VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF CIVIL ENGINEERING

Geotechnics and Underground Engineering

Generated: 24. 11. 2026

Faculty	Faculty of Civil Engineering
Type of study	Doctoral
Language of instruction	English
Code of the programme	P0732D260003
Regular period of the study	4 years
Coordinating department	Department of Geotechnics and Underground Engineering
Coordinator	doc. RNDr. Eva Hrubešová, Ph.D.
Keywords	Mining Structures, Underground Engineering, Geothermal Energy, Slope Stability, Geotechnics

About study programme

The study is focused on the field of behaviour of geomaterials, geomechanics, technology of realization of geotechnical, underground and mining constructions corresponding to the development of digitization and smartification of engineering constructions (including BIM technology), behaviour of geotechnical and underground constructions subjected to extraordinary loads, development of methods of modelling of various types of geotechnical constructions, environmental geotechnics and the problems of energy geotechnics associated with geothermal energy. The cooperation of doctoral students is foreseen for the scientific and research activities of the supervising departments. This study programme is a unique study programme at universities in the Czech and Slovak Republics.

Graduate's employment

Graduates of the doctoral degree programme Geotechnics and Underground Engineering are employed as fully qualified specialists in companies with geotechnical and broader building focus, in scientific research institutions and on universities. They have the prerequisites, knowledge and skills for independent scientific and research work in scientific teams as well as teams of design and realization in solving complex problems of geotechnics, underground and mining engineering.

Study aims

The doctoral (PhD) study programme Geotechnics and Underground Engineering is multidisciplinary and is based on science and specialised technical courses, in which the student will further develop his knowledge and experience acquired in previous studies with the aim of their application in scientific research activities and practise. Research activities are focused on the field of behaviour and properties of geomaterials, geomechanics, advanced technologies of realization of geotechnical, underground and mining constructions corresponding to the development of digitization and smartification of engineering constructions (including BIM), behaviour of geotechnical and underground structures subjected to extraordinary loads, development of advanced methods of modelling of the behaviour of various types of geotechnical constructions and constructions, issues of energy geotechnics focused on the area of efficient exploitation of geothermal energy and broader implementation of mathematical methods in solving problems of geological and underground engineering.
The basic objective of the doctoral study programme Geotechnics and Underground Engineering is to raise qualified specialists who will be responsible for the development of knowledge in the area and other related areas and will be able to apply and further develop theory and new non-traditional progressive technologies and methods in solving professional problems in the fields of geotechnical and underground constructions, foundation, mining structures, environmental and energy geotechnics.
The programme is based on an individual study plan. Based on the selected study subjects of the individual study plan and the topic of dissertation, the student focuses on the specific area in which the research activity will take place. The cooperation of doctoral

students is foreseen for the scientific and research activities of the supervising departments.

Graduate's knowledge

Graduates of the doctoral programme deepen their theoretical and practical knowledge and acquire the skills, knowledge and experience needed for scientific research work in the field of study programme. The graduate of the doctoral study program Geotechnics and Underground Engineering finds the main application in geotechnical companies and companies with a broader building focus, in research institutes and universities and in the control functions at the level of state and local government. The graduate can work as a designer of complex geotechnical and underground constructions, a specialist consultant in various areas of geotechnics (foundation, mining, environmental and energy geotechnology) as well as a scientific researcher and educator in university workplaces. The graduate will also find application in solving complex geotechnical problems related to the depth and surface mining of mineral resources, as well as in solving environmental problems related to the use of rock environment for storage or exploitation of thermal energy. Due to the completed professional linguistic training he will also be prepared for the application in the framework of international working and scientific-research professional teams.

Graduate's skills

Graduates acquire skills for independent scientific work and will be prepared to apply acquired knowledge, skills and experience in:
• Solution complex problems of geotechnical practice requiring the application of new progressive construction and information technologies (including BIM);
• The management of the working team in solving complex geotechnical problems;
• Solving and managing demanding research projects, including international projects

Hard skills

- IT skills/knowledge: MS Office, (Easy archive advantage)
- Knowledge of the development of plans and documentation related to mining activity or activity carried out in a mining manner
- Knowledge of testing properties of soils and rocks using laboratory and field tests
- SW from the field of geotechnics
- SW 3D/CAD
- Design and management of concrete structures
- Designing
- Reading technical documentation
- Knowledge of mathematical models
- Ventilation of tunnel excavations and underground works
- Knowledge of documentation processing and calculation in the field of dimensioning reinforcement for underground mining works
- (Eurocode 7) ČSN EN 1997 Design of geotechnical structures
- Knowledge of properties of particulate materials
- Orientation in technical drawings
- SW from the field of underground construction
- Application of computer design programmes
- Project management
- Line constructions

Study curriculum

- form Full-time (en)
- form Part-time (en)