



CONTACT

Program Student Advisory

Nußallee 17 | 53115 Bonn

M.Sc. Ines Barczewski

Tel.: +49 228/73-35 70

barczewski@igg.uni-bonn.de

www.gug.uni-bonn.de/kontakt

Study and Examination Issues

Nußallee 17 | 53115 Bonn

Dipl.-Ing. Bernd Binnenbruck

Tel.: +49 228/73-35 72

pruefungengeodaesie@uni-bonn.de

www.gug.uni-bonn.de/kontakt

Student Council Geodäsie

Nußallee 17 | 53115 Bonn

Tel.: +49 228/73-35 64

fsgeod@uni-bonn.de

www.fsgeod.uni-bonn.de

Zentral Study Advisory and Counseling Service

Poppelsdorfer Allee 49 | 53115 Bonn

Tel.: +49 228 73-7080

zsb@uni-bonn.de

www.uni-bonn.de/zsb

International Office

Poppelsdorfer Allee 49 | 53115 Bonn

Tel.: +49 228 73-4464, +49 228 73-4491

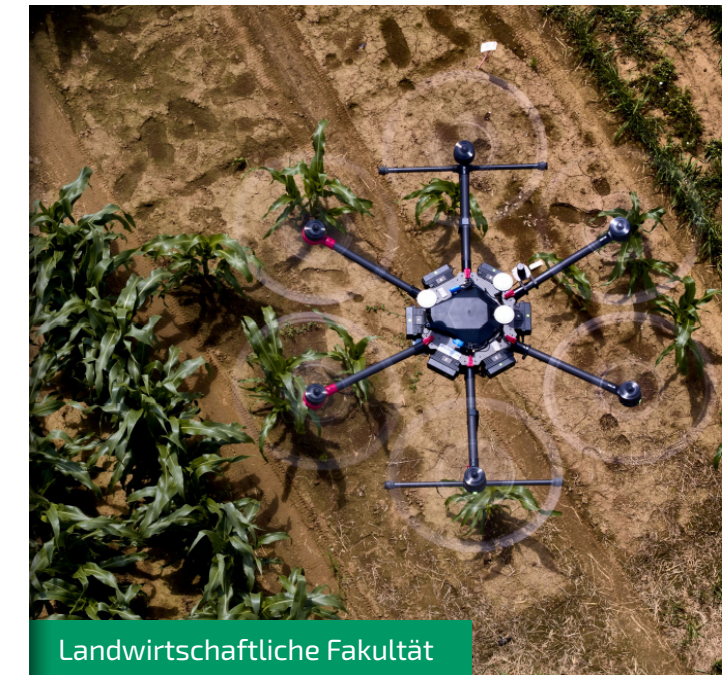
instud@verwaltung.uni-bonn.de

www.uni-bonn.de/international



Stand: August 2022 | Bildnachweis: Titel und Außenseiten: Volker Lannert / Universität Bonn; Innenseite: IGG / Universität Bonn

Geodetic Engineering



Landwirtschaftliche Fakultät

B B

M M

E E

L L

Bachelor
Bachelor of Science (B.Sc.)

Master
Master of Science (M.Sc.)

Staatsexamen | Kirchliche Examen

Lehramt



INSTITUTE OF GEODESY AND GEOINFORMATION

The University of Bonn has been offering geodesy education for more than 125 years. At the institute all geodetic subdisciplines are represented by their own professorships.

- Astronomical, Physical and Mathematical-Geodesy
- Earth System Research
- Geodesy
- Geoinformation
- Information Management
- Photogrammetry
- Remote Sensing
- Urban Planning and Land Management
- Theoretical Geodesy

The research groups conduct several projects in cooperation with numerous national and international partners and institutions. Two projects of the institute are outstanding.

- Since 2019 **PhenoRob**, the only Cluster of Excellence in Germany in agricultural sciences, is part of the institute. It brings together researchers from different disciplines to investigate how technology can enable sustainable crop production.
- In 2021 a new Collaborative Research Center **Regional Climate Change: The Role of Land Use and Water Management (DETECT)** was established. It investigates the hypothesis that human-induced land use change and intensified water management influence the regional climate.

Further Information

Institute of Geodesy and Geoinformation

www.igg.uni-bonn.de

Mandatory Documents

- Bachelor's Certificate of a at least three-year Bachelor's Degree
- Transcript of Records of your Bachelor's Degree
- Secondary School Leaving Certificate
- TOEFL or IELTS result
- Curriculum Vitae and Letter of Motivation

Please note, we do not consider GRE scores. Based on the application documents, the examination board will decide your eligibility for the Master's program.

FEES

The Master's Program "Geodetic Engineering" is tuition-free. Students have to pay a semester fee, which includes a regional public transport ticket (called „Semester Ticket“).

Degree	Study options	Standard period of study	Start of course
Master of Science (M.Sc.)	Major	4 Semesters	Winter Semester



Geodetic Engineering

The two-years Master's program Geodetic Engineering offers three different profiles which deal with various topics. You will choose one area as a major and a second as a minor topic depending on your interests.

MOBILE SENSING AND ROBOTICS

The profile addresses state-of-the-art techniques for analyzing and interpreting sensor data that has been recorded from moving vehicles, such as cars, UAVs, robots or agriculture platforms, as well as for selecting appropriate actions based on the collected information.

During your study you will become familiar with complex multi-sensor systems, combining different types of laser scanners, cameras, depth cameras, GNSS receivers or inertial sensors. You will learn to implement algorithms to calibrate sensors, use their data and to fuse different sensor data to estimate the vehicle's pose and the surrounding objects. Methods for kinematic pose estimation and pattern recognition and their use for the interpretation of image and laser data are key skills.

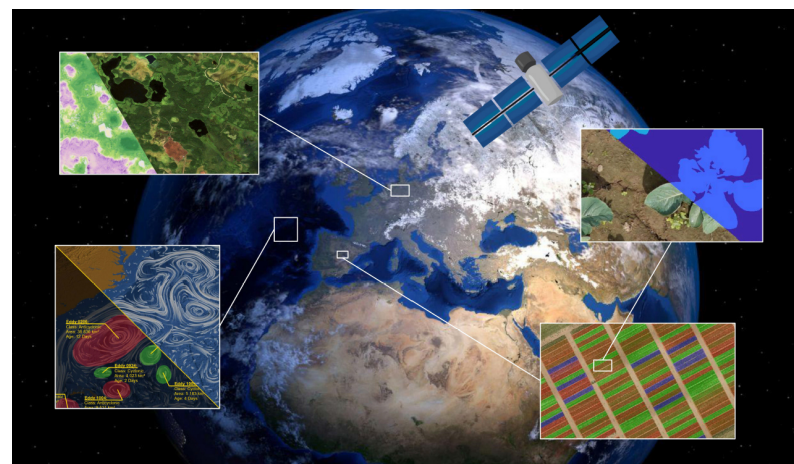
The study program will provide you with expertise for solution-oriented approaches, which are theoretically founded and on the frontier of current research activities. You will also learn skills in project management, teamwork and the presentation of your own work.

If you are interested in sensors and mobile-sensor systems, self-driving cars or robotics and you have a strong background in programming and mathematics this is your profile.

GEOINFORMATION AND SPATIAL DEVELOPMENT

The profile focuses on geoinformation technology that can help decision makers and planners tackle some of the most important challenges of today and the future. Since 2007, more than half of the world's population has been living in towns and urban regions. Rapid urbanization forces the consumption of natural resources - especially of land - and leads to climate change as well as social inequity. The profile covers advanced methods and systems, including data structures and algorithms for automatic analysis and visualization of geoinformation and spatial development.

You will learn how to deal with spatial, mathematical and algorithmic reasoning as well as software programming and the utilization of software for recent problems, e.g. in urban planning. The profile covers geoinformation systems (GIS), spatial data mining, automated cartography and geovisualization, spatial analysis of real estate markets and land valuation. It addresses methods for integration, conflation and abstraction of spatial data, the analysis of trajectories and transport networks, agent-based models of land use, multi-criteria assessment and optimization methods for spatial



COURSE SCHEME

1. Semester	2. Semester	3. Semester	4. Semester	
5 Advanced Modules	Mandatory Module II Major Profile	Compulsory Elective Module	Master's Thesis	
15 CP	6 CP	6 CP		
Profile Fundamentals	Compulsory Elective Module	Compulsory Elective Module		
3 CP	6 CP	6 CP		
Mandatory Module I Major Profile	Compulsory Elective Module	Compulsory Elective Module		
6 CP	6 CP	6 CP		
Mandatory Module I Minor Profile	Project Module	Project Module		
6 CP	12 CP	12 CP		
				30 CP

decision support systems in urban planning and land management, smart cities, spatial data infrastructures, spatial databases, as well as location-based services.

If you are interested in developing and implementing innovative solutions to problems of spatial data handling and urban development and you have a strong background in GIS and urban development this is your profile.

GEODETC EARTH SYSTEM SCIENCE AND DATA ANALYSIS

The profile focuses on how advanced satellite- and space-geodetic observation techniques, in combination with innovative data processing and modeling approaches, provide us with adequate information to make appropriate decisions based on empirical results and their interpretation.

You will choose elective courses and project topics that allow you to deepen your knowledge in particular space- or satellite-geodetic sensors / terrestrial networks, in reference frame realization, integration of data with geoscientific models, or in data analysis techniques using high-performance computing.

If you are interested in geodesy, gravity, earth rotation, climate change, sea level, mass transports in the earth system, earth

observation, satellite technology, adjustment techniques and optimization methods, and other topics related to Geodetic Earth System science, and you have a strong background in mathematics and earth sciences this is your profile.

REQUIREMENTS AND APPLICATION

Applicants must possess a first, higher education qualification (Bachelor's Degree) in Geodesy, Geoinformation or related topics, such as Geoscience, Computer Science, Mathematics, Physics or Electrical Engineering.

Academic Admission Requirements

At least **24 credits** from Mathematics, Physics and Programming and furthermore **48 credits** from at least two of the following research areas:

- Physical Geodesy, Space Geodesy, Geodynamics and Earth System Research,
- Data Analysis, Modeling and Scientific Computing in the context of Geoscience,
- Photogrammetry, Remote Sensing, Computer Vision and Robotics,
- Geodetic Measurement Technology, Engineering Geodesy and Satellite Measurement Technology,
- Algorithmics, Spatial Databases, Geo-Information and Geo-Information Systems,
- Urban Development, Land Readjustment and Real Estate Evaluation and Land Management.

Language Requirements

- TOEFL paper-based: 575 points
- TOEFL internet-based: 90 points
- IELTS: 6.5

Native English speakers, German, Swiss, Austrian citizens with Abitur / Matura and students who received their first degree entirely in english taught study programs fulfill the language requirements.