study program goals

The master studies in Geodesy aim at:

1. Providing students with the knowledge and skills that will allow them to solve specific problems in geodetic practice such as those arising in the:
    - Basic geodetic works (Earth's shape and dimensions, gravitational field, navigation, geodynamics); · state survey and real estate cadastre;
    - Cartography;
    - Various engineering fields;
    - Real property law;
  2. Providing students with the necessary knowledge in geoinformatics,
  3. Development of the organizational and research skills and abilities for the team work,
  4. Qualifying students for the advanced - doctoral studies and 5- qualifying students to work in the country and abroad.
- dardization,
  - Geodynamic investigation and determination of displacement of the Earth's crust in space,
  - Aerial photogrammetric surveying of the terrain and terrestrial photogrammetric surveying of building faces, archaeological excavation sites and terrestrial photogrammetric surveying in geologic investigations, surveying in industry, mining and protection of cultural monuments,
  - Activities and works on the development and maintenance of geospatial digital databases,
  - State surveying, establishment and maintenance of real estate and infrastructure cadastre,
  - Geodetic and technical works in the course of land development by land consolidation and expropriation,
  - Cartographic works on preparation of topographic maps and thematic maps,
  - Works in engineering fields (i.e. civil engineering, architecture, space planning, industry, agriculture, forestry and others).
  - In addition to the above competencies, a graduate geodetic engineer is able to:
    - Participate in research projects,
    - Teach students in lower educational levels (geodesy, civil engineering, architecture and forestry),
    - Perform real estate evaluation,
    - Manage and develop real property market,
    - Develop and maintain geospatial information systems,
    - Analyze and interpret geospatial data.

## Study program outcomes

Upon completion of the second-degree academic studies in geodesy the student should be able to design, organize and supervise:

- Geodetic works in the course of establishing reference geodetic networks (national active and passive networks, local reference networks, leveling and gravimetric networks),
- Geodetic works on establishment of the reference geodetic planes, i.e. determination of the outer gravitational field (regional gravimetric surveying, geoid, quasi-geoid),
- Geodetic metrological works and their stan-

## Modules

Second-degree/master academic studies in Geodesy are organized in three modules:

- Geodesy - theory of satellite positioning, physical geodesy, geodetic reference networks, geodetic astronomy, satellite and inertial navigation, quality assurance in surveying, geodetic reference systems, numerical methods in physical geodesy, geodetic geodynamics, optimization in surveying, quality criteria for geodetic networks, surveying design, analysis of engineering structures

deformation, design of geodetic works in engineering, geodesy in industry, information systems of engineering, remote sensing, digital image processing, electronics in geodesy, engineering mechanics, object oriented programming, advanced adjustment of calculus, design methodology in geodesy, project management in geodesy;

- Geoinformatics - in this module students gain necessary knowledge for the design and management of projects in geodesy, application of advanced techniques and technologies for collection and processing of large quantities of geospatial data, development of spatial databases and for geospatial analysis. The knowledge of electronics and digital signal processing, adjustment of calculus, positioning, project design and management, programming and development of information systems, photogrammetry and remote sensing, geographic information systems, cartography, land development, real estate cadastre and real property management, acquired in the first-degree academic studies, is further upgraded during the master studies.
- Land Law and Economy - this module offers studies in real property law, environmen-

tal and planning law, property market, real property investment analysis and real property valuation and taxation. Artistic studies have one main research field – architectural and urban design. Specific scientific research can be changed within the same study program at the beginning of each school year, without changing the final number of ECTS.

In the second year, students are choosing basic /narrow field of scientific and artistic research, while the third study year is devoted exclusively to doctoral dissertation.

### Admission requirements

A candidate who has completed the first-degree academic studies in geodesy with a minimum of 180 ECTS credits can apply for the second-degree studies in a geodesy.

### Contact

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# Civil Engineering

at Faculty of Civil Engineering, 73 Bulevar kralja Aleksandra, 11000 Belgrade, [www.grf.bg.ac.rs](http://www.grf.bg.ac.rs)

ECTS: 60/ LANGUAGE OF INSTRUCTION: SERBIAN/ DEGREE: MASTER

## Study program content

The studies are meant to upgrade academic competences of a student who has completed previous level of civil engineering studies. Courses in all modules include specific problems of civil engineering that require additional knowledge and capabilities for analysis and design.

## Study program goals

The master academic studies in Civil Engineering aim at:

- Providing students with the professional competences in different fields of civil engineering that will allow them to participate in complex civil engineering projects;
- Qualifying students for research in the chosen civil engineering field;
- Training students to use advanced computational models in the analysis of engineering problems;
- Encouraging and development of students' creativity and critical approach in analyzing engineering problems;
- Qualifying students for further doctoral or specialist academic studies.

## Study program outcomes

By completion of the second-degree (master) academic studies the student acquires the following competences specific to civil engineering:

- Design and construction of all types of civil engineering structures – buildings, roads and hydraulic engineering structures,
- Design and execution of works on rehabilitation and reconstruction of structures,
- Design and construction of hydraulic engineering structures and infrastructures of all types and capacities,
- Application of up-to-date methods for the analysis of transport processes in surface and ground waters,
- Implementation of planning and design methodologies for urban roads, airports, railway stations and traffic nodes at all design levels in all phases,

- Design and construction of all types of geo-technical structures,
- Preparation and implementation of projects for construction and equipment management,
- Preparation of pre-feasibility studies, bill of quantities and priced bill of quantities,
- Application of the methods for environmental impact assessment of civil engineering structures and technical measures for environmental protection in planning, design, construction and maintenance phases.

## Modules

The studies are organized in five modules:

1. Structural Engineering (KON) - includes courses that qualify engineers for the design and construction of non-standard structures such as bridges, water towers, dams, underground structures, etc.;
2. Hydraulic and Environmental Engineering (HVE) - the knowledge is extended to the ground water problems with a special emphasize on the ground water quality, the hydropower engineering and waterways and ports. Advanced courses in Hydraulic Engineering Structures and Municipal Hydraulic Engineering are offered;
3. Road, Railway and Airport Engineering (PŽA) is focused on planning, design and construction of urban roads, railway stations and airports. The students develop their ability to work on more complex projects through the courses in geoinformation systems, system optimization, and others.
4. Management, Technology and Informatics in Civil Engineering (MTI) offers numerous elective courses intended to upgrade basic knowledge on project management, construction management and implementation of informatics in civil engineering. The student acquires not only the competence that allows him/her to participate in complex civil engineering projects, but also a broad basis for research in various civil engineering fields; and

5. Engineering Geotechnics (GGT) broadens students' basic knowledge in structural engineering towards specific geotechnical problems such as protection of foundation pits and landfill management.

### Admission requirements

A candidate who has completed the first-degree academic studies in civil engineering with a minimum of 240 ECTS credits can apply for the second-degree studies in a civil engineering.

### Contact

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