



UL FGG
University of Ljubljana,
Faculty of Civil and Geodetic Engineering

Univerza v Ljubljani
Fakulteta za gradbeništvo in geodezijo



UL FGG'S MISSION STATEMENT

To teach, create new knowledge and develop innovative solutions in the areas of civil engineering, environmental engineering and geodesy.

Research work intertwined in an international environment, professional excellence and excellent teaching enable us to educate innovative engineers of the future.

In cooperation with the economy and society we solve development and professional issues, develop sustainable construction and co-create conditions for a healthy and safe environment.

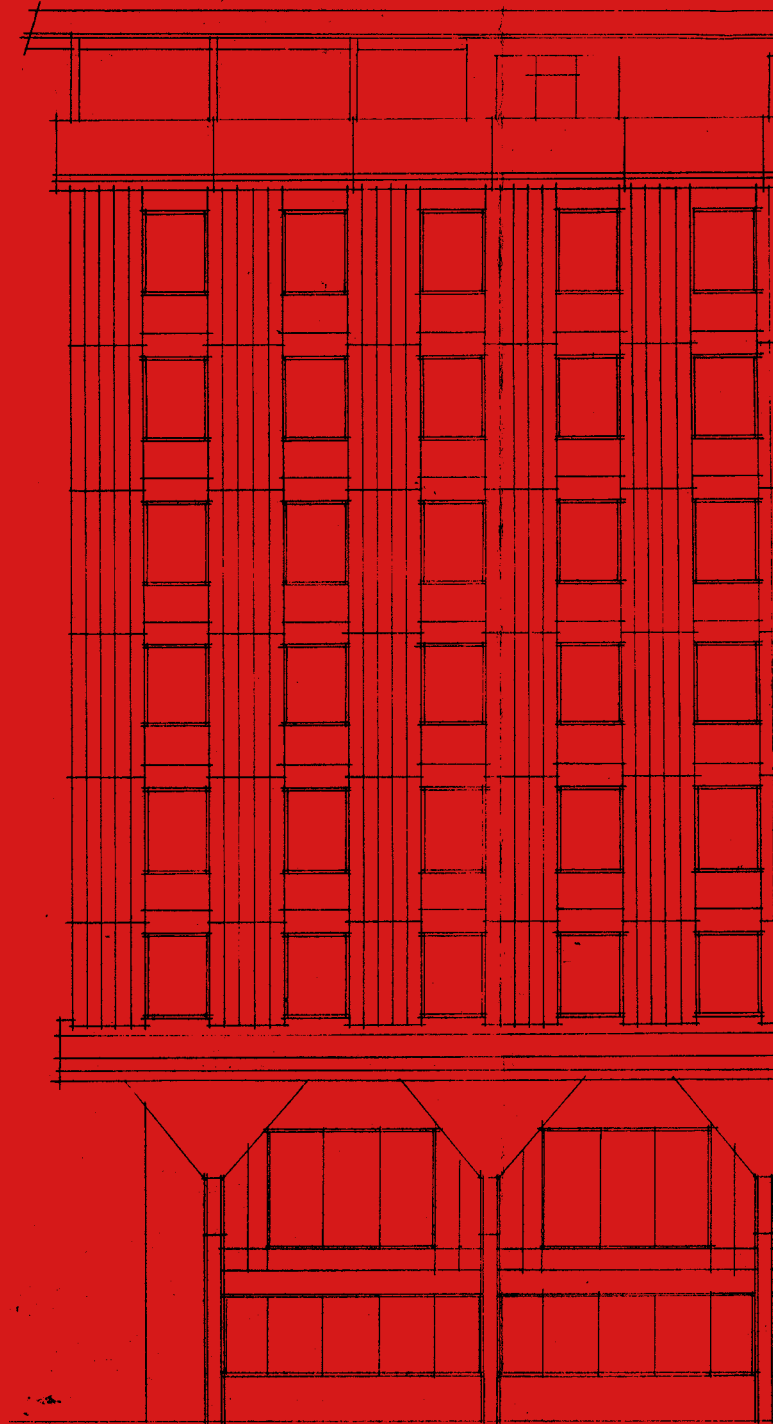


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DEAN'S FOREWORD



Dean of UL FGG,
Prof. Dr. Matjaž Mikoš

***“Challenges of the future will be
solved by our graduates.”***

For our planet, one hundred years are, geologically speaking, only a fleeting moment. We, on the other hand, see and feel the changes in this fleeting moment of one hundred years every day, more and more – our responsibility to the environment is being tested. In 2019, the Faculty of Civil and Geodetic Engineering at the University of Ljubljana (UL FGG) is celebrating its 100th anniversary. Its origins are in the

Technical Faculty, one of the five founding members of the University in Ljubljana. However, on the occasion of its 100th anniversary, UL FGG focuses not so much on the past, but on the future and its vision for the years to come, which will be, no doubt, full of new challenges as well as opportunities.

UL FGG's mission reaches beyond the literal meaning of the words in its name. Civil and geodetic engineers are joined by masters of buildings, water sciences and spatial planning. The classical areas of civil and geodetic engineering as we used to know in the past, since the Middle Ages, are being modernised; new contents are being added and the graduates, when they finish studies, start their professional careers with different knowledge and competences than a few decades ago. Some professions are moving towards extinction, new ones are being born. However, those that remain must inevitably change. Our faculty wishes to stay on this path even more than before – we wish to actively co-create a new profile of the graduate, responsible towards the natural environment and actively co-creating a safe, comfortable and sustainable built environment.

Our faculty offers 11 study programmes at all three Bologna cycles. The programmes are not only engineering-oriented, but also provide a strong basis in natural sciences and social sciences. All undergraduate and master programmes have international accreditation and are comparable to those elsewhere in the world.

Our main care and energy are focused on teaching and work with students – we are increasingly becoming mentors rather than classical mediators of knowledge, as today knowledge is easily accessible in the internet. Nevertheless, how do we know what knowledge is worthy of our attention and is based on facts? We live in an extremely complex society, governed on the one hand by globalisation, new technologies and climate changes, and on the other by increasingly urgent issues of poverty, health and safety problems affecting each individual. By interconnecting our own research, professional and teaching activities, we prepare our students to the work awaiting them when they finish their studies, which will be extremely important and will carry a lot of responsibilities.

This promotion brochure sheds some light on the areas of our work from the aspects of teaching, scientific research and professional activities, and, last but not least, here we let our students express their opinions about our faculty.

WHO ARE WE AND WHAT WE DO?

Today, the University of Ljubljana consists of 3 academies and 23 faculties that offer more than 300 different bachelor and master study programmes to more than 40,000 students, which places it among the largest universities in Europe. With their research and scientific projects the researchers of the University of Ljubljana keep pace with the latest developments in the areas of arts, sciences and technology at home and abroad. Currently, the University ranks among 500 best universities in the world according to the Academic Ranking of World Universities (ARWU – “Shanghai Ranking”) and top 4% of European universities.

From the very beginning, when the Department of Civil Engineering and the Department of Geodesy were active within the Technical Faculty of the University of Ljubljana, they boasted numerous esteemed professionals. At present, UL FGG is represented by these two departments and also the Department of Environmental Civil Engineering. Worth mentioning are also study programmes Buildings and Spatial Planning. The Faculty has 670 students studying in

5 undergraduate, 5 graduate programmes and 1 doctoral programme. The Faculty employs close to 200 full-time employees, of which 90 are teachers.

UL FGG is one of only two faculties providing civil engineering knowledge and the only faculty for geodetic engineering and water science and environmental engineering in Slovenia. Thus, all three main areas of study programmes (Civil Engineering, Geodetic Engineering and Water Science and Environmental Engineering) affect importantly and directly the personnel structure in the economy, as well as in the state administration and local communities.

In the time from its establishment in 1919 until 31 December 2018, 8,685 graduates finished their studies at UL FGG. Of that, 5,382 were civil engineers, 2,348 were geodetic engineers and 429 were engineers of water science and municipal (environmental) engineering. In 2013, we recorded the first master engineers. Until 21 December 2018, a total of 292 engineers finished the second cycle master study programmes offered by our faculty. Of that, 113 were from the area of civil engineering, 70 from the area of geodesy and geoinformation, 32 from the area of buildings, 51 from the area of water science and environmental engineering and 26 from the area of spatial planning.



MILESTONES IN UL FGG'S DEVELOPMENT

1919

On February 1, 1919, the first lecture was held.

On July 23, 1919, the Kingdom of Serbs, Croats and Slovenians adopted the Act on University, finally establishing the technical higher education courses, which thus acquired the status of a technical faculty within the University of Ljubljana. The Civil Engineering Department was established.

The first dean of the Technical Faculty was Prof. Dr. K. Hinterlechner.

On the initiative of engineer L. Novak, Professor at the then National Trade School, land surveying courses were established.

In 1921, the Committee for the Construction of the Technical Faculty, managed by an engineer, M. Štuklje, managed to realise Plečnik's design of temporary Technical Faculty at today's 7 Aškerčeva Street, later on called "Old Technical School". It housed three departments of the Technical Faculty: Civil Engineering, Architecture and Electrical Engineering. In the same building also geodesy was taught.

1931

The civil engineering study was organised in cooperation between the Institute of Technical Mechanics and the Institute of Building Engineering. In 1931, the institutes split to six institutes: Institute of Technical Mechanics and Material Research, Institute of Reinforced Concrete and Building Mechanics, Institute of Buildings, Institute of Roads and Railroads, Institute of Bridge Structures, and Institute of Water Buildings.

1945

After World War II, the Faculty of Civil and Geodetic Engineering became an independent member of the University of Ljubljana. From 1945 to the autumn of 1950, its dean was Prof. A. Hrovat. At the Department of Civil Engineering, three study orientations were established: hydrotechnical, structural and traffic. The initiative to establish the Department of Geodesy came from the Institute of Geodesy, which was at the time Geodetic Administration of Slovenia, and from individuals active in the profession.

In 1949, the complex at Hajdrihova Street was finished. It was designed by Prof. Dr. Eng. M. Goljevšček, according

to architectural drawings of Assist. Prof. Eng. Arch. J. Valentinčič. The building was called the Water Building Laboratory of the University of Ljubljana. It was the first building after World War II constructed in Slovenia specifically for education. Today, the Department of Environmental Engineering is located in the building.

1950

During the academic years 1950/51 and 1953/54, the study of engineering was implemented at the independent Technical Higher Education School, which was separated from the University of Ljubljana.

1954

The Faculty of Civil and Geodetic Engineering was member of the independent Technical Higher Education School. Then, it became the Department of Civil and Geodetic Engineering at the Technical Faculty of the University of Ljubljana.

1957

On June 28, 1957, the Act on University of Ljubljana was adopted. Based on its Article 2, the Faculty of Architecture, Civil and Geodetic Engineering (FAGG) was established. It had three departments: Department of Architecture, Department of Civil Engineering, and Geodetic-Municipal Department. The first Dean was Prof. E Mihevc (architect), and its vice dean was J. Sketelj (civil engineer).

In 1969, the new building at 2 Jamova Street was built to the design of Prof. Eng. Arch. E. Ravnikar.

With a Decree on Reorganisation of the University of Ljubljana from December 31, 1994, FAGG ceased to exist. Two new faculties were formed: Faculty of Architecture (FA) and Faculty of Civil and Geodetic Engineering (FGG). The last dean of FAGG was Dr. J. Duhovnik, and the last head of the Department of Civil and Geodetic Engineering was Dr. B. Majes.

1995

On January 1, 1995, the Faculty of Civil and Geodetic Engineering became an independent member of the University of Ljubljana.

In the academic year 1996/97, the following academic and higher education professional study programmes were introduced:

- Academic study of Civil Engineering
- Academic study of Water Science and Municipal Engineering
- Academic study of Geodesy
- Higher education study of Civil Engineering
- Higher education study of Geodesy

- The academic study programme Water Science and Municipal Engineering was first implemented two years later, in the academic year 1998/99.
- 2000**

□ Even before Slovenia joined the European Union, the Faculty of Civil and Geodetic Engineering started to cooperate in European projects (TEMPUS, SOCRATES, COST, Leonardo da Vinci, etc.).

□ In 2001, postgraduate students were for the first time allowed to transfer directly to doctoral studies, without finishing first the scientific master degree.

□ In 2009, the Department of Environmental Civil Engineering was established, located at Hajdrihova 28a, as well as the Water Management Institute.

□ In 2010, UL FGG purchased a house at Groharjeva Street 2b. The faculty's financial services were relocated there. At the same time, the Office of Study Affairs moved from the first floor to the ground floor of the main building.
- 2007**

□ In the academic year 2007/08, the Senate of the Higher Education Council of the Republic of Slovenia awarded an accreditation to UL FGG for its 11 first, second and third cycle Bologna study programmes. The Bologna study programmes were then gradually introduced from 2008/09 to 2012/13:

 - two Bologna first cycle higher education professional study programmes: Construction Management and Technical Real Estate Management
 - three Bologna first cycle academic study programmes: Civil Engineering, Geodesy and Geoinformation and Water Science and Municipal Engineering
 - five second cycle master study programmes: Civil Engineering, Spatial Planning, Buildings, Geodesy and Geoinformation and Environmental Civil Engineering
 - third cycle doctoral study programme Built Environment with three scientific areas – Civil Engineering, Geodesy and Spatial Planning, extended in 2010 to the scientific area Geology
- 2014**

□ In 2014, the faculty management and staff worked out a new UL FGG vision and mission statement.

□ Since 2014, the UL FGG interiors have been systematically redesigned. First, the main hall of the UL FGG main building at Jamova Street 2 was redesigned by students based on a call for proposals. This was followed by rearrangement of student corners and a student office, corridors, with permanent and temporary exhibitions, and renovation

- of lecture rooms. Renovations are still ongoing and are expanding to the UL FGG exterior.
- The time between 2011 and 2018 was fruitful and successful, which is evident also in the latest achievements of our staff:

 - 2011: Acad. Prof. Dr. Peter Fajfar elected member of the European Academy of Science
 - 2013: Life Achievement Award to Acad. Prof. Dr. Peter Fajfar by Slovenian Chamber of Engineers for his work in the area of structural engineering
 - 2015: Zois Life Achievement Award to Acad. Prof. Dr. Peter Fajfar
 - 2013-2017: Prof. Dr. Goran Turk elected Vice-Rector of the University of Ljubljana
 - 2017: Prof. Dr. Matjaž Mikoš elected full member of the Slovenian Academy of Engineering (IAS)
 - 2018: Acad. Prof. Dr. Peter Fajfar elected member of the National Academy of Engineering (USA)
- 2016**

□ On 30 Sept. 2016, based on the Higher Education Act, the pre-Bologna academic and higher education professional study programmes as well as postgraduate study programmes leading to the scientific master degree were finally abolished.

□ In the academic year 2015/16, the faculty was awarded international ASIIN and EUR-ACE accreditations for all of its ten first and second cycle study programmes for a period of five years.

□ In 2016, Unesco Chair on Water-related Disaster Risk Reduction (WRDRR) was established at the University of Ljubljana.

□ In 2017, UL FGG organised the 4th World Landslide Forum in Ljubljana with 600 participants.
- 2019**

□ On the occasion of the 100th anniversary of the University of Ljubljana, UL FGG organised a number of events. Especially worth mentioning are the World Construction Forum in co-organisation with the Slovenian Chamber of Engineers and 14th meeting of representatives from European planning schools AESOP in co-organisation with the Department of Landscape Architecture at the Biotechnical Faculty of the University of Ljubljana.

HOW ARE WE ORGANISED?

UL FGG implements its basic teaching, research, professional and consulting activities within three departments, two laboratories for experimental research, education and professional work, and within three research institutes for the areas of structures, earthquake engineering, computer science, water management and geo and hydro threats. We work in two buildings and are very proud of them, because they are both part of the Slovenian cultural heritage. UL FGG's main building is located at Jamova cesta 2 and was designed by architect Edvard Ravnikar, one of the most prominent architects of Slovenian Modernism.

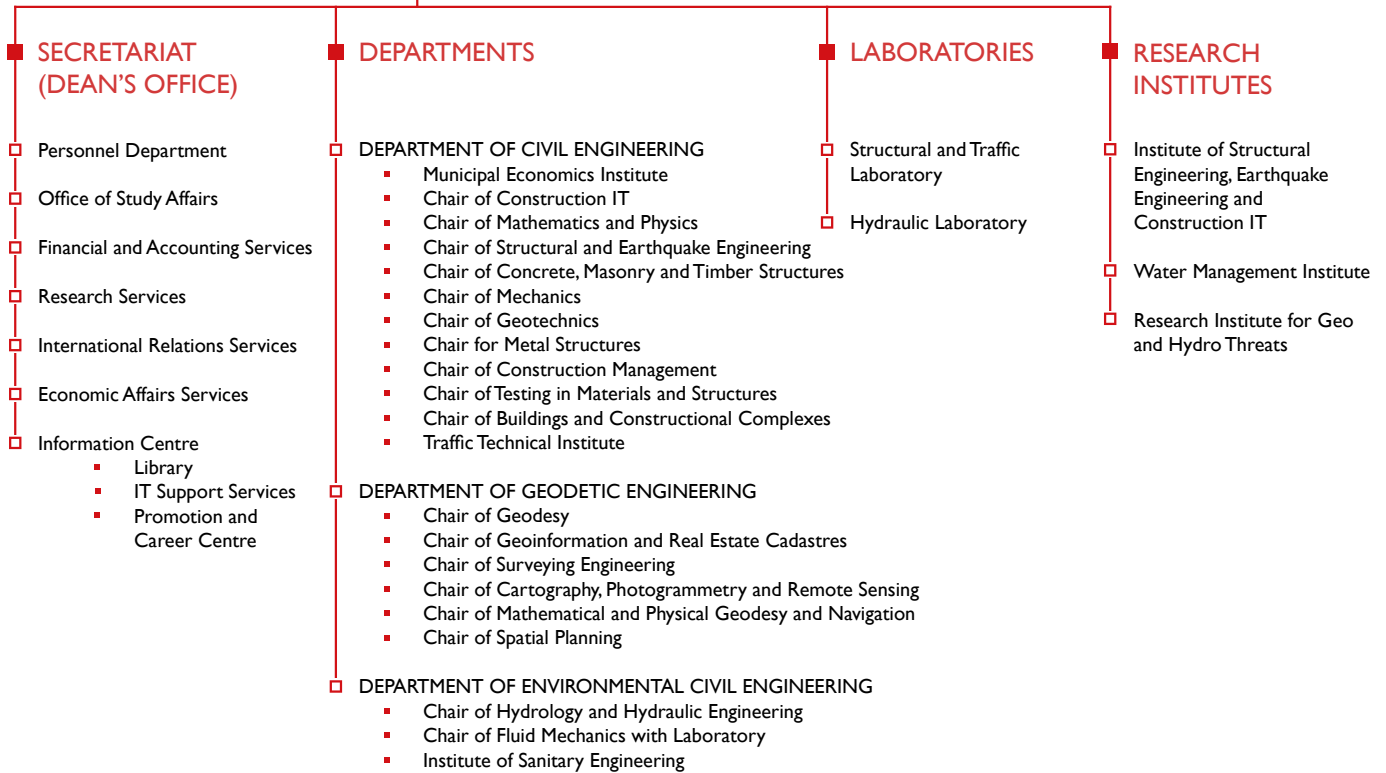
HOW DO WE CARE FOR QUALITY?

Care for quality is one of our priorities. We have set up a quality assurance system for all areas of our work, particularly for education, but also for research administration and other areas. Our goal is to be one of the best faculties in Central Europe for research and education. Administrative and technical support to teaching, research and professional work is provided by our Computer Centre, Office of Student Affairs, Library, Promotion and Career Centre, Secretary's Office and Financial Accounting Service. With the support of all employees we strive to keep raising the quality of our work, reputation and recognition of our Faculty in Slovenia and internationally. We monitor quality in different ways, including, among others, by subjecting our institution and study programmes to national (NAKVIS) and international (ASIIN) evaluations and accreditations. We take part in the association of German speaking faculties of engineering FTBGU to be comparable to the best classical German engineering schools. We also care a great deal how all our employees and students feel at UL FGG. Therefore, we conduct student surveys, asking students for their feedback.

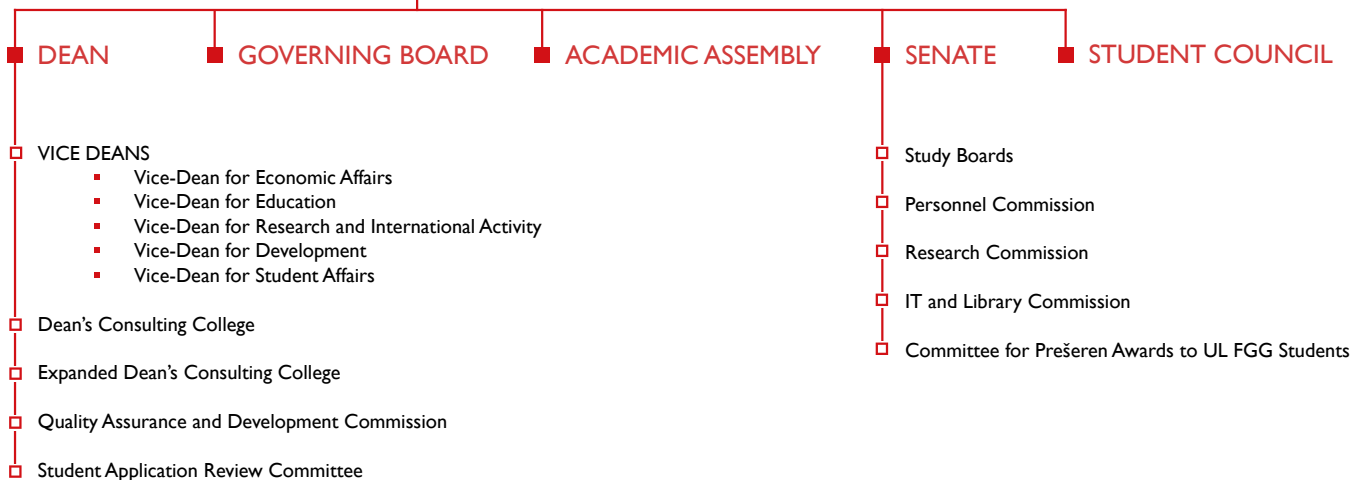
UL FGG IN NUMBERS (1 JANUARY 2019)

Number of employees	■■■■	195
Of which teaching staff	■■■■	90
Number of students	■■■■	670
Number of full-time undergraduate students (bachelor)	■■■■	400
Number of master students	■■■■	200
Number of doctoral students	■■■■	70
Number of part-time students	■■■■	0
Total floor area of buildings owned by UL FGG	■■■■	13,261 m ²
Floor area used for teaching	■■■■	4,078 m ²
Annual budget	■■■■	11,552,399.94 €

ORGANISATION STRUCTURE



UL FGG ORGANISATIONAL CHART



WHICH STUDY PROGRAMMES DO WE OFFER?

Study programmes from the areas of civil engineering, environmental engineering, geodesy, buildings and spatial planning are an excellent guarantee to the new generations of students to spend one's career engaged in interesting work, cooperating with important people and in inspiring projects. Despite the economic crisis that hit Slovenia, especially in the construction sector, these occupations are still in high demand and offer good chances of employment, both in Slovenia or abroad.



STUDY PROGRAMMES

1st CYCLE

- Higher education professional studies
 - Construction Management
 - Technical Real Estate Management
- Academic study programmes
 - Civil Engineering
 - Geodesy and Geoinformation
 - Water Science and Environmental Engineering

2nd CYCLE

- Master study programmes
 - Civil Engineering
 - Geodesy and Geoinformation
 - Water Science and Environmental Engineering
 - Buildings
 - Spatial Planning

3rd CYCLE

- Doctoral study programmes
 - Built Environment
 - Environmental Protection (with 12 other members of UL)

HOW DO WE FOSTER COOPERATION?

Study programmes of all three cycles offered by UL FGG allow students the possibility to select electives at other national and international higher education institutions. In addition, students from other members of the University of Ljubljana and other national and international higher education institutions can select elective courses offered by UL FGG. For this purpose, we accredited three courses especially for students of other, non-engineering faculties. Our teachers frequently participate in many study programmes of other members of the University of Ljubljana, as well as at other higher education institutions in Slovenia and abroad. Many courses within our curricula are taught by university professors from other members of the University of Ljubljana and other research organisations. Especially lively cooperation with other Slovenian higher education institutions and the economy is within the final theses of our students. UL FGG has always encouraged interdisciplinarity, which frequently demands, at all three cycles of studies, cooperation of supervisors and co-supervisors from other disciplines and from practice.



According to our long-term vision of development, UL FGG has been for many years successfully nourishing international activity, which includes exchange of students, teachers, researchers and supporting staff. Through our Office of International and Research Activity, we provide systematic support, mainly within exchange programmes, such as Erasmus+, CEEPUS, Marie Skłodowska Curie, and others. The largest number of exchanges are realised within the Erasmus+

programme. Thus, the number of bilateral agreements with our partner institutions throughout Europe has increased already to about 60. This allows us to receive each year about 60 incoming students, whereas the number of outgoing Slovenian students is slightly lower.

With the aim to assist our graduates in their transfer to practice and in building successful careers, we encourage them to decide for international training exchange. For this purpose, we publish calls for student exchanges for practical training within the Erasmus+ programme, under the auspices of the University of Ljubljana. Motivated by the desire to offer our students additional possibilities and added value of exchange for training, UL FGG applied for, in cooperation with the University of Maribor and two companies, LUZ d.d. and Lineal d.o.o., and was successful in winning our own project of international student exchanges for training, Erasmus KA103. In the last two years, we sent 17 students from UL FGG and the University of Maribor to international training.

Part of the Erasmus+ programme is also Erasmus Mundus joint master programmes that attract the best students from all around the world. At UL FGG, we cooperate in two such programmes: Erasmus Mundus Flood Risk Management in cooperation with UNESCO-IHE (the Netherlands), Technical University in Dresden (Germany) and Technical University of Catalonia in Barcelona (Spain), and BIM A+ or European Master in Building Information Modelling in cooperation with the University in Minho (Portugal) and Polytechnics Milano (Italy). Worth mentioning are also two double degree agreements within the master study programme Water Science and Environmental Engineering, running in cooperation with Zurich University of Applied Sciences (Zürich, Switzerland) and Università della Calabria (Italy).



RESEARCH AND DEVELOPMENT

Research and development are important parts of the Faculty's activities with which we create about a quarter of all revenue. The Faculty carries out basic and applied projects with an emphasis on ensuring optimal functionality, sustainable development and resilience of the built environment. The research work at the Faculty is becoming more and more internationally oriented due to the increase of the mobility of our researchers abroad and due to employing researchers from abroad.



Research is carried out in seven research programs, approximately 15 national projects and more than 20 European projects. Special attention is given to transferring knowledge from the latest research into curricula, which ensures the long-term excellence of study programs. UL FGG's vision for future research is to further increase international cooperation within various research projects, especially within the EU Framework for Research and Innovation Horizon 2020 and within the forthcoming 9th Framework Programme for Research and Innovation, while at the same time developing areas which are particularly important for the development of the Republic of Slovenia. UL FGG promotes cooperation with both the private and public sectors. In cooperation with the private sector we try to solve the most important problems from the field of

the built environment. Researchers of UL FGG are involved in various experimental investigations and in the design, construction and maintenance of the built environment. The Faculty cooperates with small and large companies and with the public sector, thereby creating new services and products. In this way, it contributes to increasing the added value of the industry and to strengthening the functionality of the built environment. It also cooperates in the implementation of all major national infrastructural projects. The objective of its development work is also to improve the national and international regulations and standards related to the built environment.

In the framework of the national program Young Researchers of the Slovenian Research Agency, we also take care of human resource development. In this way, we have educated many young researchers, who have thus obtained a good opportunity for employment in research institutions, the private sector and faculties at home and abroad.



OUR AMBASSADORS

Our graduates are our best ambassadors. With their knowledge and competences they actively contribute to the development of economy and society as a whole and thus co-create the future.

Ana Jeseničnik

During my studies of geodesy at UL FGG, I took advantage of all the possibilities of internationalisation offered by our faculty – from an international student meeting (IGSM), to ERASMUS study in Spain and student mobility for training through IAESTE in Turkey. Owing to the positive experiences I had abroad, I also found my first job outside Slovenia. I joined a Swiss company, a world famous manufacturer of drones used for mapping. My work includes development and testing of products as well as consulting and customer services. Within my work obligations, I am also frequently sent abroad, where the knowledge I acquired at our faculty is highly valued.



Jurij Karlovšek

The wide variety of international cooperation programmes encouraged by UL FGG enabled me already as an undergraduate student to take part at an international training in Japan, Tokyo, where I became enthusiastic about geotechnics, especially tunnelling. Then I set out to international exchange to Sydney, Australia. This was the time that gave me many valuable international experiences and I made contacts with the industry. Finally, it also resulted in my job at the School of Civil Engineering at the University of Queensland, Brisbane, Australia. As associate professor, my focus is on awakening students' passion for civil engineering.



Maja Golubovič

I found a job even before my graduation from UL FGG. Based on the experiences I got at mandatory practical training, I started working as an assistant building site manager in the construction company Pomgrad. Academic education provided me with a solid foundation of knowledge and understanding of the basic laws behind structures, material behaviour and material properties, building physics, statics, as well as computer literacy in professional software tools. Now, after completing the professional examination, I work as a building site manager. For the moment, I am in charge of the construction of a residential area in Sweden, where I function as a link between the building site and the investor, designers and supervisors.

Manca Petek

When I finished my studies at UL FGG, I found my first job in Slovenia. Not long afterwards, I moved to the Netherlands, where I still work in an engineering consulting company, dealing with projects from the sector of infrastructure for drinking and waste water. The work offers a lot of variety in the type as well as complexity. I also cooperate in projects in the Netherlands and all around the world. Study at UL FGG prepared me well for the challenges I am now facing in practical work. My involvement in activities at the faculty outside the curriculum and within the study exchange and projects abroad gave me the opportunity to build my own professional network and widen my horizons already during my studies.



Vid Peterman

I studied geodesy at UL FGG. After my graduation in 2011, two of my colleagues and I established a company called Modri planet (Blue Planet). Full of enthusiasm, we purchased a drone and started developing software called 3Dsurvey, which allows for precise 3D spatial data acquisition from disorderly aerial photographs. In the beginning, our path was far from easy, but we found a solid base in the knowledge we received at UL FGG. Today, we are doing great. We have sold more than 800 copies of the 3Dsurvey software all around the world. I only have best memories of my student years.



**DEPARTMENT
OF CIVIL
ENGINEERING**

FOREWORD



Head of the Department of Civil
Engineering,
Prof. Dr. Goran Turk

*“Engineers turn dreams into reality.
Can you think of a more fulfilling
profession?”*

In the civil engineering profession, each day brings new problems, new issues that must be solved by well qualified interdisciplinary groups of experts, using basic knowledge as well as knowledge on materials and technologies. We must be aware that each building structure is unique. Although past experiences are very important, an engineer may face new challenges with each new structure, which constantly brings new experiences. In civil engineering, routine work is not as common as in some other professions.

The main task of the Department of Civil Engineering is education of experts in civil engineering. The department consists of 12 pedagogical research units, which makes it the largest department at UL FGG. The areas of work are divided into general, such as mathematics, physics and mechanics, and expert, which consist of building materials and structures, earthquake and fire engineering, efficient energy use and living comfort, traffic and municipal engineering, geotechnics, organisation of construction works and technologies, and construction informatics.

At our department, teaching and research activities are closely intertwined, which is evident in a large number of the second and third cycle of students cooperating in our projects, and in the fact that teachers include the results of their research projects in their educational work. Research activity runs within five programme groups and four research projects financed by the Slovenian Research Agency, six Horizon2020 projects and many other national and international projects. The areas of our research activity cover basic as well as applied research for different fields of civil engineering. Our department nourishes active cooperation with Slovenian economy and research cooperation with international universities and institutes.

The civil engineer is an extremely diverse profession, which means that not every civil engineer can be specialist for all areas of civil engineering. However, we are convinced that our graduates are capable of solving various construction problems of today and tomorrow. They prove this with their final theses that represent syntheses of different knowledge and are useful in real-life professional and expert cases. Experience also shows that they are capable of a quick and successful entry in the civil engineering practice in Slovenia and abroad. We believe that our graduates are capable to adapt, in a relatively short time, to new challenges and new conditions that will undoubtedly keep changing with accelerated speed.

TEACHING ACTIVITY

Building structures are unique. For this reason, civil engineering is a profession with an extremely wide scope that requires creative, innovative and dedicated professionals. There is no room for error and solid basic knowledge is as important as knowledge about materials and technologies. The final product is a result of joint work of an interdisciplinary group of experts. The Department of Civil Engineering is in charge of the development of knowledge and education for the field of civil engineering.

Civil engineering is a very wide professional area. It includes care for stability, safety and durability of building structures, as well as energy efficiency of buildings and care for healthy and comfortable living conditions. Of course, civil engineering is not limited only to buildings, but includes also design and construction of roads, power structures and other engineering structures for managing rivers, preventing landslides or repair after landslides, etc.

In our educational work, we consistently use modern ICT technology: in our web classroom students find most of the materials required for their studies; within professional courses students are also introduced to the use of software that they will need in practice. This part of the teaching



activities is implemented in computer rooms with modern hardware and software equipment. An important part of teaching activities is held in laboratories. Students first attend classes in the structural and traffic laboratory, where they are introduced to building materials, their properties and principles of testing materials as well as structural elements. Part of the teaching activities is organised also in soil mechanics and fluid mechanics laboratories. Some courses are implemented partly in the field, for others we organise expert field trips, visiting currently active building sites, factories manufacturing building materials and prefabricated products, and laboratories of institutes.

Traditionally, in the first few years the study of civil engineering is focused on providing basic knowledge from mathematics, physics, stability, strength, hydromechanics, soil mechanics and basic professional courses, such as Materials, Geodesy, Roads, Construction Technology, Buildings, etc. Towards the end of the studies, students are offered in-depth knowledge of individual areas of civil engineering in the form of modules or orientations: municipal engineering, structural, traffic, geotechnical, hydrotechnical, construction management orientations and buildings.

Students of the municipal engineering orientation learn the details about spatial interventions as a whole, real estate management, especially municipal and housing economics, and real estate valuation.

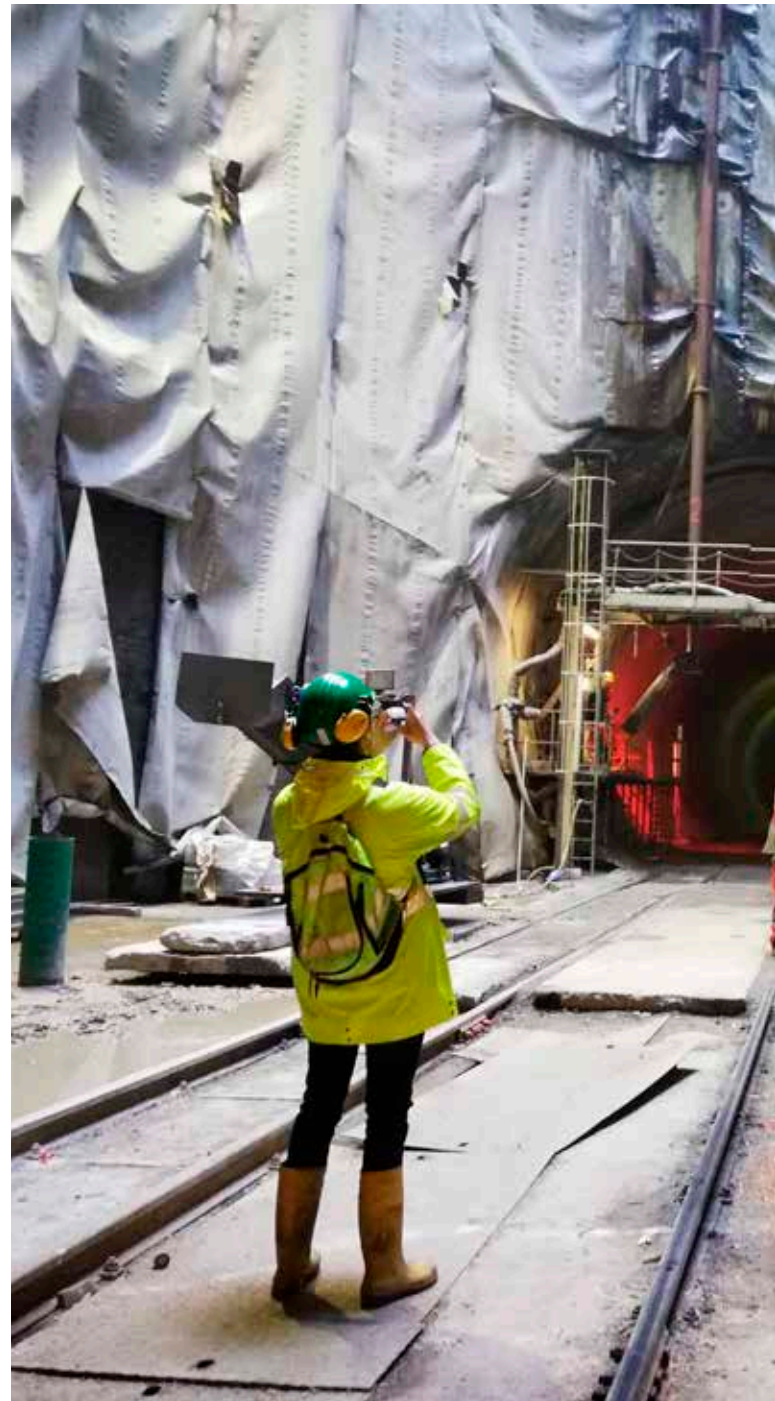
At the structural division, the focus is on providing safety of load-carrying structures of buildings made of all building materials. Students learn about the principles of correct building design and engineering structures, methods of static and dynamic analysis of structures, construction procedures and details of timber, steel and reinforced concrete structures. For our territory, it is of special importance that engineers are also experts of earthquake engineering.

The purpose of the courses within traffic engineering is to teach students about characteristics and laws of road and railway traffic, to give knowledge on the procedures in the design, construction and maintenance of traffic infrastructure as well as the prediction and modelling of traffic.

Graduates from the orientation Buildings are specialists in building physics, efficient energy use in buildings and providing living comfort.

An increasing number of our students use the opportunities offered by European projects, intended to internationalisation, and do part of their obligations at foreign universities. In exchange, we host a considerable number of foreign students.

Since 1995, we have been organising a national championship in construction mechanics for secondary schools. The purpose of this competition is to make the area of mechanics more popular and to improve the knowledge in this area. Because of the very positive response by the





secondary school students and their teachers, each year a collection of tasks from this area is prepared, together with a complete presentation of solutions. Our students are also successful in numerous competitions outside our faculty.

We are proud of our graduates, who show within their final theses the ability of independent study and synthesis of the acquired knowledge in real-live professional and development cases. Our best students regularly win UL FGG's awards already during the studies, as well as for their final theses. The best final theses are awarded with the prestigious Prešeren awards.

SCIENTIFIC, RESEARCH AND PROFESSIONAL ACTIVITY

Research and professional activity in our Department is implemented in pedagogical research units (chairs) that represent link to each other as well as to external Slovenian and international partners. In various forms, we cooperate with distinguished international institutes and universities.

We are successful in winning European research projects, we cooperate with Slovenian construction industry carrying out demanding expert tasks in Slovenia and abroad, in the development of norms and other technical regulations in civil engineering, and in the transfer of European norms into national practice. We frequently appear as reviewers of designs for demanding building projects. The cooperation with the industry in developing new products and technologies in civil engineering has been intensifying as well, of which we are particularly proud. Part of our professional activity is also forensics, as we cooperate in solving disputes among stakeholders in construction projects.



Research work at our department is currently running within 5 Research Programs: E-construction, Structures and Building Physics, Mechanics of Structures, Earthquake Engineering, Water Engineering and Geotechnical Engineering. Especially in the areas of earthquake engineering, mechanics and construction IT, the achievements of our researchers are well recognised and valued at the international scale. Evidence supporting this fact is annual growth of citations of our published works. Many of us actively and regularly review



articles for distinguished international journals as reviewers or members of editorial boards.

We lead or participate as partners in various research projects financed by the Slovenian Research Agency. For the moment, members of the Department of Civil Engineering lead the following projects: Mass Concrete – Technological Optimisation by Advance Experimental Methods, Seismic Stress Test of Built Environment, Nonlinear Dynamics of Spatial Frame Structures with Enforced Kinematic Compatibility for Advanced Industrial Application, Sensor Technologies in Diagnostics and Monitoring of Cultural Heritage Buildings, Modelling Pyrolysis to Determine the Decomposition of Wood in Natural Fire.

Researchers from the area of building materials and testing in materials and structures conduct experimentally supported analyses of cultural heritage buildings and innovative structural elements, such as glulam timber frames filled by laminated glass plates or panels from waste packages for the application in civil engineering. This research is on the one hand focused on the protection of built heritage, and on innovative solutions for modern buildings on the other. In the development of mineral materials, such as brick, concrete, mortar and injection grouts, we cooperate with other laboratories within the University of Ljubljana and conduct tests of their chemical structure and microstructure. We intensively research the latest technologies in the area of materials with mineral binders, such as cements, lime and additional cementitious materials. In order to facilitate the development of adequate formulas for high strength concrete made from domestic materials, we investigate

mechanical and rheological properties of concrete considering the concrete mix composition. We develop new types of concrete distinguished by better durability or achieving higher compressive strength. Because rheology of mineral binders in fresh state is an important topic, we conduct investigations in this area as well. With our laboratory investigations, we look into the behaviour of load-carrying elements made of reinforced and prestressed concrete, metals and composite timber elements, with various types of strengthening and binders. We cooperate with the economy in the development of innovative reinforced and prestressed concrete, composite and timber structural elements and prefabricated systems. Defects and damages in structural elements are determined by failure tests, completed by non-failure tests.

A lot of research energy is dedicated to basic and applied research and development of methods and tools for as realistic as possible modelling of demanding structural elements and constructions subjected to various types of loads, including earthquakes and fires. The developed methods and tools allow nonlinear analysis of composite beams, glulam timber beams, steel, reinforced concrete and composite structures at elevated temperatures, polymer structures, nonlinear dynamics of spatial structures as well as statistical methods and reliability of structures. Basic research has always been the foundation for further applied research, which has resulted in socially important achievements. Thus, results of our research



and expert work in the area of earthquake engineering have considerably contributed to better seismic safety of numerous very important structures, such as nuclear power plants, important viaducts and shopping centres. Socially important were also research works dealing with more common types of structures used in everyday life, such as residential and industrial buildings. Cooperation with various business companies in Slovenia has led to numerous new and improved procedures for the design of many types of building structures, such as reinforced wall buildings, prefabricated buildings and bridges. We also pay a lot of attention to the development and use of new technologies (e.g. seismic isolation systems) and new environment-friendly materials (e.g. high-performance synthetic materials) for the improvement of seismic safety of different structures. Researchers in the areas of earthquake engineering and steel structures are very active in working bodies of the European Standardisation Organisation. This cooperation is also an important source of ideas for research and guarantees its relevance and topicality.

We are also proud of the development we have achieved in the area of scientific computing, where knowledge from computer science, mathematics and mechanics is efficiently combined with engineering knowledge. In the last two decades, we have developed an innovative system for automatic elaboration of nonlinear numerical models. It consists of AceGen program that allows automatic generation of arbitrary numerical programs and AceFEM program that allows symbolic-numerical environment for the analysis according to the finite element method. The programs are supported by the world's leading

manufacturer of general symbolic-numerical environments for technical computing, Wolfram Research, Inc. The developed system has received wide response from many research groups dealing with the issues of engineering modelling in Slovenia and throughout the world.

We also develop planning methodologies for the design of buildings, their elements and constructional complexes considering bioclimatic conditions. We perform stationary and dynamic analysis of thermal flows in buildings, analyse daylight and illumination and develop control systems for the regulation and optimisation of functioning of internal environment in buildings. We are interested in thermal comfort of building users and develop computer simulations for the analysis of thermal and illumination properties of buildings, and we study interactions among building users with the emphasis on a healthy and stimulating environment. In this area, we also conduct experiments in the real living environment, the purpose of which is to check the simulation presumptions and present applications of advanced systems for the regulation of interior environment.

In the area of geotechnics, we link the development of knowledge and methods for ground research with the needs of the economy. Thus, in the time of fast planning and construction of Slovenian motorways, we introduced new field and laboratory procedures into Slovenian practice (pressiometer, flat and seismic dilatometer, cyclic shear test, suction measurements and behaviour of non-saturated soils). Our research work consists of numerical analyses, use of new materials in geotechnics (geosynthetics), introduction of new technologies (continuous control of ground compaction, improvement of geotechnical anchors, automation of tunnel deformation measurement analysis). We dedicate increasing amount of our time to providing ecologically impeccable and technologically safe use of secondary raw materials – side products of chemical and metallurgical industry, or their safe depositing in the environment. A large part of research runs in our soil mechanics laboratory with modern equipment.

The aim of our research in traffic engineering is to contribute to the quality of traffic infrastructure in all phases of their life cycle, i.e. from planning and design to construction, functioning and maintenance. We develop similar methods





also for the area of cultural heritage. By studying drivers' perception of road alignment in the environment, our aim is to help design predictable, safer roads that forgive drivers their mistakes. With the development of intelligent transport systems, we work to improve safety and permeability of traffic infrastructure. With our external partners, we have developed numerous IT solutions intended to more efficient project management. We continuously update and develop them, and offer them as integral support to final users. An important area of our work is also preparation of expert bases for various acts, regulations and rules. We conduct many traffic studies and projects from the area of traffic safety for Slovenian clients. At the same time, we are also involved in international research projects and publish results of our research in internationally recognised journals.

Success of every construction company is unquestionably dependent on the optimisation and planning of all processes applied in construction projects. This involves all construction phases, from the identification of investor's needs to the final delivery of the structure to use. We use and develop contemporary methods and technologies for the design, monitoring and analysis of projects, with the aim to implement them in construction practice. From the aspect of IT support to construction project management, we stay in touch with the industry that develops appropriate software solutions. When dealing with the built environment, we emphasise the holistic approach. For this reason, we pay a lot of attention to the life cycle and maintenance of building structures. As we are aware of the importance to keep our environment clean, our research is dedicated also to the interventions in the environment in the construction industry. In this area, we are monitoring the current situation in the construction industry and are looking for solutions to environmental problems.

"What is essential is invisible to the eye!", could also be claimed for municipal infrastructure. Buried in the ground or standing on the surface, it is often taken for granted – its existence as well as functioning. We only become aware of its existence when it stops functioning. We have studied the accessibility of municipal infrastructure in different areas within several European projects and discovered that the existing theoretical models from this area have never been transferred into practice

due to various obstacles that have never been conquered. Within COST project Land Management for Urban Dynamics we analysed, in cooperation with experts from Europe, the ability of the public sector to mobilise land as a condition for implementing urban projects. Denationalisation and privatisation after 1991, in the new socio-economic system, required real estate market valuation models. In cooperation with our partners, we developed the first real estate valuation models in Slovenia.

Today, the use of ICT technologies in civil engineering contributes considerably to the digital transformation of the construction industry and to improved methods of management and administration in construction design, implementation and operation. We use methods of information modelling (BIM), internet communication, high-throughput processes and data infrastructure, as well as the related new methods of work, cooperation and organisation. We develop advanced methods of using BIM in stages before, during and after construction, where modelling is related to the function and technical solutions for elements and systems of buildings. We emphasise the adequacy of information protocols for all key stakeholders in construction projects with initial levels of details in BIM models. Our research work is focused on automatic quantitative and qualitative analysis of the recorded data, including cloud points and the use of models for new methods of multi-material sustainable design. We use advanced model technologies of project



management (5D), develop models from conceptual design for immediate use in production in scale (3D print) or in actual size, for construction control, model updating with sensors, augmented reality and, last but not least, model maintenance of building structures (6D). Our development work includes, among others, technologies for software development. They are expected to change considerably in the next few years, which means that they must be transferred also to the construction area (e.g. for the development of demanding cloud applications to calculate dynamics of bodies of fluids).

All the above could not be possible without the universal language in engineering – mathematics – and the basic knowledge of natural sciences from the area of physics. Our mathematicians cooperate in our research for the development and implementation of various statistical and numerical methods, for example in modelling traffic flows and functional regions. Indispensable is the contribution of physicists in the research related to building physics and development of non-failure methods for testing concrete elements as well as in the use of phase-changeable materials for the thermal protection of buildings. However, both mathematicians and physicists conduct most of their research work within their specific areas, e.g. in numerical mathematics, chaos theory, in the development of more efficient batteries and even in the research of magnetic properties of new materials for their potential use in medicine.



**DEPARTMENT
OF GEODETIC
ENGINEERING**

FOREWORD



Head of the Department of
Geodetic Engineering,
Prof. Dr. Bojan Stopar

*“Space is one of a few limited
natural assets. For sustainable use
and successful spatial management,
quality spatial data are
indispensable.”*

The basic missions of the Department of Geodetic Engineering are teaching and research work in the areas of geodesy, geoinformation, Earth monitoring, cartography, recording, real estate management and valuation and spatial planning.

Technological development constantly brings new technologies for the acquisition of spatial data. The number of users of spatial data is quickly increasing as well, and spatial data are gaining on importance in modern society. Despite technological progress, geodesy is a basic science in the area of spatial data acquisition, because high quality spatial data can only be acquired according to geodetic principles.

Spatial data acquired, recorded, managed and used by the state in its records represent the basic spatial infrastructure. For the purpose of safety of real estate ownership, real estate data are managed in the form of various cadastres. For the planning and implementation of spatial interventions, also numerous other spatial data are important, from topography to various regimes in space. Spatial data infrastructure is the foundation for proper functioning and decision making in a society and can be considered as equivalent to municipal, traffic, power supply or telecommunication infrastructure.

Research work at the Department of Geodetic Engineering focuses on the methodologies for the acquisition, valuation, use and representation of spatial data, as well as on the spatial data infrastructure gathered for the needs of the state and other users. Our research work runs in cooperation with numerous other disciplines, experts from the University of Ljubljana and other universities, with experts from national and international research institutions, companies and public administration. We transfer the results of our research work to the contents of our study programmes and we make sure that our study programmes consist of classical knowledge as well as modern achievements.

We offer first cycle academic study programme Geodesy and Geoinformation, second cycle master study programme Geodesy and Geoinformation, first cycle higher education professional study programme Technical Real Estate Management and second cycle master study programme Spatial Planning. We educate experts who are capable of working in modern society, because the study gives them manifold engineering and technical knowledge,

knowledge from the areas of spatial and urban planning and knowledge from environmental, economic, legal and organisational sciences.

The Department of Geodetic Engineering offers modern and internationally accredited study programs, where teachers and students work together to strengthen the foundations for successful development of the profession also in the future.



TEACHING ACTIVITY

Our teaching is focused on providing knowledge adjusted to the development of geodetic science and profession in the world and the needs of the economy and public administration in Slovenia. Traditional tasks of geodesy are acquisition, valuation and presentation of spatial data. Fast technological development in the areas of information science and technologies for the acquisition of spatial data give birth to constantly new possibilities for the acquisition of spatial data and keep opening new areas of their use. Each of the technologies for the acquisition of spatial data has its own specifics. Their shared characteristics and adequate quality of spatial data are possible only if they are acquired according to geodetic principles. In the past, geodesy used to be one of few sciences dealing with spatial data. Today, it is a science that provides the reference basis and reference spatial data for all other sciences and disciplines dealing with the environment.

Geodesy collects, analyses, establishes and maintains records on spatial and real estate data and provides for their organisation, interconnection and distribution. In this respect, classical and modern knowledge from the areas of geodesy and geoinformation are important, as well as the understanding and the use of measuring technologies for the acquisition of spatial data on the Earth and in the Universe, and concepts and methods for providing the highest quality of



spatial data. Besides, the geodetic engineer also requires basic knowledge about law related to land administration (real estate cadastres, real estate records) and how to provide legal certainty as to real estate ownership, as well as knowledge about economics related to land and real estate administration and valuation. Owing to its role in space, geodesy must be part of the planning and implementation of spatial interventions. For this reason, our students learn about the basic procedures of spatial planning and the basics of civil engineering.

The aim of the study programmes at the Department of Geodetic Engineering is education of experts, who are capable of connecting the areas of geodesy and geoinformation, real estate management, spatial and urban planning with the areas of environmental, economic, legal and organisational sciences. Interdisciplinary knowledge is of key importance for the implementation of various geodetic and civil engineering projects, real estate recording, valuation and taxation, geoinformation solutions, land, real estate and spatial management and administration, spatial planning and spatial policy management.

We invite lecturers from business companies and public administration to share their knowledge with our students, we organise visits to various institutions and field trips in Slovenia and abroad. Students have the possibility to participate in research and professional work within various projects and are encouraged to cooperate with national and international institutions. Under the umbrella of the ERASMUS+ programmes, UL FGG is actively involved in the exchange of students for study and training. Students are encouraged



to apply to various public calls and we help them develop their own ideas to the final results. The best final theses are proposed for various awards, such as the University and the Faculty Prešeren Awards, the ESRI Awards, and others.

The total number of students enrolled to the first cycle study programmes at the Department of Geodetic Engineering is about 140, with further 90 students at the second cycle programmes. Students work with modern geodetic measuring and software equipment for the acquisition, processing, analysis, visualisation, storage and management of all types of spatial data.

Members of the Department of Geodetic Engineering organise thematic lectures from the areas of geodesy, geoinformation and their related disciplines for secondary schools and participate in the organisation of technical days and summer schools for primary and secondary schools.



SCIENTIFIC, RESEARCH AND PROFESSIONAL ACTIVITY

Scientific and research work runs under the umbrella of two research programmes financed by the Slovenian Research Agency: Geoinformational Infrastructure and Sustainable Spatial Development of Slovenia and Earth Observation and Geoinformatics. These programmes include researchers of all chairs from the Department of Geodetic engineering as well as researchers from the Municipal Economics Institute from the Department of Civil Engineering. Our research work focuses on practically all areas of geodesy, geoinformation, cartography, photogrammetry, remote sensing, real estate cadastres, real estate valuation, municipal engineering, municipal economics and spatial planning. In detail, we are engaged in the establishment, development and maintenance of the national coordinate system, development of methods, algorithms and software for positioning in global navigation satellite systems, the definition of the Earth's gravity field as well as monitoring and modeling of geokinematic activities in Slovenian territory. Our research is directed also towards the development of the concepts of high-precision geodetic surveying and engineering geodesy, where we are developing the methodology for the control of stability in the natural environment and of built structures. With modern measuring technology and adequate methodology that we continuously upgrade and develop, we monitor stability of critical infrastructure in Slovenia, such as hydro power plants, the nuclear power plant, thermo power plants and other major constructions and natural structures. Our special emphasis is also on the development of geoinformation and navigational solutions to support decision making in cases of natural and other disasters. We develop methods and software for the processing and analysis of laser scanning data, development of photogrammetric methods and methods for the processing of remote sensing data on the Earth's surface and the Universe recorded from the air, and with the development of standards for the acquisition and use of spatial data. Fast technological development requires



constant development of methods and technologies for the visualisation of space and spatial data, whereas the increasing number and the improving quality of spatial data with the increasing number of their users necessitate the development of spatial analyses. Constantly ongoing is also research activity focused on the acquisition, management and administration of real estate data, land development and planning and spatial development.

Apart from the above presented research activity, we are also actively involved in numerous national and international research and development projects. We cooperate with researchers from other faculties and universities and with experts from research institutions and business companies in Slovenia and beyond.

We cooperate with the Surveying and Mapping Authority of the Republic of Slovenia and the Geodetic Institute of Slovenia, as well as with ministries, municipalities and institutions developing solutions in the areas of geodetic and spatial data infrastructure, land administration and spatial management, solutions supporting decision making in cases of natural and other disasters, solutions in the preparation of expert bases for the drawing up spatial development documents, and with institutions engaged in planning of urban and regional areas, development of urban systems and regional development, urban resistance and challenges of climate changes as well as inclusion of the public in the processes of spatial planning. We pay a lot of attention to the cooperation with the economy, as we cooperate with companies in all areas of geodesy, geoinformation and spatial planning.

The findings of our research and development work are regularly presented at various national and international scientific and expert conferences, published in internationally renowned journals, where we also cooperate as reviewers and members of editorial boards. We publish and review articles in the journal *Geodetski vestnik*, published by the Slovenian Association of Surveyors.





**DEPARTMENT OF
ENVIRONMENTAL
ENGINEERING**

FOREWORD



Head of the Department of
Environmental Civil Engineering,
Prof. Dr. Matjaž Četina

*“Treatment of water is our
responsibility to present and future
generations.”*

Environmental problems of modern society are piling up, which is the reason why this extensive and interesting area of environmental civil engineering, nourished and developed at the Department of Environmental Civil Engineering, is becoming increasingly important. On one hand, this is explicitly engineering knowledge about the construction of water, hydrotechnical, geotechnical and environmental structures. On the other hand, this area is closely linked to nature and water, because future graduates of water science and environmental engineering will mainly deal with complex interdisciplinary problems of sustainable river and torrent regulation, providing clean drinking water, drainage and treatment of waste waters from urban areas, waste and secondary material treatment, hydro power as a renewable energy source, prediction and mitigation of climate change effects as well as integrated evaluation of impacts on the environment. All this requires adequate knowledge on natural sciences and social sciences that we provide during the studies at the Department of Environmental Civil Engineering. The study is based on traditionally well-established cooperation with teachers from other faculties of the University of Ljubljana, mainly from the Biotechnical Faculty, Faculty of Chemistry and Chemical Technology and Faculty of Social Sciences.

We are aware that successful teaching is inseparably linked to adequate research work. With our work in national and international projects we strive to remain in line with the latest achievements of technical environmental protection and contribute to the global fund of knowledge in this area.

Another important activity of our department is cooperation with the economy and individual ministries, because constant contact with practice is a guarantee that the knowledge we provide to our students is up-to-date and can be used for finding immediate solutions to environmental challenges of the present and the future.

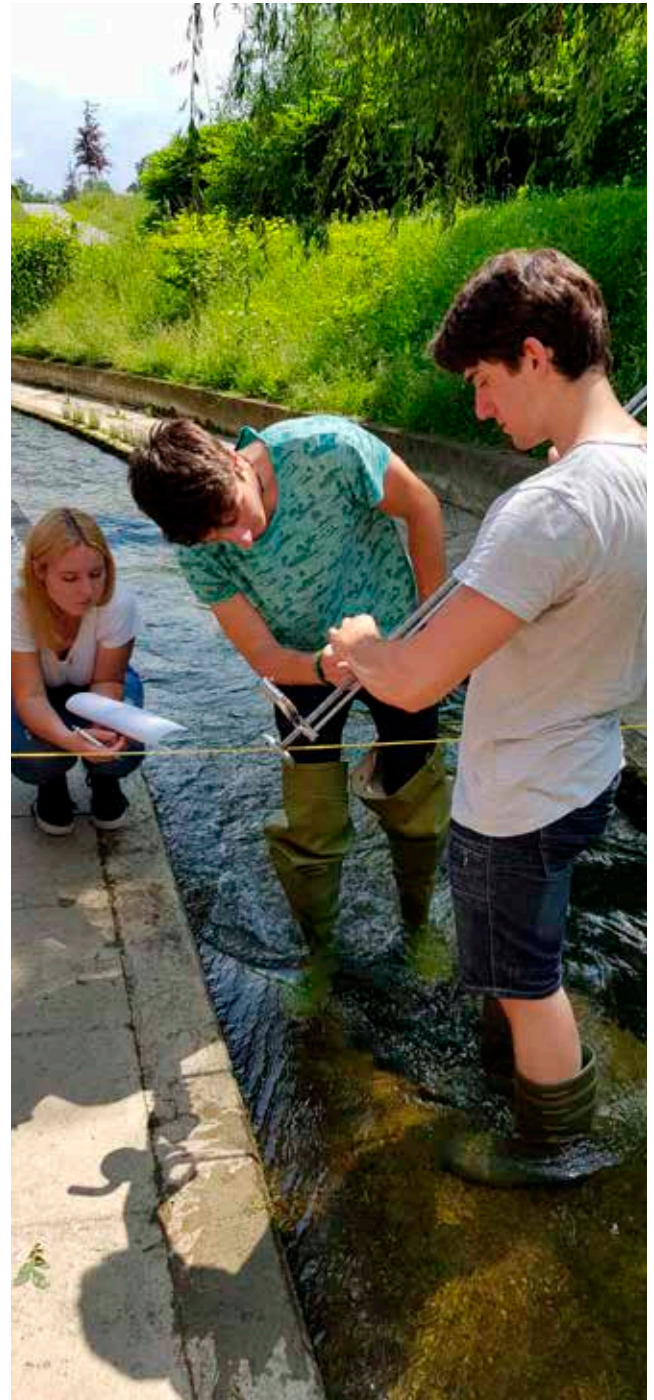
Both the staff and the students of the Department of Environmental Civil Engineering are aware of the opportunities offered by the dynamic and rapidly developing area of environmental engineering. We wish to face all challenges with responsibility and with consistent upgrading of our knowledge, aspiring for excellence in our area.

TEACHING ACTIVITY

The Department of Environmental Civil Engineering at UL FGG consists of Chair of Fluid Mechanics with Laboratory, Chair of Hydraulic Engineering, Institute of Sanitary Engineering and Water Management Laboratory. Teaching is our primary mission and is provided within two study programmes: bachelor and master study programmes of Water Science and Environmental Engineering. We educate engineers for the challenges of the future, with rich technical knowledge supported by the understanding of natural and social processes. In this time and age, only interdisciplinarity allows us to solve the ever increasing complexity of engineering problems: managing floods and draughts, supply of quality drinking water, waste water treatment with modern technologies, power supply from low-carbon sources, efficient secondary raw material management and introduction of modern environmental technologies.

Study at the bachelor and master study programmes of Water Science and Environmental Engineering is modern and interdisciplinary. It successfully fills the gap at the University of Ljubljana between study programmes dealing with natural sciences and technical sciences. Already at the first cycle of studies it offers wide knowledge and understanding of specific problems. At the second cycle, detailed knowledge and specialisation are foreseen for various areas of water management. Students learn how to solve problems of the present and the future: floods, draughts, food supply, water pollution, waste depositing, re-use and recycling. As a typical technical faculty, we offer our students a complete and modern programme of technical environmental protection that is destined to contribute importantly to knowledge in the third millennium.

The beginnings of our study programmes go back to 1998, when the first academic study programme with the name Water Science and Municipal Engineering was established. In the academic year 1998/99, we enrolled the first generation of students, who have by today successfully



embarked on their careers and have paved the way for further generations of graduates.

In each academic year we have altogether between 60 and 80 students enrolled in our two study programmes. This relatively low number of students is one of the main advantages of this programme, because it enables work in smaller groups and a much more personalised relationship between teachers and students. We provide knowledge in a modern way, using modern technology. Students have access to the departmental library, state-of-the-art laboratory and measurement equipment, as well as a computerised virtual classroom and administration systems. With group, project, laboratory and field work and by solving concrete problems and case studies, we provide students with practical knowledge and skills. Under the mentorship of our teachers and in cooperation with various companies, our students are involved in many projects under the joint name Creative Path to Practical Knowledge. We teach students skills of public appearance in front of expert and lay public and provide them with business transaction skills for dealing with clients in administrative procedures, public tenders and building and measure planning. The aim of the programmes is also to familiarise students with the basic engineering expertise to such extent that the graduates can successfully continue their second and third cycle studies in other programmes. It is therefore not surprising that our graduates receive numerous awards and prizes, such as the Prešeren award, the Pomurska research award, the Goljevšček award and the Saubermacher award. So far, more than 15 theses have received prizes. We are actively involved in the international study programme of flood risk management with foreign universities (Dresden, Barcelona and Delft). Double Degree agreements with Zurich University of Applied Sciences and University of Calabria allow our students of Water Science and Environmental Civil Engineering to acquire two certificates on finished studies – double diploma. Modernisation and internationalisation of study programmes require parallel implementation of courses in English, and all members of the Department of Environmental Civil Engineering are fully dedicated to this task.





SCIENTIFIC, RESEARCH AND PROFESSIONAL ACTIVITY

In our research work, we build and nourish cooperation with other departments of UL FGG, faculties, institutes and universities in Slovenia and abroad. The most important research deals with the basic areas of fluid mechanics, hydrology and hydraulics, as well as highly specialised areas of modern systems of water and clean energy supply, hydraulic structures, advanced water treatment technologies, transfer of pollutants and thermal energy in the environment. We also pay a lot of attention to the investigation of global and local climate changes. Only constant link to practice can reveal the needs of society and knowledge required to master global and local challenges of the present and the future. Cooperation with the economy is for this reason an important part of the department's activities. Our staff and students are well aware of the responsibilities and opportunities appearing with the challenges of this time, which is why we constantly strive towards excellence in our area.

Despite the small group of researchers, we lead or participate in international UNESCO programmes, projects of the European Framework Programmes, cross-border cooperation and bilateral projects, as well as in national basic and applied projects and in the programme group Water Science and Technology and Geotechnical Engineering. Our hydraulic laboratory is equipped for research in basic areas of water flow and transport of matter and heat, as well as in the design and safety of hydrotechnical structures. We link research to issues of drinking water supply, by including cutting-edge water treatment technologies consisting of hydrodynamic cavitation and ultra-filtration, and losses in water supply networks, and establish cross-border links for water supply. In two sanitary engineering laboratories, we conduct investigations of advanced industrial waste water treatment technologies, energy supply from biogas, where the measuring equipment enables also more demanding analyses. We are also involved in research of infrastructure and cities of the future with small energy demand and

minimum quantity of secondary raw materials. We develop up-to-date software, numerical models of dam and embankment failures, models of flood events, landslides and debris flows, as well as models for the transport and decomposition of pollutants in the natural environment. Part of our research is also dedicated to the development and elaboration of specific equipment for measurements on rivers and for the transfer of data from the field to the laboratories. Our Department of Environmental Civil Engineering publishes the only Slovenian scientific journal from the areas of water science, hydrotechnics and other water related issues, called *Acta hydrotechnica*. Evidence of successful scientific and research activity of our department is visible in numerous invited lectures at universities and



scientific symposia abroad, memberships in editorial boards of the world's leading journals from the area of protection against natural disasters, as well as in numerous publications in renowned international journals and monographs.



We endeavour to transfer the results of our research into practice as soon as possible. In cooperation with economic and non-economic business companies, ministries and large companies, the results of our research work become applicable for wider society. The applications we develop are being used in hydropower industry, in the prediction of extreme events and in environmental protection. Cooperation with small companies engaged in water management, hydrotechnics and secondary raw material management enables transfer and practical use of specific knowledge. Experts from the Department of Environmental Civil Engineering cooperate as designers, and even more frequently as reviewers of project documents in the area of water science and hydrotechnics. Some members of the department also work full-time in business companies. This allows direct transfer from scientific research into practice, and, perhaps most importantly, direct transfer of experiences, skills and knowledge from engineering practice into teaching; the latter is the first and foremost mission of the University, UL FGG, as well as the Department of Environmental Civil Engineering.





ABOUT STUDENTS

STUDENT ORGANISATION



President of UL FGG SC,
Amel Emkić, dipl. inž. grad. (UN)

***“UL FGG Student Council
contributes importantly to the
creation of student-friendly and
quality studies.”***

At UL FGG, student organisations include Student Council, Student Organisation and three student societies. Various projects that we carry out at the faculty are aimed at encouraging students to participate in all aspects of student life and activities.

Representatives of the highest student body at the faculty, UL FGG Student Council, represent the interests of students in the faculty's bodies and actively communicate with the faculty's and university's management. In this way, we importantly contribute to the creation of student-friendly and quality studies.

Student organisations at the university and faculty focus not only on issues related to study and examination processes, but deal also with promotion and improvement of social and professional life of students. Part of that is also organisation of various conferences, seminars, courses, concerts, sports competitions, student parties, tourist travels and field trips as well as charity actions.

Membership in the Student Council, Student Organisation and student societies is very beneficial for all students, because the members get the opportunity to learn about different ways of team work and are involved in various projects, which helps them develop their soft skills.

With our participation and representation of our faculty at national and international student events we are building a network of important contacts that will undoubtedly be very useful for us, because the future is yet to be built!

UL FGG STUDENT COUNCIL

Student Council of the Faculty of Civil and Geodetic Engineering, University of Ljubljana (UL FGG SC), is the highest representative body of the faculty's students. It represents the interest of our students vis-a-vis the faculty's management and other faculty's bodies, the university as well as in general. It has 24 student representatives of all first and second cycle study years, and one representative of the doctoral studies. The UL FGG SC has its representatives in the UL FGG Senate, Governing Board, Academic Assembly, in study boards of individual departments and in different commissions. Owing to such presence of students in the faculty's bodies, the UL FGG SC has been, for many years now, very successful in improving the quality of studies by raising initiatives on its own as well as the students' behalf. In accordance with its competences, the UL FGG SC discusses all the matters related to the rights and obligations of the UL FGG students, delivers its opinions on educational competences of teachers and associates in the election procedures and reports on the opinions of UL FGG

students in the UL Student Council. Apart from that, we also elect members of our working bodies and the faculty's bodies, deliver opinions on candidates for the faculty's dean and vice-deans and adopt statutes and regulations relating to the UL FGG SC activities.

Four times a year, the UL FGG SC publishes free journal *Študentski most* (Student Bridge). Through the tutor coordinator we also make sure that the student tutorship at our faculty is of high quality. We encourage mobility, international cooperation and research activity of the UL FGG students. Indeed, a large part of our financial means are used to co-finance the participation of our students at conferences, seminars and competitions (e.g. traditional international conferences for civil engineering, geodesy and architecture students "We Build the Future" in Serbia, competition in spaghetti bridge design "How Strong is the Bridge?", traditional meeting of civil engineering students "Gradbenijada"). We also provide for extracurricular cultural activities of our students (dance parties, exhibitions) and actively cooperate with the UL FGG Student Organisation, student societies and the UL Career Centres. In 2018/2019, the President of the Student Council is Amel Emkić, with Maruša Cestnik functioning as Vice-President.



UL FGG STUDENT ORGANISATION

The Student Organisation of the Faculty of Civil and Geodetic Engineering, called SILE FGG (Forces of FGG), is a less formal group of enthusiastic students doing their best to organise various events that bring more fun to the life at UL FGG. At the same time, we represent the interests of our students under the umbrella organisation of the UL Student Organisation. We contribute to students getting to know each other and to general positive atmosphere by organising various events, such as skiing, bowling, field trips, barbecues, blood donor campaigns, "toast day", printing of unique UL FGG T-shirts and glasses and with various parties. In the last few years, our projects of Charity December, student seminars and participation at the international meeting of civil engineering students "Gradbenijada" have also received a wide response.

With the organisation of events and activities we aspire to offer the students of our faculty plenty of opportunities to socialise, have fun and enjoy in active student life, thus raising also the sense of belongingness to our faculty.



STUDENT SOCIETIES AT UL FGG

At present, there are three student societies at UL FGG: Student Society of the Department of Civil Engineering, Student Society of the Department of Geodetic Engineering and Student Society of the Department of Environmental Civil Engineering. Their main task is to bring students of their departments together at various activities adapted to the study orientation. However, these events are normally always open to all other interested students as well.

The Society of Civil Engineering Students was founded in October 2008, with the main purpose to help students get as much professional knowledge and experiences as possible also outside the faculty's building, as well as to have fun and socialise. Activities organised by this society include visits to construction sites, "toast days", and many others.

The Society of Geodetic Engineering Students has been in charge of extracurricular activities and social life of the students of Geodesy and Geoinformation, Technical Real Estate Management and Spatial Planning since 2001. Each year, we organise numerous social and professional events that contribute to the promotion of geodesy (e.g. geodetic karaoke, geodetic barbecue, freshman party, computer software training seminars). To maintain lively contacts of our students with the students from former Yugoslavia, we make sure that our students regularly participate at the



annual regional meetings of geodetic students as well as at the Geodetic Days.

The basic mission of the Society of Water Science Students is care for extracurricular activities and social life of the students of Water Science and Environmental Engineering, who wish to expand, use and share their knowledge with others, as well as to raise the awareness about water science in younger generations. Each year, the society organises interesting field trips and assures participation at the Mišič Water Days. During the year, we organise various events, such as chestnut picnic, breakfast and barbecue for water science students.



STUDENTS' SOCIAL LIFE

To provide for some interesting reading during breaks or boring lectures, four times a year, the UL FGG SC publishes the journal Študentski most (Student Bridge). The whole editorial board consists of students. The aim of the journal is to inform students and other readers on the activities at UL FGG and in the profession. Thus, we spend our free time during the day in our student corner at the first floor of our faculty.



Under the umbrella of the elective course Sports Education, we provide for student recreation during the year with various social and sports activities, such as cycling, hiking, skiing, sailing and many sports competitions. Students are also active within various sports teams. We are well aware how important it is to have as much sports available as possible and to maintain and improve our psycho-physical fitness. In addition, sports also brings us together (spreading of social network).

The UL FGG Student Council, the UL FGG Student Organisation and our student societies all make sure that students get together at acquaintance and freshmen parties, barbecues, as well as motivation and team building weekends. In cooperation with our sports education teacher, every autumn and spring we have the opportunity to participate in various sports activities in nature, such as hiking, school of alpine climbing, cycling tours, sailing schools, as well as rafting and kayaking. In the winter months, students can join multi-day hiking tours and skiing courses.

The UL FGG hall is frequently used as a place for cultural events – such as photographic exhibitions, exhibitions of student projects and competitions, as well as student dance parties, all organised several times per year by the UL FGG SC.

STUDY ABROAD AND FOREIGN STUDENTS AT UL FGG

Numerous students decide to do part of their study obligations or practical training abroad. There are several possibilities, but the most popular ones are within programmes such as ERASMUS+, Ceepus, IAESTE or Basileus. In this way, students get priceless experiences by

comparing and expanding their knowledge with their peers from all around the world. Another benefit that comes with exchange is improving the knowledge of foreign languages learnt while living in a foreign country outside the comfort zone of a familiar environment. An increasing number of our students use this opportunity, because the selection of foreign universities is very wide. On the other hand, an increasing number of foreign students come to our faculty and return back home with positive experiences.



Doron Hekič, 2nd year CE MA, Structural Engineering

After my secondary school, I decided to study civil engineering at UL FGG. When I finished my diploma at the first cycle academic study, I decided to continue at the master study of civil engineering. During my studies at UL FGG, I spent a year at the university RWTH in Aachen within the Erasmus+ program. Beside the exchange, I also had the opportunity to cooperate in international interdisciplinary projects at the University of Osijek and the University in Weimar. Beside the high quality studies offered by UL FGG, exchange possibilities for studies at the best universities and cooperation with students from other areas in international projects are for me the biggest added value.

Petra Podržaj, 2nd year GIG MA

Based on signed bilateral agreements between UL FGG and many universities all around Europe, I decided to try an Erasmus+ exchange for studies. It was my wish not only to improve my professional knowledge, but also to refresh my Spanish, so I decided to study at the Polytechnic University in Madrid. The international exchange improved my competences, as well as helped me to grow as a person and to find motivation for further study in the master program. In the future, I also wish to participate in practical training abroad. There are many employers looking for students with work experiences from different cultural settings.



Mariell Arntzen (Universitetet i Bergen – UiB)

Studying at UL FGG has been very exciting and educational. I have learnt new ways of studying, and it has been interesting to learn how you do things in Slovenia. The lecturers are also knowledgeable and skilled. Exchange in Ljubljana is a great opportunity to experience new places and gain new perspectives and tips for your studies. You get the opportunity to make new friends from all over the world and good experiences that stay with you for the rest of your life.

Jan Weber (HTWK Leipzig)

I come from Leipzig, Germany, and I spent two semesters at UL FGG as an Erasmus student. The professors I had classes with were friendly and always available. The usage of software programs was always up to date and competent. To get to know other students and professors, I highly recommend to take part in sports activities like hiking, kayaking, sailing or skiing, which occur regularly during the semesters. I had a good time here and I would definitely do it again.



Simon Arčan, 2nd year CE MA,
Infrastructural Engineering

The study of civil engineering is very interesting, it spreads over a wide spectrum of areas that we encounter in our everyday lives. The always available and friendly teachers create a pleasant study environment at the faculty. Further benefits are also student societies and the student council that make sure there is plenty of social activities.



Katja Arh, 3rd year CE BA

The civil engineer must be responsible, resourceful, a team player, nature friendly and economical. UL FGG is an excellent springboard into the world of engineering, because it gives us theoretical basis, teaches us the engineering approach to problems, critical thinking and cooperation.



Klavdija Kastelic, 2nd year CM

I like UL FGG, because here I'm given the opportunity to be actively involved in the student organisation and the student council. In this way, I can contribute to positive changes and we bring students together with organisation of activities and events.



Luka Gradišar, 2nd year CE MA,
Structural Engineering

Study of civil engineering requires perseverance and curiosity. As future engineers, we will be able to use the acquired knowledge and engineering mindset to open many doors all around the world and in many different interdisciplinary areas.



STUDENTS ABOUT US

Department of Civil
Engineering

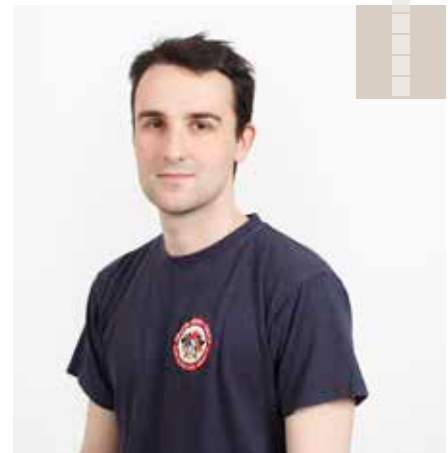
Polona Zorinič, 1st year GIG MA

I dare to say that the study of Geodesy and Geoinformation at our faculty is an excellent springboard into the labour market. It provides us with all important knowledge that we need to become successful and confident engineers. Students and teachers help us on this path with a lot of positive energy.



Nejc Slemenšek, 2nd year TRM

I decided to study geodesy because the work of a geodetic engineer is very dynamic, including a lot of field work as well as computer work with various software programmes. The study itself is very interesting and never monotonous. This is, I believe, because geodetic science is of such vast nature, which I did not know before.



Nina Črnigoj, 2nd year GIG BA

At the end of my secondary school, I searched for a university study that would build on information science and mathematics. I decided to go in this direction mainly because it gives me the opportunity to solve real-life cases of geodetic measurements. The schedules at the faculty suit me, because classes are in the morning hours.



STUDENTS ABOUT US

Department of Geodetic Engineering

Žiga Maroh, 1st year GIG MA

An advantage of the study of Geodesy and Geoinformation is a smaller number of students in each class than at other faculties. For this reason, teachers are able to pay more attention to each individual student. I am proud to be a surveyor and I am proud to be part of this faculty, because it has been and still is providing me with knowledge that I can use in practice.



Blaž Košorok, 1st year WSEI MA

The study program of Water Science and Environmental Engineering provides me with a lot of theoretical as well as practical knowledge to solve a variety of problems related to waters and the environment. The department is small, which is why students are not only numbers to our teachers, and this contributes to better transfer of knowledge.



Urška Maček, 2nd year WSEI MA

The study of Water Science and Environmental Engineering gives us a wide spectrum of knowledge and many possibilities to find jobs in different areas, such as drinking water supply, waste management, river engineering, etc. The study, which besides engineering thinking also gives us resourcefulness and perseverance, is complemented also by a relaxed atmosphere at Hajdrihova street.



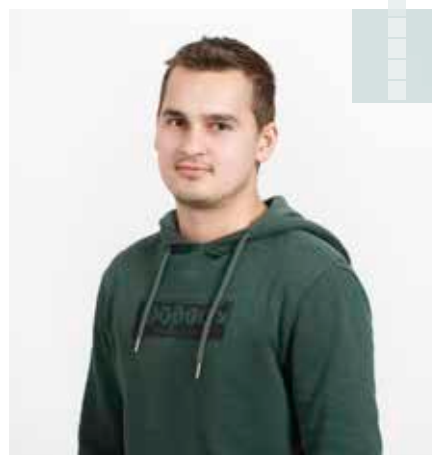
Deja Mavri, 1st year WSEI BA

The study of Water Science and Environmental Engineering offers a lot of knowledge on the laws of nature, environment and how to solve environmental problems. It was this that attracted me to enrol. Early on, the study and the acquired knowledge on how things work have made my everyday environment even more interesting.



Tadej Dolenc, 3rd year WSEI BA

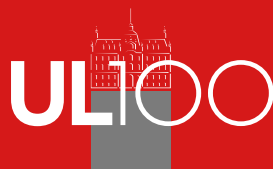
The study of Water Science and Environmental Engineering provides a wide spectrum of knowledge from the areas of natural sciences and technology. As environmental engineers, we can solve challenges of today and tomorrow and in this way help provide the basic needs of people and preserve the environment, which are among the most important human values.



STUDENTS ABOUT US

Department of Environmental
Civil Engineering

Univerza v Ljubljani
Fakulteta za gradbeništvo in geodezijo



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UL FGG'S VISION

Until 2025, to be among the best departments in the areas of civil engineering, environmental engineering and geodetic engineering in Central Europe.

- To raise the quality of research work to the highest international level.
- To continuously improve and modernise study programmes and the quality of educational work.
- To raise the importance and quality of engineering education and engineering profession in modern society.
- To get more involved in the solving of developmental and professional issues in Slovenia and internationally.