

**UNIVERSITY STUDY PROGRAMME**  
**GEO TECHNOLOGY AND ENVIRONMENTAL ENGINEERING**

**Academic year 2024/2025**

## General information

Name of programme	<b>Geotechnology and Environmental Engineering</b>
Degree	University study programme
Level	First level
KLASIUS-SRV	Higher university education (first Bologna level) (16204)
ISCED	Production technologies (54)
KLASIUS-P	Mining and other extraction of minerals (undefined in more detail) (5440)
KLASIUS-P-16	Mining and other extraction of minerals (0724)
Frascati	Natural-mathematical sciences (1) Technical sciences (2)
Level SOK	SOK level 7
Level EOK	EOK level 6
Level EOVK	First level
Member of the University of Ljubljana	Faculty of Natural Sciences and Engineering, Aškerčeva cesta 12, 1000 Ljubljana, Slovenia
Duration (years)	3
ECTS credit points per year	60
Mode of study	Full-time

## Basic goals of the programme

The Geotechnology and Environmental Engineering university study programme is a natural sciences and engineering programme that prepares future graduates for work involving underground construction, environmental engineering and obtaining mineral resources.

During their studies, students perform industry placement training that gives them the opportunity to get acquainted with work processes and use their theoretical knowledge in practical situations. Together with the acquired practical experience and counselling offered by teaching and professional mentors, students use electives to shape their study programme in such a way that the theoretical and specialist content is tailored to their requirements and needs.

Consequently, students obtain the necessary competences required for direct employment and/or continued professional or theoretical training in the entire field of obtaining mineral resources, primary processing of raw materials, blasting, underground construction, drilling techniques, observation and tracking in nature, geotechnical research, evaluation and conducting of activities affecting nature, rehabilitation of degraded areas, environmental management, solid waste materials and land redevelopment due to natural disasters (landslides, earthquakes etc.) and due to incorrect past activities affecting nature.

The first-level university study programme Geotechnology and Environmental Engineering enables the training of experts in the above fields and represents an increase in expertise in activities that have been neglected in the past on the one hand, e.g. care for the preservation of the natural environment, and on the other hand, technical and economic possibilities did not yet allow construction and wider use of spaces below the surface of the earth.

The knowledge and skills obtained enable graduates to work in demanding professional and managerial jobs both in the public and private sector. At the same time, they give them the opportunity to continue their studies in the framework of similar postgraduate programmes.

## General competences (learning outcomes)

European engineering programmes tend to be comparable to American engineering programmes. The undergraduate first-level university study programme Geotechnology and Environmental Engineering provides the following qualification attributes or competences:

- ability to work in engineering companies, public administration, research laboratories in institutes working in the field of geotechnology, environmental engineering, mineral extraction etc.;
- ability to use basic knowledge of mathematics, physics and chemistry to solve engineering problems;
- capability of conducting experiments as well as analysis and data interpretations;
- theoretical and practical knowledge from the particular field of expertise;
- ability to quantify and identify as well as formulate and solve engineering problems;
- capability of using techniques, skills and modern engineering tools needed for practical work;
- ability to produce a quality professional analysis in the field of geotechnology and environmental engineering;
- ability to perform individual and project work in the field of geotechnology and environmental engineering;
- understanding of ethical and professional responsibility;
- ability to recognise the need for and capability of life-long learning;
- confident expression of thoughts and communicating in a foreign language;
- ability to use the acquired knowledge and skills in the wider area of geotechnology and environmental engineering;
- ability to participate in projects involving geotechnology, environmental engineering and raw material extraction;
- ability to choose, describe and interpret different natural phenomena within the domain of geotechnology and environmental engineering;
- capability of problem parametrisation and optimisation within the field of geotechnology and environmental engineering;
- capability of understanding stochastic processes in the natural environment;
- capability of continuing studies in the field of engineering and natural sciences;
- ability to offer wider social participation in the area of technological development.

## **Subject-specific competences (learning outcomes)**

The competence profile of a student completing the undergraduate university study programme Geotechnology and Environmental Engineering encompasses the following competences:

- in-depth basic professional knowledge in the field of geotechnology, environmental engineering and extraction of mineral resources, complemented by selected knowledge in the field of natural sciences, engineering, management and information and communication technologies;
- ability to understand and theoretically substantiate professional topics, application of methods (for example in the field of extracting mineral resources: the Velenje mining method, in geotechnology; the new Austrian method of tunnel construction);
- ability to connect natural sciences knowledge with knowledge of other engineering disciplines;
- ability to work independently on applied projects related to geotechnology, environmental engineering and extraction of mineral resources;
- ability to understand geological circumstances in the design and construction of structures;
- ability to understand measurements and observations in the design and construction of structures;
- ability to organise the optimal use of mechanical devices in the design and construction of structures;
- ability to understand the business operations of a company in terms of revenues and costs of structure construction, extraction of mineral resources etc.;
- ability to economically manage projects in the field of geotechnology and environmental engineering and related disciplines;
- ability to use theoretical knowledge in solving and assessing environmental protection problems;
- ability to use theoretical knowledge in planning interventions in the environment with minimal harmful consequences for space and people;
- ability to identify problems, their theoretical analysis, finding solutions and taking appropriate action;
- developed ability to learn on their own in their professional field and to adapt to borderline problems;
- ability to participate in development work and transfer development and research achievements into practice;

- ability to understand the interdependence between natural sciences, modern technologies and engineering;
- ability to communicate with co-workers and experts from related fields, which enables active participation in team work, also in the field of projects based on the integration of professional legalities and experiences within the domain of geotechnology and environmental engineering;
- developed professional ethical and environmental responsibility;
- ability to use modern software tools.

## **Enrolment conditions**

Enrolment in the university study programme Geotechnology and Environmental Engineering is possible for anyone:

- a) who has completed general matura exam;
- b) who has passed the vocational matura exam in any secondary school programme and an examination in one of the general matura courses: mathematics, physics or foreign language; the chosen course cannot be the course that the candidate already passed at their vocational matura exam;
- c) who has completed any four-year secondary school programme before 1 June 1995.

## **Selection criteria in case of limited enrolment**

If the number of candidates applying for the programme exceeds the number of available enrolment places, candidates shall be selected according to the following criteria:

candidates from point a) will be selected according to:

- overall performance at the general matura exam (60% of points),
- overall performance in the 3rd and 4th year of secondary school (40% of points);

candidates from point b) will be selected according to:

- overall performance at the vocational matura exam (40% of points),
- overall performance in the 3rd and 4th year of secondary school (40% of points),
- performance in the chosen general matura course (20% of points).

candidates from point c) will be selected according to:

- overall performance at the final examination (60% of points),
- overall performance in the 3rd and 4th year of secondary school (40% of points).

## **Criteria for crediting knowledge and skills obtained before enrolment**

Recognition of knowledge and skills acquired before the enrolment is considered individually. The Study Committee of the Faculty of Natural Sciences and Engineering decides on recognition after preliminary consideration by the Department of Geotechnology, Mining and the Environment. Candidates can be recognised for their knowledge acquired through different methods of education if it is similar in content to the courses or the programme of the university study programme Geotechnology and Environmental Engineering. In addition to the application, the candidate must provide certificates and other evidence of acquired skills and the content of these skills.

When crediting knowledge obtained before the enrolment, the Study Committee will take into account the following criteria:

- whether conditions for enrolling into the study programme Geotechnology and Environmental Engineering are adequate,
- whether the scope of the completed educational course adequately compares with the credited requirements.

Acquired knowledge and skills may be credited as a completed study activity if the conditions for taking part in the educational programme were at least attained secondary school education, if the prior educational programme encompassed at least 75% of the scope of the course and if at least 75% of its contents cover the same areas as the course which the applicant would like to have credited. If the Study Committee establishes that the acquired knowledge can be credited, it is granted the same number of ECTS credit points as awarded for the course in question.

A special case of crediting skills and knowledge obtained prior to the enrolment is the crediting of practical training if the student was full-time employed at a company working with geotechnology activities or environmental engineering.

In the case of a possible enrolment limitation, knowledge and skills acquired before the enrolment, i.e. awards and other public recognitions, are also taken into account as a selection criterion.

## **Assessment methods**

The assessment methods are in accordance with the Statute of the University of Ljubljana and are specified in the curricula.

## **Requirements for progression through the programme**

Students may enrol in the next year if they have:

- accumulated at least 49 ECTS credit points from exams and other study requirements in the currently enrolled year,
- met all the requirements from the previous study year.

Students may exceptionally be allowed to continue to the next study year even if more than 11 required ECTS credit points are missing if there are justified reasons. Justified reasons are listed in the Statute of the University of Ljubljana.

The Study Committee of the Faculty of Natural Sciences and Engineering decides on progression to a higher year without fulfilling certain obligations, based on the student's written application.

The Study Committee of the Faculty of Natural Sciences and Engineering can enable extremely capable, hardworking and talented students with the average grade of at least very good (8) to progress through the programme and complete their studies in a shorter time than determined by the study programme for the duration of full-time studies.

To repeat a study year (to re-enrol in the same study year), students must have:

- in the 1st study year achieved at least 26 ECTS credit points;
- in the 2nd study year achieved at least 26 ECTS credit points.

A student can repeat a year or change a study programme once during their studies for failing to meet obligations in the previous study programme.

## **Requirements for transferring between programmes**

Transfer is possible between study programmes:

- which guarantee the acquisition of comparable competences or learning outcomes at the end of the studies;
- among which, according to the criteria for recognition of knowledge and skills acquired before the enrolment in the university study programme Geotechnology and Environmental Engineering, at least half of the obligations under the European Transferable Credit System (ECTS) from the previous study programme, referring to the compulsory courses of the university study programme Geotechnology and Environmental Engineering.

An individual exam passed in the previous study programme is recognised as passed in the university study programme Geotechnology and Environmental Engineering if the contents of the two courses are at least 75% compatible. The recognised exam is evaluated with the same number of ECTS credit points as in the previous study programme; however, not with more ECTS credit points than allocated in the university study programme Geotechnology and Environmental Engineering.

Candidates can enrol in the 2nd or 3rd study year of the university study programme Geotechnology and Environmental Engineering with transfer if:

- they meet the conditions for enrolment in the study programme,
- vacant places are available.

The Study Committee of the Department of Geotechnology, Mining and the Environment determines for each candidate the extent to which it recognises already completed study obligations, determines new obligations and defines the year the candidate can transfer to.

## **Requirements for completing studies**

Successful completion of the studies is conditioned by the fulfilment of all obligations and conditions specified in the study programme. In doing so, each student must first successfully complete a three-year university study programme and successfully defend a diploma thesis.

## **Professional title (abbreviation)**

Bachelor of Science (B.Sc.)

## SUBJECTS OF THE STUDY PROGRAM WITH INTENDED COURSES AND SUBJECT LECTURERS

### 1st year

	University course code	Course title	Lecturers	Contact hours					Individual work	Hours total	ECTS	Semester	Elective
				Lectures	Seminar	Tutorial	Clinical tutorial	Other forms of study					
1.	0067526	Physics I	Marko Žnidarič	45	0	30	0	0	75	150	5	1st semester	no
2.	0067529	Geometry in Engineering I	Goran Vižintin, Željko Vukelić	45	0	30	0	0	75	150	5	1st semester	no
3.	0067537	Computer Science and Informatics	Goran Vižintin	30	0	30	0	0	60	120	4	1st semester	no
4.	0067531	Chemistry I	Urška Lavrenčič Štangar	60	0	15	0	0	75	150	5	1st semester	no
5.	0067533	Mathematics I	Janko Bračič	60	0	30	0	0	90	180	6	1st semester	no
6.	0067535	Mechanics I	Pino Koc	45	0	30	0	0	75	150	5	1st semester	no
7.	0067527	Physics II	Borut Paul Kerševan	45	0	30	0	0	75	150	5	2nd semester	no
8.	0067528	Geology with Mineralogy and Petrology	Mirijam Vrabc	45	0	30	0	0	75	150	5	2nd semester	no
9.	0067530	Geometry in Engineering II	Goran Vižintin, Željko Vukelić	45	0	30	0	0	75	150	5	2nd semester	no
10.	0067532	Chemistry II	Iztok Turel	30	0	15	0	0	45	90	3	2nd semester	no
11.	0067534	Mathematics II	Janko Bračič	60	0	30	0	0	90	180	6	2nd semester	no
12.	0067536	Mechanics II	Pino Koc	45	0	45	0	0	90	180	6	2nd semester	no
Total				555	0	345	0	0	900	1800	60		

## 2nd year

	University course code	Course title	Lecturers	Contact hours					Individual work	Hours total	ECTS	Semester	Elective
				Lectures	Seminar	Tutorial	Clinical tutorial	Other forms of study					
1.	0068625	Economics and Organization of Work in Geotechnology	Jurij Šporin, Željko Vukelić	45	0	45	0	0	90	180	6	1st semester	no
2.	0067539	Management and Processing of Waste Materials	Jože Kortnik	30	15	0	0	15	60	120	4	1st semester	no
3.	0067542	Soil Mechanics I	Vojkan Jovičić, Željko Vukelić	30	0	15	0	0	45	90	3	1st semester	no
4.	0067544	Mineral Processing	Jože Kortnik	45	0	45	0	0	90	180	6	1st semester	no
5.	0067545	Surveying I (Elementary Geodesy I)	Damjan Hann, Goran Vižintin	30	0	15	0	0	45	90	3	1st semester	no
6.	0067547	Basics of Mechanical Engineering I	Željko Vukelić	30	0	30	0	0	60	120	4	1st semester	no
7.	0561368	Applied Geophysics I	Goran Vižintin	30	0	30	0	0	60	120	4	1st semester	no
8.	0067541	Mathematics III	Janko Bračić	30	0	30	0	0	60	120	4	2nd semester	no
9.	0067543	Soil Mechanics II	Vojkan Jovičić	30	0	30	0	0	60	120	4	2nd semester	no
10.	0067546	Surveying II (Elementary Geodesy II)	Damjan Hann, Goran Vižintin	30	0	15	0	15	60	120	4	2nd semester	no
11.	0067548	The Basics of Mechanical Engineering II	Željko Vukelić	45	0	45	0	0	90	180	6	2nd semester	no



12.	0067550	Environmental Management	Jože Kortnik	30	30	0	0	0	60	120	4	2nd semester	no
13.	0086886	General Optional Courses		60	0	60	0	0	120	240	8	2nd semester	no
Total				465	45	360	0	30	900	1800	60		

### 3rd year

	University course code	Course title	Lecturers	Contact hours					Individual work	Hours total	ECTS	Semester	Elective
				Lectures	Seminar	Tutorial	Clinical tutorial	Other forms of study					
1.	0067553	Deep Drilling I	Željko Vukelić	30	0	30	0	0	60	120	4	1st semester	no
2.	0067555	Engineering Geology and Hydrogeology	Barbara Čenčur Curk, Goran Vižintin	60	30	0	0	0	90	180	6	1st semester	no
3.	0067559	Extraction of Mineral Resources I	Damjan Hann, Janez Rošer, Željko Vukelić	60	0	15	0	15	90	180	6	1st semester	no
4.	0067560	Foundation Of Structures	Vojkan Jovičić, Željko Vukelić	45	0	45	0	0	90	180	6	1st semester	no
5.	0086887	Professional Optional Course I		30	0	30	0	0	60	120	4	1st semester	no
6.	0067549	Practical Training I	Jože Kortnik	0	0	0	0	80	40	120	4	1st semester	no
7.	0067551	Ore Dressing and Recycling	Jože Kortnik	45	15	15	0	15	90	180	6	2nd semester	no
8.	0067554	Deep Drilling II	Željko Vukelić	30	0	15	0	0	45	90	3	2nd semester	no
9.	0067556	Rock Mechanics	Vojkan Jovičić, Željko Vukelić	45	15	30	0	0	90	180	6	2nd semester	no
10.	0067557	Surveying in Geoscience	Damjan Hann, Goran Vižintin	30	0	15	0	0	45	90	3	2nd semester	no
11.	0086888	Professional Optional Course II		45	0	45	0	0	90	180	6	2nd semester	no
12.	0067552	Diploma Thesis		0	0	0	0	90	90	180	6	2nd semester	no
Total				420	60	240	0	200	880	1800	60		

### Elective professional course type

	University course code	Course title	Lecturers	Contact hours					Individual work	Hours total	ECTS	Semester	Elective
				Lectures	Seminar	Tutorial	Clinical tutorial	Other forms of study					
1.	0068648	Construction Materials	Damjan Hann	30	30	0	0	0	60	120	4		yes
2.	0559592	Applied Geophysics II	Goran Vižintin	45	0	45	0	0	90	180	6		yes
3.	0075658	Geotechnical Constructions	Vojkan Jovičić, Željko Vukelić	45	15	30	0	0	90	180	6		yes
4.	0075660	Technical English	Barbara Luštek Preskar	0	15	45	0	0	60	120	4		yes
5.	0075672	Fluids in Geotechnology	Željko Vukelić	30	0	30	0	0	60	120	4		yes
6.	0075821	Practical Training II	Jože Kortnik	0	0	0	0	120	60	180	6		yes
		Total		150	30	180	0	120	420	900	30		