ASIIN Seal & European Labels

Accreditation Report

Master's Degree Programme
Civil Engineering
Water Science and Environmental Engineering
Geodesy and Geoinformatics

Provided by
University of Ljubljana

Version: 24th June 2022

Table of Content

A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
Magistrski študijski program druge stopnje Gradbeništvo	2nd Cycle Master's Study Programme in Civil Engineering	ASIIN, EUR-ACE® Label	25.5.2015 – 30.9.2021 ASIIN	03
Magistrski študijski program druge stopnje Geodezija in geoinformatika	2nd Cycle Master's Study Programme in Geodesy and Geoinformatics	ASIIN, EUR-ACE® Label	25.5.2015 – 30.9.2021 ASIIN	03
Magistrski študijski program druge stopnje Vodarstvo in okoljsko inženirstvo	2nd Cycle Master's Study Programme in Water Science and Environmental Engineering	ASIIN, EUR-ACE® Label	25.5.2015 – 30.9.2021 ASIIN	03
Date of the contract: 23.06.2021 **Submission of the final version of the self-assessment report:** 02.02.2022 **Date of the onsite visit:** 24.-25.03.2022 **At:** online				
Peer panel: Prof. Dr.-Ing. Tim Ricken, Universität Stuttgart Prof. Dr.-Ing. Wolfgang Reinhardt, Universität der Bundeswehr München Prof. Dr.-Ing. Thorsten Albers, Ostfalia University of Applied Sciences Dr. Christoph Schetter, Kammerdiener Peegut Gruppe Pedro Torralbo Muñoz, University of Córdoba				
Representative of the ASIIN headquarter: Yanna Sumkötter				

[1] ASIIN Seal for degree programmes; EUR-ACE® Label: European Label for Engineering Programmes
[2] TC: Technical Committee for the following subject area: TC 03 - Civil Engineering, Geodesy and Architecture

Responsible decision-making committee: Accreditation Commission	
Criteria used: European Standards and Guidelines as of 15.05.2015 ASIIN General Criteria, as of 28.03.2014 Subject-Specific Criteria of Technical Committee 03 – Civil Engineering, Geodesy and Architecture as of 28.09.2012	

B Characteristics of the Degree Programmes

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Magistrski študijski program druge stopnje Gradbeništvo	Second cycle graduate in Civil Engineering or in Building Information Modelling (BIM)	• Geotechnics - Hydrotechnics • Structural engineering • Building information modelling - BIM A+ • Infrastructural engineering	7	Full time, part time	Erasmus Mundus Master Study Programme (Joint degree) Building Information Modelling (BIM A+) Partners: • University of Minho, Portugal. • Polytechnic University of Milan, Italy	4 Semesters	120 ECTS	Annually / Master study programme Civil Engineering from academic year 2011/2012. BIM A+ from academic year 2019/2020.
Magistrski študijski program druge stopnje Geodezija in geoinformatika	Second cycle graduate in Geodesy and Geoinformatics	-	7	Full time, part time	-	4 Semesters	120 ECTS	Annually / academic year 2012/2013.
Magistrski študijski program druge stopnje Vodarstvo in okoljsko inženirstvo	Second cycle graduate in Environmental Engineering	• Hydraulic engineering • Environmental engineering • Flood risk management	7	Full time, part time	Two agreements on double degree programmes3: 1. Zurich University of Applied Sciences (ZHAW, Switzerland) 2. University of Calabria (UNICAL, Italy) Erasmus Mundus Master Study Programme Flood Risk Management (FRM) Partners: • IHE Delft, Netherlands • Technische Universität Dresden, Germany • Universitat Politecnica de Cagalunya, Spain	4 Semesters	120 ECTS	Annually / Master study programme Water Science and Environmental Engineering from academic year 2012/2013. Double degree programme with ZHAW from academic year 2017/2018. Double degree programme with UNICAL from academic year 2018/2019. FRM from academic year 2019/2020.

[3] EQF = The European Qualifications Framework for lifelong learning

For the Master's degree programme Civil Engineering the institution has presented the following profile in the information booklet as well as on the website:

"University of Ljubljana is the oldest and largest higher education and scientific research institution in Slovenia. It was founded in 1919. The Faculty of Civic and Geodetic Engineering is one of 23 faculties within the university. The Faculty carries out basic and applied research with an emphasis on ensuring optimal functionality and the sustainable development of the built environment. Within this faculty, the basic goal of the Master's degree programme Civil Engineering is to educate experts with in-depth and specific knowledge and skills from the basic areas of civil engineering and considering the chosen orientation and elective courses also with special in-depth knowledge from the individual area of civil engineering or the areas related to it.

Within the study, the student will learn about the traditional principles upgraded by the latest findings. The contents will be delivered in a contemporary way with modern technology. Students will also learn about all specifics in Slovenia and Europe resulting from special historic, socio- economical and geographic characteristics. With group work, project work and problem-oriented tasks they will get accustomed to group work, public appearance and managing customers as well as get actively involved in research. All the acquired theoretic knowledge will be tested to the largest possible extent with appropriate practical work and with solving demanding theoretic or professionally oriented problems and projects, which will facilitate them the inclusion in practical work after the study and to understand the issues related to civil engineering.

Students acquire the necessary in-depth and specific knowledge from the basic natural sciences and computer information courses, the knowledge from the basic courses related to civil engineering as well as specific knowledge from professional civil engineering courses. Within individual orientations and elective courses students can choose specialisation and prepare for further study within the programmes of the third cycle. The goal of the programme is to ensure international comparability, mobility and progression, and the graduate can continue study in Europe and get a job within the European Union. […] The goal is also to increase the progression of students and to provide better quality by introducing regular study, with the development of general student and teacher tutorship as well as tutorship for specific courses. Students can test their acquired knowledge in practice within the two weeks practical training in construction and similar companies that also represent the target employment areas. The programme designed in this way results in a graduate with in-depth theoretical and expert knowledge who can find job in construction companies or individually perform the most demanding expert and development tasks from the area of civil engineering in Slovenia and in Europe."

For the Master's degree programme Geodesy and Geoinformatics the institution has presented the following profile in the information booklet as well as on the website:

"University of Ljubljana is the oldest and largest higher education and scientific research institution in Slovenia. It was founded in 1919. The Faculty of Civic and Geodetic Engineering is one of 23 faculties within the university. The Faculty carries out basic and applied research with an emphasis on ensuring optimal functionality and the sustainable development of the built environment. Within this faculty, the basic goal of the Master's degree programme Geodesy and Geoinformatics is to educate experts capable of analytical and synthetic thinking, creative, critical, efficient and constructive solving of complex research and development problems and project-applied tasks in the fields of geodesy and geoinformatics. The programme ensures interdisciplinary integration of the experts and at the same time it provides excellent foundation for further studies at the third cycle of any natural science and technical programmes. Moreover, it enables students to obtain a license of Responsible Surveyor by the Slovenian Chamber of Engineers. The study programme provides students comparability of educational attainment also in an international context."

For the Master's degree programme Water Science and Environmental Engineering the institution has presented the following profile in the information booklet as well as on the website:

"University of Ljubljana is the oldest and largest higher education and scientific research institution in Slovenia. It was founded in 1919. The Faculty of Civic and Geodetic Engineering is one of 23 faculties within the university. The Faculty carries out basic and applied research with an emphasis on ensuring optimal functionality and the sustainable development of the built environment. Within this faculty, graduates of the Master's degree programme Water Science and Environmental Engineering will acquire fundamental knowledge of natural sciences, as well as applicable expert (civil engineering) skills for solving demanding administrative procedures and designing, planning, implementing and maintaining more demanding (according to the Construction Act) civil engineering structures (according to the uniform classification of types of constructions CC-SI) in the areas of water management, municipal and environmental engineering. Besides gaining general theoretic knowledge about hydraulics and geotechnics, students will also learn the modern principles of water science and the latest achievements of the profession in individual areas of environmental and civil engineering, presented in a modern way using state-of-the-art technology. By working in groups, involvement in project work, field work and by solving problem tasks, students will acquire essential teamwork and public speaking skills and will be able to coherently present scientific and engineering ideas to expert and lay public. They

will become acquainted with project management in the fields of environmental civil engineering and water management, and especially designing specialised construction types and measures. The students will have the opportunity to test all the acquired expert knowledge to the largest possible extent within practical exercises and real-life case studies, which will help them, together with practical training as part of the study, to get involved in practical work after the finished master's study. Another goal of the programme is also to provide the students with sufficient basic engineering knowledge to allow the development of abstract thinking and successful continuation of the study at different third cycle (i.e. doctoral) programmes (e.g. civil engineering or environment protection).”

C Peer Report for the ASIIN Seal[4]

1. The Degree Programme: Concept, content & implementation

Criterion 1.1 Objectives and learning outcomes of a degree programme (intended qualifications profile)

Evidence:

- Objective-module-matrices
- Self-Assessment Report
- Study plans of the degree programmes
- Information booklets of the degree programmes
- Module descriptions
- Website
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The peers take note that the faculty presents extensive sets of objectives and learning outcomes for all degree programmes to be assessed in this accreditation procedure (cf. Appendix). For each programme, the learning outcomes are divided into "general competences" and "course-specific competences". They are accessible to students, staff members and other stakeholders via links on the subject-specific pages of the faculty website to the Slovenian versions of the study programme information booklets. The websites as well as the English-language information booklets for all degree programmes quote those learning outcomes in translation.

The peers recognise that, in formulating the intended learning outcomes for all degree programmes, the faculty has followed the EUR-ACE framework standards of engineering pro-

[4] This part of the report applies also for the assessment for the European subject-specific labels. After the conclusion of the procedure, the stated requirements and/or recommendations and the deadlines are equally valid for the ASIIN seal as well as for the sought subject-specific label.

grammes and the Subject-Specific Criteria of the ASIIN Technical Committee for Civil Engineering, Geodesy and Architecture. The peers confirm that the study aims and learning outcomes of the Master's degree programmes correspond to level 7 of the European Qualifications Framework. The description of the three Master's degree programmes complies with the definition in the ASIIN Subject-Specific Criteria of more research-oriented programmes. The representatives of the faculty management inform the peers about the historical origins of the programmes: Before the implementation of the Bologna system, the programmes were four-year university Diploma programmes. The faculty adjusted the programmes to the Bologna requirements by splitting the academic programmes into a three years Bachelor's and a two years Master's programme. This is obviously one of the reasons why the graduates from the university's Bachelor degree programmes enter the labour market with their Bachelor's degree or continue their studies by enrolling in the Master's degree programmes.

In the respective discussions, both students and business representatives confirm the position of the faculty that there is a high demand on the labour market for graduates from the Master's degree programmes. The peers learn that graduates mostly work as project manager in construction companies and the chamber of commerce and industry in Slovenia or as researcher in the geodetic institute of Slovenia. Others are currently completing their PhD studies. During their studies, the Master's degree students acquire the necessary competences such as development of abilities to understand and creatively solve problems, critical reading and understanding of texts, independent search of knowledge and sources and qualification for the transfer and use of theoretic knowledge into practice as well as solving expert and working problems to find an adequate professional position. They are generally satisfied with their job perspectives. Sometimes, students of the programmes under review already have an employment and are trained on the job in the last phase of their studies, while in other cases the companies attract the students with scholarships. The business representatives attest the programmes a good balance between civil, environmental and geodetic aspects of engineering and appreciate the orientation towards project-based learning. The extent to which the soft skills and IT skills of the graduates could be further strengthened is explained in more detail under criterion 1.3.

In summary, the peers gain the impression that the objectives and intended learning outcomes meet the requirements of the Subject-Specific Criteria of the ASIIN Technical Committee for Civil Engineering, Geodesy and Architecture and of the EUR-ACE framework. They consider the defined learning outcomes to reflect the level of academic qualification aimed at and to be viable and valid. The implementation of the objectives and intended learning outcomes will be further explained under criterion 1.3. The qualification profiles of the study programmes allow the students to take up occupations that correspond to

their qualifications. Concerning the quality assurance and the further development of the programmes, the peers approve that the faculty has set up several committees with teaching staff and student participation which monitor the performance of the programmes and develop improvement proposals for the faculty senate. The extent to which the communication with the industry representatives should be institutionalized in order to regularly use their feedback for the further development of the programmes is explained in more detail under criterion 6.

Criterion 1.2 Name of the degree programme

Evidence:

- Self-Assessment Report
- Information booklets of the degree programmes
- Diploma Supplements

Preliminary assessment and analysis of the peers:

The names of all degree programmes are published on the subject-specific pages of the faculty website as well as in the information booklets of the degree programmes. Based upon the analysis of the different sets of learning outcomes, the peers acknowledge that the names reflect the intended aims and learning outcomes. This applies particularly to the Master's degree programmes Civil Engineering as well as Water Science and Environmental Engineering with their extensive approach to cover all relevant fields of Civil and Environmental Engineering as those degree programmes offer students a number of pathways and the opportunity to attain high levels of specialisation within the range of both fields.

Regarding the name of the degree programme Geodesy and Geoinformatics, the peers learn that, according to the faculty, the correct translation of the degree programme is Geodesy and Geoinformatics. However, as will be explained in more detail under criterion 1.3, the peers underline that the amount of IT-related modules should be strengthened and therefore ask whether the title "Geodesy and Geoinformation" would not be more appropriate. The teaching staff explains that before the implementation of the Bologna system, there were two different departments for Geodesy and Geoinformation. After the implementation of the Bologna system, the faculty decided to combine both as the relevant Master's degree programme is supposed to produce data on the one hand and use it in order to deliver the information to different areas and support the spatial development on the other hand. The peers can understand these explanations and are satisfied with them. They believe that strengthening the amount of IT-related modules will additionally support the title of the degree programme.

Concerning the use of language in the courses, the peers learn from the representatives of the faculty management that the language policy of the Slovenian government is relatively strict with regard to the acceptance of teaching in foreign languages. The Higher Education Act of the Republic of Slovenia stipulates that the language of instruction shall be Slovenian and that Higher Educational Institutions shall ensure the development of Slovenian as a professional and scientific language. The faculty would like to increase the number of courses only taught in English but the law leaves room for only few exceptions, which do not apply to the programmes. Consequently, the faculty has to provide the same courses in Slovenian for the Slovenian students and in English for the international students. However, if they wish, the Slovenian students also have the possibility to participate in the courses provided in English. The peers consider this a factor that will drive internationalization.

Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Report
- Study plans of the degree programmes
- Information booklets of the degree programmes
- Academic guidelines
- Module descriptions
- Objective-module-matrices
- Discussions during the audit

Preliminary assessment and analysis of the peers:
From the statements made in the Self-Assessment Report and the discussions with the faculty representatives and students, the peers gain the overall impression that the curricula of all degree programmes represent well-established sets of fundamental engineering knowledge and specialised knowledge in different fields of civil, environmental or geodetic engineering. They also recognise that the faculty has established structures (like the Committees for the 1st and 2nd Cycle Studies) and processes to evaluate, update and gradually improve the curricula.

The Master's degree programme Civil Engineering is designed for four semesters and 120 ECTS credits. The study programme offers four areas of specialization called "division": "Structural Engineering", "Building Information Modelling – BIM A+", "Geo- and Hydrotech-

nics", and "Infrastructural Engineering". Students are supposed to acquire basic and specific expert knowledge from the area of civil engineering, mainly from the areas of design, organisation, management and execution of construction works and construction manufacturing, construction informatics, ecology, spatial planning and spatial policy as well as skills in independent comprehensive design of demanding structures and project management in the area of civil engineering. Students have to complete 120 ECTS in total, divided into compulsory courses (between 77 and 94 ECTS credits, depending on the division), elective courses (between 12 and 18 ECTS credits, depending on the division) and Master's thesis including publication (10 ECTS credits, except for the BIM A+ division which is worth 30 ECTS credits). The students of all divisions except BIM A+ additionally have to complete 4 ECTS credits of practical training. To finish the degree programme, students of the division Structural Engineering must take two external elective courses (4 ECTS credits in the second and 4 ECTS credits in the third semester), and a master module consisting of additional professional electives from the area of structural engineering. Students of the division Geo- and Hydrotechnics must complete three external elective courses (4 and 5 ECTS credits in the second and 4 ECTS credits in the third semester). The division Infrastructural Engineering foresees three elective courses (4 ECTS credits in the second and 4 and 5 ECTS credits in the third semester) as well as four elective master modules in the fourth semester. Moreover, students may choose external elective courses in any study programme of the university of Ljubljana or from other universities.
Moreover, if a student chooses the "BIM A+" division, he or she is automatically enrolled in the corresponding Erasmus Mundus Master study programme financed within the Erasmus Mundus scheme of the European Commission. According to the SAR, it is a "master after master" programme offered by a consortium of three universities: University of Minho, Portugal as coordinator and University of Ljubljana and Polytechnic University of Milan, Italy as partners. The programme consists of two semesters, while the students are enrolled to the second year based on the recognition of their previous studies. Thus, the study consists of 120 ECTS credits, of which 60 ECTS credits are recognised from previous studies and 60 ECTS credits are gained within the programme of BIM A+. The programme foresees mandatory mobility, which means that students study at two of the three partnering universities. At one of the universities they complete their course work and at the other university, they prepare their Master's thesis. Upon finishing their studies, they receive a double degree diploma from the two universities.

The peers are receiving conflicting information by the description of the BIM A+ division being a "master after master programme" and learn from the programme coordinators and the teaching staff that the students who choose this division have three options in order to be admitted to it: they are requested to graduate from a prolonged Bachelor's degree programme that encompasses four years or 240 ECTS credits. Otherwise, students have the possibility to finish the first year of the Master's degree programme Civil Engineering at the

university of Ljubljana and to switch afterwards to the BIM A+ division in the second year. Alternatively, they can also join the BIM A+ division after completion of their Master's studies. The programme coordinators explain that predominantly international students choose this division and enroll for this one year only after having completed their previous Master's studies. The peers welcome these explanations and believe that, with regard to the contents and especially to the international focus of this divison, the BIM A+ studies are highly recommendable to all interested students. However, they still wonder whether BIM A+ is supposed to describe a division of the Civil Engineering degree programme or an individual Master's degree programme. In addition, the peers realize that according to the ranking criteria which are the basis for admission to the BIM A+ division, graduates with a Bachelor of Science degree are weighted 0.75, but degrees with less than 240 ECTS credits are weighted 0. The peers think that it should be avoided that Bachelor of Science graduates are admitted to the division in theory, but in fact locked out by insufficient score-outcomes due to the down-weighting criteria. The admission requirements therefore seem to be inconsistent and different from the other divisions of the Civil Engineering degree programme. Since the peers did not have enough information at the time of the audit regarding the admission requirements and the description "master after master", they ask that the above mentioned unclear information be provided together with the comment of the university.

The Master's degree programme Water Science and Environmental Engineering is designed for four semester and encompasses 120 ECTS credits. The study programme offers three areas of specialization called "division": "Hydraulic Engineering", "Environmental Engineering" and "Flood Risk Management". Besides gaining general theoretic knowledge about hydraulics and geotechnics, students will also learn the modern principles of water science and the latest achievements of the profession in individual areas of environmental and civil engineering, presented in a modern way using state-of-the-art technology. Students have to complete 120 ECTS in total, divided into compulsory courses (60 ECTS credits), elective courses (30 ECTS credits) and Master's thesis including publication (30 ECTS credits). Students are recommended to select courses from the Civil Engineering (divisions "Geo- and Hydrotechnics" and "Infrastructural Engineering") or the Geodesy and Geoinformatics degree programme. Otherwise, students also have the possibility to choose modules at other faculties of the university of Ljubljana, other universities in Slovenia or abroad. Students are also offered a possibility to obtain a double degree diploma based on two agreements on academic cooperation with Zurich University of Applied Sciences, Switzerland and the University of Calabria, Italy. Both agreements allow the students to complete a study exchange in the second year or their studies, either for one or two semesters.
Moreover, if a student chooses the "Flood Risk Management" division, he or she has the choice to do the joint degree (Erasmus Mundus Master study programme) with the Delft

Institute for Water Education, Netherlands, the Technische Universität Dresden, Germany and the Polytechnic University of Catalunya, Spain. Only the students enrolled in the second year, based on the recognition of their previous studies, of the Erasmus Mundus Master study programme are obliged to the full joint degree study.

The Master's degree programme Geodesy and Geoinformatics is designed for four semesters and encompasses 120 ECTS credits. The study programme does not offer any area of specialisation. It is supposed to offer the students the possibility to obtain a license of Responsible Surveyor by the Slovenian Chamber of Engineers. Moreover, students will learn how to independently solve all kinds of professional and development tasks in the fields of geodesy and geoinformatics and to understand, apply and develop modern surveying methodologies and technology. Furthermore, they will study the planning, organisation and management of surveying tasks for the establishment, maintenance and restoration of the basic geodetic reference system as well as of geodetic works in the land surveying and in the procedures of cadastral regulation and registration of real estate for example. Students have to complete 120 ECTS in total, divided into compulsory courses (91 ECTS credits), elective courses (19 ECTS credits) and Master's thesis including publication (10 ECTS credits). Elective courses are foreseen for the second semester in the scope of 7 ECTS credits and in the third semester in the scope of 12 ECTS credits. The study programme itself proposes 10 elective courses, which cover different areas of Geodesy and Geoinformatics. Otherwise, students also have the possibility to choose modules at other faculties of the university of Ljubljana, other universities in Slovenia or abroad, preferably in the field of municipal engineering, traffic infrastructure or hydrology.

Based on such evaluations and after discussion in the relevant bodies, the faculty implemented some changes and improvements since the previous accreditation carried out by ASIIN in 2015. In the Master's degree programme Civil Engineering, a new BIM A+ division has been introduced in the academic year 2019/20, because BIM services represent the future of the construction process. Moreover, a working group has been set up to prepare a unified five-year study programme of Civil Engineering. It includes the heads of individual chairs and is headed by the head of the department. In the Master's degree programme Water Science and Environmental Engineering, three elective modules (Hydraulic Engineering, Environmental Engineering and Flood Risk Management) have been introduced in 2016 in the 2nd year of the study programme in order to improve the competence profile through improved horizontal interconnections between the courses included in each elective module. Furthermore, the introduction of these modules also enabled the university to better embed the Erasmus Mundus Flood Risk Management programme into the Master's degree programme and to improve the international academic cooperation that ena-

bled students from cooperating institutions (Zurich University of Applied Sciences, Switzerland and University of Calabria, Italy) to obtain the double degrees. The result was an increased number of foreign students enrolled in the study programme. As for the Master's degree programme Geodesy and Geoinformatics, an exchange of modules between the individual semesters was made, because of the disproportion of ECTS credits between semesters in the first year of the study programme. To harmonize the ECTS credits for the Master's thesis among all study programmes, the faculty decreased the awarded ECTS credits from 20 to 10 and additionally introduced a project task.

Overall, the peers are in principle satisfied with the curricular structure of all programmes. They see that the programmes are well structured and that the modules build on each other in a reasonable way, enabling the students to effectively reach the learning outcomes as laid down for the programmes as a whole.

However, the peers note that only in the Geo- and Hydrotechnics, Structural Engineering and Infrastructural Engineering divisions of the Civil Engineering degree programme students have to complete a practical training of two weeks. The peers learn from the programme coordinators and the teaching staff that students of the Water Science and Environmental Engineering degree programme have the possibility to choose the elective course "practical training" which is worth 6 ECTS credits in order to apply the acquired theoretical knowledge. The same applies to the students of the Geodesy and Geoinformatics degree programme who are allowed to take the elective course "field project work" which is worth 4 ECTS credits. Moreover, students gain practical experience while they prepare their Master's theses in collaboration with companies. Furthermore, the programme coordinators underline that almost all students of the Master's degree programmes under review work beside their studies. The students and the industry representatives confirm this statement. The students additionally declare that, before the beginning of the Covid19 pandemic, excursions or field trips to construction sites, companies or the Slovenian coast have taken place on a regular basis, at least once a month. In some modules they are requested to work on a real project which has been commissioned by a company. As an example, a project in the field of water management systems can be mentioned, on which the students of the Water Science and Environmental Engineering degree programme have worked. The project consisted in solving a drainage problem in the city of Ljubljana. The students had to work in groups on specific parts of the project and later had to present their results to their colleagues from the company. Nevertheless, the students as well as the prospective employers also indicate that they would like to intensify the practical aspects of the degree programmes to get intensively acquainted with the structures of a company and to experience all steps of a project. Therefore, the peers consider it appropriate to increase the practical aspects of the programmes in case the faculty decides to make changes to the

programmes. Thus, it can be stated that the peers consider the activities offered by the university to be useful and should continue to promote them.

With regard to the seven categories of the EUR-ACE criteria for programme outcomes of Master's degree programmes (knowledge and understanding, engineering analysis, engineering design, investigation, engineering practice, making judgements, lifelong learning) the peers wonder about the non-technical, societal implications of engineering work. From the programme coordinators, they learn that project and field work contribute to develop the ability to identify, formulate and solve unfamiliar complex engineering problems that are incompletely defined, have competing specifications, may involve considerations from outside their field of study and non-technical – societal, health and safety, environmental, economic and industrial – constraints. However, since the university applied for the EUR-ACE Label and the peers did not have enough information at the time of the audit regarding these aspect, they ask that the above mentioned unclear information be provided together with the comment of the university.

With regard to IT-related modules, the peers ask the programme coordinators and the teaching staff which modules cover this aspect, as the amount seems to be quite low. From the programme coordinators, the peers learn that the faculty does not offer any modules that are exclusively taught by lecturers from the computer science department. However, all modules that deal with mathematical or computer science aspects are taught by lecturers who are employed by the faculty of Civil and Geodetic Engineering, but bring a mathematical or computer science background. As an example can be cited the Vice Dean of the faculty who has a diploma in computer science. Furthermore, the programme coordinators state that IT-related contents are included in the majority of the modules. However, during the discussion with the prospective employers as well as with the graduates, the peers learn that in the field of student's IT skills there is still room for improvement. The prospective employers explain that IT skills like for example GIS and remote sensing technologies could be strengthened. This confirms the impression of the peers. Therefore, they recommend to add more IT-related modules to the programmes.

Furthermore, the peers discuss with the programme coordinators and the teaching staff the ways in which the students can improve their English proficiency. They learn that in all degree programmes there are special bilingual classes in which many of the modules are taught in English in order to offer international students the possibility to study in English. These modules can also be taken by Slovenian students. Additionally, English literature is used as can be seen from the literature suggested for the individual modules in the module descriptions. In all study programmes, a number of visiting lecturers teach in English.

Finally, the peers ask how the teaching staff and the prospective employers evaluate the soft skills of the students. They learn that the students from university of Ljubljana are particularly resilient in many respects: both in terms of competition and in terms of their perseverance. Moreover, they demonstrate good analytical and critical thinking skills. In spite of this, the industry representatives as well as the graduates also underline that specific soft skills as the ability to communicate with clients, to publicly speak and present in front of an audience and project management skills could still be improved. Consequently, the peers recommend to strengthen the soft skills of the students, in particular communication, presentation and project management skills.

Criterion 1.4 Admission requirements

Evidence:

- Self-Assessment Report
- Academic Guidelines
- Information booklets of the study programmes
- Enrolment Guides
- Websites
- Discussions during the audit

Preliminary assessment and analysis of the peers:
As the faculty states in its Self-Assessment Report, admission to all degree programmes is limited. Currently, they admit 40 full-time students to the Civil Engineering degree programme and 30 students to the Water Science and Environmental Engineering degree programme and the Geodesy and Geoinformatics degree programme respectively. The Master's degree programmes are available to the graduates from a Bachelor's degree programme in the relevant or other expert areas. Graduates from the higher education professional study programmes in the relevant areas also have access to the Master's degree programmes under review. Since the faculty offers the possibility for graduates of Bachelor's or higher education professional degree programmes in other expert areas to apply for the Master's degree programmes under review, rules for the compensation of missing competences have been developed. Before the enrolment in the Master's degree programmes, the applicants have to take some additional courses in the range of 10-60 credits in their third study year, in programmes for additional education and by passing exams before the enrolment and thus complete the necessary study obligations before the application.

A chart with the numbers of the students enrolled in all programmes of the faculty demonstrates a substantial decrease between the academic years 2019/2020 and 2021/2022, which particularly applies to the Master's degree programmes Civil Engineering and Water Science and Environmental Engineering. The number of applicants is below the admission numbers (e.g. 32 applicants for the Master's degree programme Civil Engineering in the academic year 2020/21) and continue to decline. In the discussions with the programme coordinators and the teaching staff, the peers learn that, on the one hand, this is a long-term effect of the economic crisis in 2008 which resulted in numerous bankrupts of Slovenian construction companies. In order to counter the decreasing number of students, the faculty is currently increasingly promoting their engineering degree programmes and uses social media channels such as TikTok and Instagram to make the information accessible to as many prospective students as possible. On the other hand, the construction sector is starting to recover from the economic crisis and is currently booming again. As a result, many construction companies are recruiting bachelor's students directly after they graduate. The peers see the economic crisis as a justifiable basis for the decreased student numbers and therefore welcome the promotional efforts of the faculty.

The overwhelming majority of students who have been admitted to the Master's degree programmes have graduated from the Bachelor's degree programmes of the faculty. The number of the remaining students who studied other disciplines at the university of Ljubljana outweighs the number of students coming from other universities. The number of incoming students from other European countries within the Erasmus+ exchange has recently decreased from about 73 in 2017/2018 to 36 in 2020/21 because of the Covid19 pandemic. The faculty created a mixed offer of courses held in English with contributions from the different fields of specialisation. The peers can understand the pandemic-related decline in incoming students. They welcome the offer of English courses and believe that its expansion, as well as the return to the pre-pandemic situation will lead to an increase of the corresponding numbers.

The peers acknowledge that the admission requirements and selection criteria are transparently displayed on the subject-specific pages of the faculty website. The rules and procedures are binding. The admission requirements are structured in a way that supports the students in achieving the learning outcomes.

However, as it has been further explained under criterion 1.3, the admission requirements for the BIM A+ division of the Master's degree programme Civil Engineering are different from the other degree programmes and divisions under review and the exact framework conditions are not clear to the peers. Therefore, they ask the faculty to provide additional information about this division together with the comment of the university.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 1:

Criterion 1.3:

Regarding the requested additional information about the BIM A+ division of the Master's degree programme Civil Engineering at the Faculty of Civil and Geodetic Engineering, the University of Ljubljana underlines that the division is embedded into the 2nd cycle master study Civil Engineering, which is accredited by the NAKVIS - National Accreditation Agency of the Republic of Slovenia. BIM A+ is considered as a special one-year elective master (60 ECTS), which requires students that they already completed all the coursework (240 ECTS or more) in the regular 2nd cycle master study of civil engineering, and they are allowed to apply for the enrolment into BIM A+ under the condition that only the last year elective and the thesis from the regular 2nd cycle master study of civil engineering are missing.

The university also allows other (not enrolled) students who already completed a degree equivalent to 240 or more ECTS to enrol into this division. In practice, this means that students have at least 300 ECTS (1st and 2nd cycle). Additionally, they are already Certified Architects or Engineers. Due to high demand, most of the students in the BIM A+ division already have at least a Master's degree. Collectively, the university has processed applications from over 40 countries, and also had two applications from students who already had a PhD degree. This year (for the academic year 2022-2023), the university has 960 applications, and only 1 in 30 shall be able to enrol, which required from the consortium to set criteria for the admission that are rather demanding. Thus, admission requirements and ranking of students is different from other divisions. The peers appreciate that the university provided additional information about the admission requirements and the description "master after master". They understand that BIM A+ is a division of the present Civil Engineering programme, which has different admission requirements than the other divisions of the programme. However, all divisions include the same regular duration of study and the total amount of 300 ECTS points to be achieved.

Moreover, with regard to the requested additional information about the non-technical, societal implications of engineering work, the university underlines that, in general, the societal impact, relevance and responsibility of the engineer is embedded in almost all courses of the three curricula under review– for example related to climate change, sustainability and health. After all, it is this engineering profession that is providing for human life and work environments in a way that is responsible towards the planet in present, respectful of the cultural inheritance of the past, and mindful of the needs of the future generations. Students have at their disposal internal elective courses with regard to non-tech-

nical, societal implications of engineering work (for example Project Management, Property Law, Transport Ecology) and external elective courses from non-engineering faculties. There is a range of courses available from academies and colleges to students from other University members. Some of these courses are specifically accredited only for students of other University members. In addition, the University and the student organization are offering a multitude of events, lectures and short courses on socially relevant topics – from gender equality to entrepreneurship.

With regard to the individual degree programmes, it should be underlined that in the summer semester of the 2nd year of the Master's degree programme Civil Engineering, students are confronted with project work and problem solving by working in small groups. This is supposed to help them learn how to get used to working in a group, to public appearances and customer services, and at the same time develop the ability to define, understand and creatively solve professional challenges in a holistic way. Within the module "Interdisciplinary Project Study of Computer-Aided Design of Structures", civil engineering students prepare a project work in cooperation with architecture students. Thus, in addition to working in a group, the students also face cooperation with disciplines that have a different culture. Successful project completion requires constructive coordination of different interests. Moreover, students can choose student tutoring in the form of subject tutoring as one of the forms of assistance to younger colleagues and thus improve their ability to social communication and imparting knowledge. By publicly presenting seminar papers in some courses and defending the Master's thesis, students are able to strengthen and consolidate their communication skills and abilities.

In the framework of the Master's degree programme Geodesy and Geoinformatics, the university underlines that special attention is given to emphasising the role of surveying and geoinformatics in society, which has far-reaching implications in the social, health and safety, environmental, economic and industrial fields. Students of this degree programme are acquainted with these non-technical implications of their field during regular lectures and tutorials. In courses related to urban and spatial planning as well as land management, they obtain comprehensive knowledge about spatial planning and environmental protection to make people's lives comfortable and safe in these environments and to ensure sustainable spatial development, resistant to natural and other hazards. The module "Land Consolidation and Rearrangement" is supposed to teach students about the concept of active land policy and its role for sustainable spatial development in order to train them to balance different interests in the space related to land consolidation and other forms of land rearrangements. The teaching staff underlines the importance of personal data that students find at their disposal in their work environment. In all fieldwork activities, students are able to communicate with landowners, are considerate of passers-by, respect traffic

regulations and wear reflective vests. In all these courses, particular attention is given to the students' soft skills related to public participation, negotiations, conflict resolutions and communications.

Moreover, within the courses Geodetic Measuring Systems, Photogrammetry and Remote Sensing, Satellite Geodesy and Navigation and Engineering Survey, the teaching staff regularly emphasizes the importance of the accuracy of the obtained data for safety. For example, with regular landslide monitoring, use of remote sensing technologies such as UAV photogrammetry, terrestrial laser scanning, aerial and satellite data, early landslide symptoms can be detected and the impact of landslide activity can be reduced. Within the course Geophysics in Geodesy, students learn about the seismology and physics of earthquakes. In Satellite Geodesy and Navigation they learn about GNSS for monitoring the Earth's atmosphere, Navigation in problematic conditions for GNSS that can help guide firefighters and how geodesy can contribute to applications, such as autonomous vehicle navigation systems in the near future. In the modules related to Geoinformatics, students use GIS software in order to analyse long-term satellite data series. Such analyses can be used for early drought detection and provide solutions for agriculture, to name just one example.

In the scope of the Master's degree programme Water Science and Environmental Engineering, which is strongly interdisciplinary oriented, students do obtain considerable amount of the interdisciplinary knowledge that can be used during their careers to deal with societal, environmental and economic topics. Such topics are incorporated in different modules such as the module Basics of Spatial Sociology, Water Policy and courses that are organized within the module Floods and Water Management such as Spatial Planning for Flood Protection and Socio-Economical Assessment of Flood Risk. Additionally, students can select different elective courses such as Introduction to Research Work or Project in Infrastructural Systems that are largely specialized in the development of content coverage with regard to non-technical, societal implications of engineering work. In addition, the faculty of Civil and Geodetic Engineering and the University of Ljubljana in general offer a large number of training courses that students can optionally select if they want to enhance specific skills like for example Project Thinking. Moreover, student organizations that are organized within the university organize specific trainings for students (e.g., use of English or German language in engineering, use of specific software such AutoCad, use of programming languages such as R software, etc.). The peers appreciate that the university provided additional information about the non-technical, societal implications of engineering work and understand that the students of all programmes under review learn how project and field work contribute to develop the ability to identify, formulate and solve unfamiliar complex engineering problems that are incompletely defined, have competing specifications,

may involve considerations from outside their field of study and non-technical – societal, health and safety, environmental, economic and industrial – constraints.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Self-Assessment Report
- Study plans of the degree programmes
- Module descriptions
- Objective-Module-Matrices
- Information booklets of the degree programmes
- Discussions during the audit
- Cooperation agreements BIM A+, FRM, UNICAL, ZHAW
- Overview of student mobility

Preliminary assessment and analysis of the peers:
The Master's degree programmes under review are designed for 2 years and the students need to achieve 120 ECTS. Each semester is equivalent to 16 weeks of learning activities, including two weeks for final exams.

After analysing the module descriptions and the study plans, the peers confirm that all degree programmes under review are divided into modules, and that each module is a sum of coherent teaching and learning units. All programmes allow the students to define individual focuses through broad ranges of electives and specialization areas.

The distribution of the different types of courses (mandatory courses, electives, practical training and final thesis) is different for each of the three degree programmes. The share of mandatory courses is the highest in the Infrastructural Engineering division of the Master's degree programme Civil Engineering where it amounts to 78 % (in contrast to 64-73 % in the other divisions of Civil Engineering degree programme, 50 % in the Water Science and Environmental degree programme and 76 % in the Geodesy and Geoinformatics degree programme) while the share of electives is far more dominant in the Water Science

and Environmental Engineering degree programme with 25 % than in the other programmes (15 % in the Geodesy and Geoinformatics degree programme as well as in the Geotechnics-Hydrotechnics and Structural Engineering divisions of the Civil Engineering degree programme, 11% in the BIM A+ division of the Civil Engineering degree programme and 10% in the Infrastructural Engineering division of the Civil Engineering degree programme). The share of practical training (3%) is higher in the Civil Engineering degree programme (except for the BIM A+ division) than in the other two degree programmes which do not contain any mandatory internship. However, it has to be regarded that, within the chosen area of specialisation, students have the possibility to create highly individualised curricula for themselves. The distribution of the different courses over the respective programmes reflects very well the distinctions between them. The peers agree that, with its choice of modules, the structures ensure that the intended learning outcomes can be reached and allow students to define an individual focus and course of study.

International Mobility

The Self-Assessment Report as well as the discussions make it clear that, while striving to become an international acknowledged university, international recognition is one of the university's primary goals for the next years. The auditors emphasise that it is very useful for students to spend some time abroad during their studies to improve their English proficiency, to get to know other educational systems, and to enhance their job opportunities.

The peers learn that the University of Ljubljana already provides some opportunities for students to conduct internships and study semesters abroad. There are cooperation agreements with universities and organisations in over 20 countries worldwide (for instance China, Austria, Chile, Croatia, Albania, Portugal) partly regarding student exchange, partly regarding research collaboration. The students have the possibility to apply for different scholarships sponsored by the national Ministry of Education, Science, Culture and Sport, the Slovenian Human Resources Development and Scholarship Fund as well as Furthermore, both departments Urban and Regional Planning as well as by CMEPIUS (Centre of the Republic of Slovenia for international mobility programmes and European educational and training programmes). The Civil Engineering and Water Science and Environmental Engineering degree programmes give students the opportunity to optionally study at several other universities as part of a summer school or a double or joint degree programme. For this purpose, the university of Ljubljana has concluded partnerships with the university of Minho, Portugal and the Polytechnic university of Milan, Italy for the optional Erasmus Mundus programme BIM A+. Moreover, the university has concluded partnerships with the Zurich University of Applied Sciences, Switzerland and the university of Calabria, Italy for an optional double degree programme as well as with the IHE Delft Institute for Water Education, Netherlands, the Technische Universität Dresden, Germany and the Polytechnic

University of Catalunya, Spain for the optional Erasmus Mundus programme of the Water Science and Environmental Engineering degree programme. This will make it possible for the students to collect further experience and be better prepared to enter the job market after their studies. Qualifications obtained at other universities in Slovenia or abroad are recognised in line with the courses at university of Ljubljana.
Counselling is provided by the International Office of the faculty. The students can best realise such a stay in semesters 3 or 4 of the Master's degree programmes or, in case of a shorter stay, during the holidays. As they confirm, there are no problems with credit transfer or the organisation of student mobility.
In summary, the peers appreciate the effort to foster international mobility and support the university of Ljubljana to further pursuing this path.

Criterion 2.2 Work load and credits

Evidence:

- Self-Assessment Report
- Study plans of the degree programmes
- Information booklets of the degree programmes
- Survey of student satisfaction
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The faculty makes use of the ECTS credit point system and allocates ECTS credits to the modules according to an estimated workload that is required from an average student for the successful completion of the course. The workload comprises both attendance-based learning and self-study. The course descriptions inform about how the workload is divided into the time spent on contact lessons (lectures, seminars, tutorials, etc.) and the time for individual work. All mandatory parts of the degree programmes, including practical training and Master's thesis, are awarded with credits.

According to the SAR, 1 ECTS credit is equivalent to 15 hours of student work. However, according to the ECTS credit point system 1 ECTS credit must equal 25-30 of students' workload. Therefore, the peers ask the programme coordinators and learn that this information has been a mistake in the SAR and that the allocation of credits is based on the assumption that one ECTS credit consistently equals a workload of 30 hours. The peers can confirm this by checking that the credits awarded for the different modules in the modules description

correspond with the actual workload of the students. In all degree programmes, the ECTS credits are relatively evenly distributed over the semesters; so that in every semester students can acquire a total of 27-33 credits. The student evaluation survey includes questions that check the agreement between the nominal workload according to the course descriptions and the actual workload.

In the discussion with the students, the peers learn that they largely share the opinion of the faculty that the estimated time budgets are realistic and that no significant discrepancies occur between actual workload and ECTS credits. The students also emphasise that they consider the workload high but manageable. However, with regard to the study plans, the peers realize that the Master's thesis in the Water Science and Environmental degree programme is worth 30 ECTS credits whereas in the two other study programmes (except in the BIM A+ division of the Civil Engineering degree programme) it is worth only 10 ECTS credits. From the teaching staff, the peers learn that in many modules of all degree programmes, the teaching staff utilizes a project-based teaching methodology. Therefore, the students of the last semester of the Civil Engineering as well as the Geodesy and Geoinformatics degree programmes have to complete project work which is worth 20 ECTS credits and related to the subject of the following Master's thesis. These subjects are supposed to prepare the subject of the Master's thesis. In both cases, students are required to demonstrate the ability to work independently on a topic from their relevant field within a given period of time using scientific methods and to present the result in a technically and linguistically appropriate manner. The peers note that the learning process within the project work and the theses consequently enable the students to demonstrate their engineering design skills. Since the project work and the Master's thesis are thematically linked and as this is also a common practice at other European universities, the peers are satisfied with these explanations. Nevertheless, it is recommended to regularly check that the credits awarded for the Master's thesis correspond with the actual workload of the students.

The peers conclude that the workload has been calculated realistically for the modules of all degree programmes.

Furthermore, during the discussion with the students, the peers learn that in order to progress with the study programme and be allowed to enter the second year of all Master's degree programmes under review, students must have completed 54 ECTS credits. However, even if a student should fail all exams in one semester, he or she would be allowed to move to the next semester, because there is no minimum number of ECTS credits to move from one semester to the next. The peers think that it could be useful for the faculty to consider this aspect in order to avoid students accumulating too many failed or yet-to-be-taken modules.

As the statistical data provided by the university of Ljubljana shows, the average length of study is 3 to 3,5 years in all degree programmes under review. According to the programme coordinators, the teaching staff and the students, this is due to the financial privileges that the student status offers in Slovenia with regard to health insurance, restaurant vouchers, reduced entrance fees to museums and tax efficient rates while working as a student. It is also due to the fact that most of the Master's students work next to studying, because it offers them the possibility to receive a scholarship from the respective company. The students explain that companies increasingly prefer to hire students, because it is more profitable for them. Additionally, the peers see that almost all students complete the degree programmes as there are only 12-30% of the students of the different divisions of the Civil Engineering degree programme, 19% of the students of the Water Science and Environmental Engineering degree programme and 24% of the students of the Geodesy and Geoinformatics degree programme who dropped out of the degree programmes between 2018 and 2020. The reason for most of the drop-outs are the before mentioned students who were not actually studying, but instead profit from financial privileges that the student status offers in Slovenia. The data verifies that all three degree programmes under review can be completed in the standard study period.

Criterion 2.3 Teaching methodology

Evidence:

- Photos and videos of laboratories
- Self-Assessment Report
- Module descriptions
- Samples of lecturer evaluation by students
- Websites
- Discussions during the audit

Preliminary assessment and analysis of the peers:

In the Self-Assessment Report, the faculty states that teaching in all degree programmes is mainly based on lectures, which are held by those lecturers who achieved the status of "habilitation" (cf. criterion 4.1), laboratory exercises with around 10 students, seminars, tutorials, project work and field work.

The university of Ljubljana introduced an online Learning Management System (UL FGG e-classroom) in order to monitor the teaching methodology that is applied and make acces-

sible the various course materials. Each teacher or professor must upload his or her teaching materials and working procedures on UL FGG e-classroom.

During the classes, active and interactive teaching methods (e.g. lectures, discussions, reports, presentations, and group work) are applied. As a general teaching philosophy, the university of Ljubljana aims at encouraging the students to gain knowledge from different scientific areas and to introduce them to research activities. This should ultimately result in a student-centred learning and project-based learning approach. The teaching and learning are supported by a broad range of media, both traditional (books, papers) and online (videos, presentations etc.). In the course of the Covid-19 pandemic, the university has swiftly switched to online learning with videoconferences, recorded videos and other media.

In general, the students appreciate the quality of teaching and the didactic methods used by the lecturers. They confirm that some of the teachers make use of innovative and interdisciplinary teaching methods and supportive information technology. The teaching staff reports that in many courses, e.g. in those with geotechnical content, students work on real projects together with other departments, e.g. architecture, in an interdisciplinary way. For this purpose, the students are divided into groups of 3-4 people each, in which they have to work on a project from the point of view of a client or reviewer. At the end of the semester, all groups present their results and evaluate each other. The students also receive feedback from the responsible lecturer. This approach is designed to develop students' presentation and teamwork skills.

From the discussion with the teaching staff the peers learn that particularly the younger professors, assistant professors and teaching assistants demonstrate a lot of devotion to academic teaching, including the use of new didactic methods and technical equipment. In conclusion, the peers find that the teaching methods and instruments in use support the students in achieving the learning outcomes. They are well adapted to the aims and conditions of the individual courses. To them, the programmes seem to be well-balanced between attendance-based learning and self-study, and there is evidence that the Master's degree programmes offer students the opportunity to develop skills in academic research.

Criterion 2.4 Support and assistance

Evidence:

- Self-Assessment Report
- Information booklets for all degree programmes
- International student's guidebook

- Discussions during the audit

Preliminary assessment and analysis of the peers:
According to the faculty, there are numerous offers providing services and information about the study programmes and the execution of the study process by phone and electronically through the faculty website. Personal consultation for students is mainly available at the Student Office but also at the University Career Centre and the International Office. The Career Centre offers students presentations of work environments, networking and "speed dates" with employers organised by the Student Council, career days and workshops for acquiring competencies.

For the accompaniment of the teaching process, the faculty has established a system of mentoring and tutoring. Mentors are selected among the teaching staff, one for each study year of the three degree programmes respectively. The tutoring system is defined in corresponding written regulations. Apart from tutoring by members of the teaching staff, student tutorship is also available. In the opinion of the faculty, it is especially the student-provided tutoring that contributes to a better performance of students who are experiencing learning difficulties. Before the academic year starts, student tutors may choose to receive a monetary award for the completed tutoring or select tutoring as an elective course, evaluated with 4 ECTS credits. Student tutors can choose the second option only once. The student evaluation survey contains a section dealing with the general performance of the faculty and includes questions on the provision of information at the faculty and on counselling. Moreover, students can express their opinions and comments at the Class Councils, and their representatives also participate in the Study Board of the Department of Civil Engineering and the Quality Assurance and Development Commission.

The students confirm that they are satisfied with the system of mentoring and tutoring, and that addressing a fellow student tutor is usually their first choice. When it comes to choosing their respective fields of specialisation, they feel also adequately counselled.

As the faculty pursues a policy to provide equal opportunities to students with special needs and with disabilities, it offers possibilities for adjustments to enable such students to enroll in its study programmes. The adjustment measures cover the organisation of exams (extended time, breaks, conducting of oral exams in written form or vice versa), the laboratory work (special space and access to machines, individual approach, contextual adjustments), and the relaxation of deadlines for the execution of compulsory assignments, seminar papers, and other study obligations.

The peers thus acknowledge that sufficient resources are available to provide individual assistance, advice and support for all students, and that the allocated advice and guidance

assist the students in achieving the learning outcomes and in completing the courses successfully. Overall, the peers judge the extensive support system to be one of the strong points of the University of Ljubljana.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 2:

Since the University of Ljubljana does not address this in its statement, the peers stand by their previous impression.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:

- Self-Assessment Report
- Module descriptions
- Examination regulations
- Information booklets for all degree programmes
- Samples of student's work (projects, exams and theses)
- Websites
- Academic Calendar
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The peers recognise that the faculty has defined a form of assessment for each of the modules that are offered within the curricula of the three degree programmes. Binding rules for the organisation of exams and grading, including for the Master's thesis, are laid down in the regulation document "Rules on the first and second cycle studies at the UL FGG, Article 36".

While most of the exams of the Master's degree programmes under review are conducted in written form, there is also some variety for which the programme coordinators claim an increased number of oral exams and presentations. Mid-term exams, partial exams, seminar works, logbooks, practical projects, home projects and homework, which account for at least 30% of the final grade, are additionally employed to assess the students' achievement of the learning outcomes. The form and length of each exam is mentioned in the

course descriptions that are available to the students via the university's homepage, the Learning Management System (UL FGG e-classroom) and the academic calendar. The final grade of each module is calculated based on the score of these individual kinds of assessment. The exact formula is given in the module handbook. The university of Ljubljana uses a grading system with the grades 1-10, where a 6 is necessary to pass a module.

The peers discuss with the students how many and what kind of exams they have to take each semester. The students confirm the diverse examination forms by pointing to a number of exams that combine a written part with an oral part afterwards. For other courses, there is only one final exam in every semester. Usually, there are additional practical assignments or homework. The final grade is the sum of the sub exams. They further explain that they have to take between five and seven exams per semester.

According to the faculty, there are at least five examination terms for each course in all degree programmes. Two examination terms are at the end of the winter semester, in the period between the middle of January and the middle of February, two examination terms are in June at the end of the summer semester and at least one examination term is between the middle of August and the middle of September. The regular examination terms are published each academic year in the university's online study information system latest at the end of October. Students are not required to take more than one exam of one semester's courses on the same day. There must be at least ten days between two consecutive examination dates in the same teaching unit.

Altogether, students have five opportunities to pass the exam for a specific course. They can take one re-examination within the same examination period, the next one half a year later. For the fifth repetition, the commission has to be approved by the faculty senate. Students with special needs and students with disabilities are guaranteed adjustments in conducting the exams (cf. criterion 2.4).

During the discussions, the students explain that they are generally content with the examination system, but also wish for a break of at least one week between the two examination terms within one period in order to be able to better prepare themselves for the following exams.

Moreover, they also mention that there is some support for the preparation and feedback on the results of laboratory and practical work. However, the students wish for a consistent and more intensive feedback on their assignments. The peers consider these wishes to be sensible and strongly support this request.

The selection of exams and Master's theses that were presented to the peers gives them the impression of an adequate level of the tasks and demonstrates good performances of the students. They are overall satisfied with the general quality of the samples. The peers

conclude that the criteria regarding the examinations system, concept, and organization are fulfilled and that the examinations are suitable to verify whether the intended learning outcomes are achieved.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 3:

Since the University of Ljubljana does not address this in its statement, the peers stand by their previous impression.

4. Resources

Criterion 4.1 Staff

Evidence:

- Self-Assessment Report
- Staff Handbook
- Samples of lecturer evaluation by students
- List of assistants, lecturers, associate professors, professors
- Study plans of the degree programmes
- Module descriptions
- Websites
- Discussions during the audit

Preliminary assessment and analysis of the peers:

As shown in one of the charts in the SAR, the teaching staff of the Faculty of Civil and Geodetic Engineering is composed of 18 full professors, 15 associate professors, 23 assistant professors, 2 senior lecturers, 32 assistants with a PhD and 6 assistants with a Master's degree. Apart from the teaching staff of altogether 96 persons with full-time employment, 22 young researchers and 41 other employees (technical and administrative staff) work at the faculty. Since there are approximately 1.230 students enrolled in the study programmes of the faculty, the ratio between teaching staff and students is approximately 1 to 13.

For appointment procedures, the faculty relies on university-wide rules of appointment in combination with additional rules of the faculty; both have been published on the university's website.

During the online visit, the peers learn that the faculty uses the term “habilitation” in a manner that differs from its meaning in Germany. For the faculty, it is linked with the promotion from the rank of an assistant professor to the higher categories of professors by proving one’s quality of education and research. Every five years, the faculty decides who has achieved the status of “habilitation” by the number of courses taught, research activities, publication and other supporting activities. The main difference of tasks and responsibilities based on academic staff position is related to the proportion of teaching and research activities. The higher the academic staff position is, the greater is the proportion of research activities, but the smaller is the proportion of teaching activities.

This process is of particular importance for the younger teaching staff members who want to advance in their career. The academic staff is involved in a number of research projects funded by grants from the Slovenian government, the university itself or other research funds. This results in a considerable number of publications. If the respective grants allow it, students are involved in these projects, mostly through graduate theses.
The peers ask the programme coordinators about the planned, future development of the teaching staff. They learn that young researchers are particularly hard to attract, because the salaries at the university are only half of those in the industry. Students confirm this by stating that they more likely are going to seek a job in the industry and perhaps transfer back to university with an advanced career. The peers consider this as an obstacle for the transition process in which a number of professors who have reached the retirement age are replaced by younger teaching staff members that, however, can only be dealt with on a political level beyond the responsibilities of the university. Despite such minor problems, the majority of the teaching staff seems to be content with the working conditions at the faculty. The students also express their satisfaction with the teaching staff.

In summary, the peers consider the composition, scientific orientation and qualification of the teaching staff suitable for sustaining the degree programmes. From their point of view, the quantity of the staff ensures a good ratio between teaching personnel and students.

Criterion 4.2 Staff development

Evidence:

- Self-Assessment Report
- Staff handbook
- Discussions during the audit
- Websites

Preliminary assessment and analysis of the peers:
In the Self-Assessment Report, the faculty explains that its mission and vision define educational goals for the development and advancement of teaching staff. Consequently, the faculty offers the teaching staff regular formal and informal training in postgraduate study education and pedagogic education as well as various short seminars (e.g. a use of information and communication technology seminar). The faculty is monitoring the attendance in these courses. The development of the employees in this field is guided by their supervisor, usually the head of the respective chair or laboratory.

Connected with the explanation about the "habilitation" process, the peers also learn that it is obligatory to attend seminars on pedagogical skills for making this advancement. In addition, anyone who wants to promote towards "habilitation" also needs to obtain good results in the student evaluation surveys. Another criterion that positively influences the "habilitation" process is the demonstrated international mobility of higher education teachers. Between 2017 and 2021 26 teachers, assistants and researchers participated in teaching and/or research exchanges abroad.

In summary, the peers are convinced that the faculty provides sufficient support mechanisms and opportunities for members of the teaching staff to develop their personal skills. They learn that the teachers are satisfied with the internal qualification programme at the university, their opportunities to further improve their didactic abilities and to spend some time abroad to attend conferences, workshops or seminars.

Criterion 4.3 Funds and equipment

Evidence:

- List of laboratories and equipment
- Photos and videos of the facilities
- Cooperation agreements
- Recapitulation of revenue structure and equipment purchases 2018-2020
- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:
As described in the Self-Assessment Report and illustrated in a chart, the Faculty of Civil and Geodetic Engineering is funded from three sources: governmental funding for the execution of the pedagogical activity as its basic mission, governmental and partly EU funding within public research programmes for the execution of scientific research activities, and

funding from business partners for activities in the field of commercial activity. The figures presented by the university show that the faculty's income is stable and the funding of the degree programmes is secured. The academic staff emphasise that from their point of view, the three degree programmes under review receive sufficient funding for teaching and learning activities.

In preparation of the audit, the university provides a number of videos showing the laboratories of the programmes. During the online visit, the laboratories (geotechnical lab, hydrotechnical lab, structural lab, photogrammetry lab), the computer laboratories, the lecture rooms and the library were shown in more detail. The peers notice that the lecture rooms are in a good condition and equipped with modern technology. The university under review has teaching as well as research laboratories for the three degree programmes. Overall, they notice that there are no bottlenecks due to missing equipment or a lacking infrastructure. The technical equipment for teaching the students on a Master's level as well as some advanced instruments for conducting research activities are available. The students confirm this positive impression during the discussion with the peers and state their satisfaction with the available resources.

The university has licensed Microsoft Office and other standard software. UNHAS provides the students full access to this software. Students and teaching staff are satisfied with their functionality. The faculty's library as well as the reading rooms of the faculties are well equipped overall.

In summary, the peer group judges the available funds, the technical equipment, and the infrastructure (laboratories, library, seminar rooms etc.) to comply with the requirements for adequately sustaining the degree programmes.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 4:

Since the University of Ljubljana does not address this in its statement, the peers stand by their previous impression.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Module descriptions

- Websites

Preliminary assessment and analysis of the peers:
The module handbooks for the three Master's degree programmes have been published on the university's website and are thus accessible to the students as well as to all stakeholders. The peers observe that they contain all necessary information about the persons responsible for each module, the teaching methods and workload, the credit points awarded, the intended learning outcomes, the examination requirements, the admission requirements, the forms of assessment, the applicability and details explaining how the final grade is calculated.

In addition, the peers appreciate the fact that the module descriptions are available in a bilingual version (Slovenian and English), but realise that they include some terms in Slovenian that are not translated in English. From the programme coordinators and the teaching staff they learn that the template of the module descriptions has been prepared at the university level and that the individual departments do not have the permission to make changes to this document.

Finally, the peers note that the module descriptions (e.g. of the module "Mathematics 3") do not make a significant distinction between the content that will be the focus of a module and the content that is to be repeated from previous semesters. Therefore, the peers recommend to present the module descriptions with regard to the module content in a more concise way.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Sample Diploma Supplement for each degree programme

Preliminary assessment and analysis of the peers:
The peers confirm that the students of all three degree programmes under review are awarded a Diploma and a Diploma Supplement after graduation. The Diploma consists of a Diploma Certificate and a Transcript of Records. The Diploma Supplement contains all necessary information about the degree programme. The Transcript of Records lists all courses that the graduate has completed, the achieved credit points and the grades.

Criterion 5.3 Relevant rules

Evidence:

- Self-Assessment Report
- Information booklets for all degree programmes
- All relevant regulations as published on the university's website

Preliminary assessment and analysis of the peers:
The auditors confirm that the rights and duties of both the university of Ljubljana and the students are clearly defined and binding. All rules and regulations are published on the university's website in Slovenian as well as in English and hence available to all stakeholders.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 5:

Since the University of Ljubljana does not address this in its statement, the peers stand by their previous impression.

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Self-Assessment Report
- Academic Guidelines
- Samples of surveys
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The peers learn that there is an institutional system of quality management aiming at continuously improving the degree programmes.

In the Self-Assessment Report, the faculty explains how the quality assessment for the study programmes functions as a part of the faculty's quality management system as a whole. The basic approach represents a four-stage management method, which includes planning, implementation of planned measures, monitoring and checking the adequacy of implementation, and action based on the experience gained from implementation

("PCDA"). It is embedded in a setting of quality goals, regulations and responsible bodies. As for the overall system of quality assurance, the faculty has established "Regulations for quality assessment and assurance" and a Committee for Quality Assurance and Development that monitors general quality-related matters like the self-evaluation of the faculty. The self-evaluation is conducted once a year in preparation of a quality report that is included in the annual business report of the faculty. The students take part in the self-evaluation directly through the student evaluation survey or indirectly through their representatives in the relevant bodies – the Committee for Quality Assurance and the Committees for 1st and 2nd Cycle Studies. Other stakeholders like industrial partners have occasionally been involved by surveys or informal meetings.

The faculty reports that numerous measures have been implemented in recent years as a result of quality assessment and development, e.g. introductory seminars to improve the transition rates between study years, central monitoring of students' presence and fulfilled obligations, replacement of outdated study literature etc.

The student evaluation survey has been developed by the university administration and is also statistically evaluated on the university level. Two parts of the survey deal with the performance of the teacher and the features of the course. In the first evaluation, the students are asked to give their opinion on the teacher and the course before the exam. In the second evaluation after the exam, they have the possibility to judge to which extent they acquired the competences listed in the course descriptions and whether the exam was conducted appropriately. The second survey form also includes a question whether the workload was adequate. The third part of the survey deals with general aspects of the study process like the provision of information, international mobility, counselling, etc. A fourth part is about mandatory placement in those study programmes that include periods of practical training outside the university. In the Faculty of Civil and Geodetic Engineering, the students use the information system Moodle to fill in all questionnaires related to the assessment.

The results of the survey are discussed in the Committee for Quality Assurance and Development with student participation. According to a Committee member, an overwhelming majority of the lecturers receive positive evaluations. However, if a lecturer has a particularly low score, he or she will be invited to a talk with the Dean. Furthermore, a member of the Committee will attend his or her lectures and try to give advice how to improve. As the peers find out in the discussion with the lecturers, some of the teachers even organise their own surveys to get more elaborated and helpful comments than from the standardised survey.

To promote Civil, Environmental and Geodetic Engineering studies in general and to make the younger generation curious for engineering topics, the faculty organises events like summer schools and presents itself on social media channels like TikTok and Instagram and together with the student council the so-called speed dates.

The peers are impressed by the elaborated quality management system developed by the faculty that covers both the quality assurance for the study programmes and the quality assurance for the faculty as a whole including all services supporting the educational objectives. They confirm that responsibilities and mechanisms are defined and binding, the outcomes and measures are made known to anyone involved, and that the students participate in the quality assurance process not only by surveys but also by representation in the relevant bodies.

However, apart from the students, other stakeholders like the industrial partners are involved in the quality assurance process mainly through informal meetings and personal contacts with the faculty's professors. The peers believe that the employers' opinions on the graduates' education are crucial, because they provide evidence of the qualification's value as well as the appropriateness of the programme aims and the programme outcomes to the educational needs of the labour market. Therefore, the peers recommend to enhance the cooperation with the industry, e.g. by institutionalizing a regular and formal communication.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 6:

Since the University of Ljubljana does not address this in its statement, the peers stand by their previous impression.

D Additional Documents

Before preparing their final assessment, the panel ask that the following missing or unclear information be provided together with the comment of the Higher Education Institution on the previous chapters of this report:

For the Master's degree programme Civil Engineering, BIM A+ division:

D 1. Information about the admission requirements and the reasons for the eligibility to be a division

For all Master's degree programmes

D 2. Information about non-technical, societal implications of engineering work

E Comment of the Higher Education Institution (16.05.2022)

The institution provided a detailed statement regarding the additional information about the admission requirements and the reasons for the eligibility to be a division for the Master's degree programme Civil Engineering (BIM A+ division) as well as the additional information about non-technical, societal implications of engineering work for all Master's degree programmes under review.

F Summary: Peer recommendations (20.05.2022)

Taking into account the additional information and the comments given by the University of Ljubljana, the peers summarize their analysis and **final assessment** for the award of the seals as follows:

Degree Programme	ASIIN-seal	Maximum duration of accreditaiton	Subject-specific label
Ma Civil Engineering	Without requirements	30.09.2029	EUR-ACE (Depending on the decision of the ENAEE Administrative Council)
Ma Water Science and Environmental Engineering	Without requirements	30.09.2029	EUR-ACE (Depending on the decision of the ENAEE Administrative Council)
Ma Geodesy and Geoinformatics	Without requirements	30.09.2029	EUR-ACE (Depending on the decision of the ENAEE Administrative Council)

Recommendations

For all degree programmes

E 1. (ASIIN 6) It is recommended to enhance the cooperation with the industry, e.g. by institutionalizing a regular and formal communication.

E 2. (ASIIN 1.3) It is recommended to strengthen the soft skills of the students, in particular their communication, presentation and project management skills.

E 3. (ASIIN 1.3) It is recommended to add more IT-related modules to the programmes.

E 4. (ASIIN 5.1) It is recommended to present the module descriptions with regard to the module content in a more concise way.

For the Civil Engineering and Geodesy and Geoinformatics degree programmes

E 5. (ASIIN 2.2) It is recommended to regularly check that the credits awarded for the Master's thesis correspond with the actual workload of the students.

G Comment of the Technical Committee 03 – Civil Engineering, Geodesy and Architecture (09.06.2022)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the accrediting procedure and follows the assessment of the peers without any changes.

Assessment and analysis for the award of the EUR-ACE® Label:

The Technical Committee deems that the intended learning outcomes of the degree programmes do comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committee 03 – Civil Engineering, Geodesy and Architecture.

The TC 03 – Civil Engineering, Geodesy and Architecture recommends the award of the seals as follows:

Degree Programme	**ASIIN-seal**	**Maximum duration of accreditaiton**	**Subject-specific label**
Ma Civil Engineering	Without requirements	30.09.2029	EUR-ACE (Depending on the decision of the ENAEE Administrative Council)
Ma Water Science and Environmental Engineering	Without requirements	30.09.2029	EUR-ACE (Depending on the decision of the ENAEE Administrative Council)
Ma Geodesy and Geoinformatics	Without requirements	30.09.2029	EUR-ACE (Depending on the decision of the ENAEE Administrative Council)

Recommendations

For all degree programmes

E 5. (ASIIN 6) It is recommended to enhance the cooperation with the industry, e.g. by institutionalizing a regular and formal communication.

E 6. (ASIIN 1.3) It is recommended to strengthen the soft skills of the students, in particular their communication, presentation and project management skills.

E 7. (ASIIN 1.3) It is recommended to add more IT-related modules to the programmes.

E 8. (ASIIN 5.1) It is recommended to present the module descriptions with regard to the module content in a more concise way.

For the Civil Engineering and Geodesy and Geoinformatics degree programmes

E 5. (ASIIN 2.2) It is recommended to regularly check that the credits awarded for the Master's thesis correspond with the actual workload of the students.

H Decision of the Accreditation Commission (24.06.2022)

Assessment and analysis for the award of the subject-specific ASIIN seal:

The Accreditation Commission discusses the accrediting procedure and follows the assessment of the peers and the Technical Committee without any changes.

Assessment and analysis for the award of the EUR-ACE® Label:

The Accreditation Commission deems that the intended learning outcomes of the degree programmes do comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committee 03 – Civil Engineering, Geodesy and Architecture.

The Accreditation Commission decides to award the following seals:

Degree Programme	**ASIIN Seal**	**Maximum duration of ac creditation**
Ma Civil Engineering	Without requirements	30.09.2029
Ma Water Science and Environmental Engineering	Without requirements	30.09.2029
Ma Geodesy and Geoinformatics	Without requirements	30.09.2029

The Accreditation Commission recommends the award of the seals as follows:

Degree Programme	EUR-ACE Label	Maximum duration of ac creditation
Ma Civil Engineering	Without requirements	Depending on the decision of the ENAEE Administrative Council
Ma Water Science and Environmental Engineering	Without requirements	Depending on the decision of the ENAEE Administrative Council
Ma Geodesy and Geoinformatics	Without requirements	Depending on the decision of the ENAEE Administrative Council

Recommendations

For all degree programmes

E 1. (ASIIN 6) It is recommended to enhance the cooperation with the industry, e.g. by institutionalizing a regular and formal communication.

E 2. (ASIIN 1.3) It is recommended to strengthen the soft skills of the students, in particular their communication, presentation and project management skills.

E 3. (ASIIN 1.3) It is recommended to add more IT-related modules to the programmes.

E 4. (ASIIN 5.1) It is recommended to present the module descriptions with regard to the module content in a more concise way.

For the Civil Engineering and Geodesy and Geoinformatics degree programmes

E 5. (ASIIN 2.2) It is recommended to regularly check that the credits awarded for the Master's thesis correspond with the actual workload of the students.

Appendix: Programme Learning Outcomes and Curricula

According to the Self-Assessment Report and the Information booklet the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master's degree programme Civil Engineering:

The basic goal of the 2nd cycle master study programme Civil Engineering is to educate experts with in-depth and specific knowledge and skills from the basic areas of civil engineering and considering the chosen orientation and elective courses also with special in-depth knowledge from the individual area of civil engineering or the areas related to it.
Within the study, the student will learn about the traditional principles upgraded by the latest findings. The contents will be delivered in a contemporary way with modern technology. Students will also learn about all specifics in Slovenia and Europe resulting from special historic, socio- economical and geographic characteristics. With group work, project work and problem-oriented tasks they will get accustomed to group work, public appearance and managing customers as well as get actively involved in research. All the acquired theoretic knowledge will be tested to the largest possible extent with appropriate practical work and with solving demanding theoretic or professionally oriented problems and projects, which will facilitate them the inclusion in practical work after the study and to understand the issues related to civil engineering.
Students acquire the necessary in-depth and specific knowledge from the basic natural sciences and computer/information courses, the knowledge from the basic courses related to civil engineering as well as specific knowledge from professional civil engineering courses. Within individual orientations and elective courses students can choose specialisation and prepare for further study within the programmes of the third cycle. The goal of the programme is to ensure international comparability, mobility and progression, and the graduate can continue study in Europe and get a job within the European Union. The programme is harmonised with the minimum requirements of the FEANI Association, and thus also with the accreditation of the programme for the title Euro-eng. The goal is also to increase the progression of students and to provide better quality by introducing regular study, with the development of general student and teacher tutorship as well as tutorship for specific courses. Student can test the acquired knowledge in practice within two-weak practical training in construction and similar companies that also represent the target employment areas. The programme designed in this way results in a graduate with in-depth theoretical and expert knowledge who can find job in construction companies or individually perform the most demanding expert and development tasks from the area of civil engineering in Slovenia and in Europe.

General competences of the graduate of 2nd cycle master study of Civil Engineering are:

- good general information and knowledge about academic areas and scientific methods of work,
- development of abilities to setup, research, understand and creatively solve problems, principles and theories,
- critical reading and understanding of texts, independent search for knowledge and sources,
- development of the ability of critical, analytical and synthetic thinking,
- qualification for the transfer and use of theoretic knowledge into practice and solving of expert and working problems as well as interdisciplinary connections,
- development of professional and ethical responsibility,
- development of scientific literacy, public appearance and communication with customers, delivering and presenting of knowledge and results,
- possibility of using foreign expert language in written and oral communication, communication in international and national scientific circles,
- possibility of using information-communication technology,
- consideration of safety, functional, economical, environmental and ecological aspects at work,
- development of moral-ethical standards (integrity to the work with customers, unbiased advice, independence and expertise according to valid legislation), creating objective view to the environment and society.

With the 2nd cycle master study programme Civil Engineering, the graduate acquires mainly the following **course-specific competences**:

- basic and specific expert knowledge from the area of civil engineering, mainly from the areas of design, organisation, management and execution of construction works and construction manufacturing, construction informatics, ecology, spatial planning and spatial policy,
- independent comprehensive design of demanding structures,
- independent project management in the area of civil engineering,
- understanding interaction of technical and environmental issues with the ability to conceptualise and design environment friendly structures,
- performing demanding tasks from the area of civil engineering independently and within work groups for the activities described in the first indent,
- organisation, management and performance of development activity in the area of civil engineering,

- managing the basic knowledge from the area of civil engineering (natural sciences, mathematics, informatics, mechanics, materials), ability to connect knowledge from different areas and ability for the application of the acquired knowledge,
- use of knowledge in specialised areas of civil engineering (hydraulic engineering, building structures, municipal engineering, organisation – informatics and traffic engineering),
- understanding the general structure of the basic discipline and interconnection of its sub-disciplines,
- use of information-communication technology and systems, most frequently used in practice in the area of civil engineering,
- managing construction and similar companies and offices.

The following **curriculum** is presented:

SYLLABUS OF STUDY PROGRAMME WITH FORESEEN COURSE COORDINATORS

Geotechnics – Hydrotechnics (division)

1st year, mandatory

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1617	Mathematics 3	Gašper Jaklič	45	0	30	0	0	75	150	5	Winter	no
2.	1453	Numerical Methods	Boštjan Brank	30	0	0	30	0	60	120	4	Winter	no
3.	1488	Geotechnics of Infrastructural Facilities	Janko Logar	30	0	15	15	0	60	120	4	Winter	no
4.	1487	Hydraulic Modelling	Franci Steinman, Matjaž Četina	45	15	0	45	0	105	210	7	Winter	no
5.	1587	Hydrological Modelling	Mitja Brilly, Mojca Šraj	30	0	0	60	0	90	180	6	Winter	no
6.	1533	Elective course 1		30	0	30	0	0	60	120	4	Winter	yes
7.	1491	Seismic Engineering	Matjaž Dolšek	45	0	0	30	0	75	150	5	Summer	no
8.	1529	Modelling of Geotechnical Structures	Boštjan Pulko, Janko Logar	45	0	15	30	0	90	180	6	Summer	no
9.	1559	Numerical Modelling of Solids	Jože Korelc	45	0	0	45	0	90	180	6	Summer	no
10.	1458	Design of Building Structures	Drago Saje	30	0	0	30	0	60	120	4	Summer	no
11.	1618	Theory of Probability and Statistics	Marjeta Kramar Fijavž	30	0	30	0	0	60	120	4	Summer	no
12.	1273	Elective course 2		45	0	30	0	0	75	150	5	Summer	yes
		Total		450	15	150	285	0	900	1800	60		

2nd year, mandatory

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1496	Project Management	Jana Šelih	30	0	0	30	0	60	120	4	Winter	no
2.	1651	River Engineering	Matjaž Mikoš	60	30	15	0	15	120	240	8	Winter	no
3.	1517	Hydraulic Structures	Andrej Kryžanowski	60	0	60	0	0	120	240	8	Winter	no
4.	1670	Experimental Methods in Geotechnical Engineering	Janko Logar, Matej Maček	45	10	0	30	5	90	180	6	Winter	no
5.	1533	Elective course 3		30	0	30	0	0	60	120	4	Winter	yes
6.	1468	Practical training	Andreja Istenič Starčič	6	0	0	0	80	34	120	4	Summer, Winter	no
7.	1671	Torrent	Matjaž Mikoš	45	0	30	0	15	90	180	6	Summer	no
8.	1752	Slope Stabilisation	Matej Maček, Matjaž Mikoš	20	5	0	30	5	60	120	4	Summer	no
9.	1626	Rock Mechanics and Underground Structures	Janko Logar, Vojkan Jovičić	45	0	0	45	0	90	180	6	Summer	yes
10.	1481	Master thesis		0	0	0	0	150	150	300	10	Summer	no
		Total		341	45	135	135	270	874	1800	60		

Elective professional courses from Geotechnics - Hydrotechnics

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1519	Hydraulic Machines and Devices	Franc Steinman	30	0	0	30	0	60	120	4	Summer, Winter	yes
2.	1550	Hydroelectric Power	Andrej Kryžanowski	30	0	30	0	0	60	120	4	Summer, Winter	yes
3.	1602	Numerical Methods in Fluid Dynamics	Matjaž Četina	45	0	0	30	0	75	150	5	Summer, Winter	yes
4.	1329	Environmental Geotechnics	Matej Maček	30	0	30	0	15	75	150	5	Summer, Winter	yes
		Total		135	0	60	60	15	270	540	18		

Structural engineering (division)

1st year, mandatory

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1617	Mathematics 3	Gašper Jaklič	45	0	30	0	0	75	150	5	Winter	no
2.	1453	Numerical Methods	Boštjan Brank	30	0	0	30	0	60	120	4	Winter	no
3.	1465	Building Physics	Zvonko Jagličić	30	0	15	0	0	45	90	3	Winter	no
4.	1463	Non-linear Mechanics	Igor Planinc	45	0	30	15	0	90	180	6	Winter	no
5.	1464	Structural Analysis	Tatjana Isaković	30	15	0	30	0	75	150	5	Winter	no
6.	1623	Conception of Building Structures	Matija Gams	30	15	0	0	0	45	90	3	Winter	no
7.	1533	Elective course 1		30	0	15	15	0	60	120	4	Winter	yes
8.	1466	Repair and Testing of Structures	Vlatko Bosiljkov	30	15	0	30	0	75	150	5	Summer	no
9.	1489	Non-linear Analysis of Structures	Jože Korelc	45	0	0	30	0	75	150	5	Summer	no
10.	1461	Computer-Integrated Construction	Žiga Turk	45	0	15	15	0	75	150	5	Summer	no
11.	1618	Theory of Probability and Statistics	Marjeta Kramar Fijavž	30	0	30	0	0	60	120	4	Summer	no
12.	1462	Geotechnics of Buildings	Boštjan Pulko	60	0	15	30	0	105	210	7	Summer	no
13.	1468	Practical Training	Andreja Istenič Starčič	6	0	0	0	80	34	120	4	Summer	no
		Total		456	45	150	195	80	874	1800	60		

2nd year, mandatory

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1496	Project Management	Jana Šelih	30	0	0	30	0	60	120	4	Winter	no
2.	1497	Structural Dynamics and Earthquake Engineering	Matjaž Dolšek	60	0	0	45	0	105	210	7	Winter	no
3.	1498	Selected Chapters from Concrete and Masonry Structures	Drago Saje, Jože Lopatič, Sebastjan Bratina	45	0	0	45	0	90	180	6	Winter	no
4.	1499	Steel Structures II	Primož Može	45	0	0	30	0	75	150	5	Winter	no
5.	1500	Probabilistic Methods and Reliability of Structures	Goran Turk	30	0	0	30	0	60	120	4	Winter	no
6.	1272	Elective course 2		30	0	15	15	0	60	120	4	Winter	yes
7.	1481	Master thesis		0	0	0	0	150	150	300	10	Summer	no
		Total		240	0	15	195	150	600	1200	40		

Elective professional courses from Structural engineering

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1559	Numerical Modelling of Solids	Jože Korelc	45	0	0	45	0	90	180	6	Summer	yes
2.	1560	Coupled Problems	Dejan Zupan, Goran Turk	30	0	0	30	0	60	120	4	Summer	yes
3.	1561	Technology of Material with Mineral Binders	Violeta Bokan-Bosiljkov	45	0	0	45	0	90	180	6	Summer	yes
4.	1562	Advanced Construction and Building Materials	Violeta Bokan-Bosiljkov	15	15	0	30	0	60	120	4	Summer	yes
5.	1552	Fire Safety	Tomaž Hozjan	45	0	0	45	0	90	180	6	Summer	yes
6.	1537	Prestressed Concrete	Jože Lopatič, Sebastjan Bratina	45	0	0	45	0	90	180	6	Summer	yes
7.	1536	Composite Structures	Primož Može	30	0	0	30	0	60	120	4	Summer	yes
8.	1553	Engineering Timber Structures	Jože Lopatič	30	0	0	30	0	60	120	4	Summer	yes
9.	1549	Shell Structures	Boštjan Brank	30	0	0	30	0	60	120	4	Summer	yes
10.	1626	Rock Mechanics and Underground Structures	Janko Logar, Vojkan Jovičić	45	0	0	45	0	90	180	6	Summer	yes
11.	1529	Modelling of Geotechnical Structures	Boštjan Pulko, Janko Logar	45	15	0	30	0	90	180	6	Summer	yes
12.	1740	Nonlinear Seismic Analysis of Reinforced Concrete Bridges	Tatjana Isaković	30	60	0	0	0	90	180	6	Summer	yes
13.	1800	Masonry Structures	Matija Gams, Vlatko Bosiljkov	30	0	30	0	0	60	120	4	Winter	yes
		Total		465	90	30	405	0	990	1980	66		

Interdisciplinary project study of computer-aided design of structures (module)

2nd year

				Contact hours								
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1625	Interdisciplinary Seminar on Computer Aided Design of Structures	Matija Gams, Tatjana Isaković	0	90	0	60	0	150	300	10	Summer	yes
2.	1523	Information and Communication Technology for Project Work	Tomo Cerovšek, Žiga Turk	20	10	30	0	0	60	120	4	Summer	yes
3.	1531	Elective course SE		45	0	45	0	0	90	180	6	Summer	yes
		Total		65	100	75	60	0	300	600	20		

Engineering modelling (module)

2nd year

				Contact hours								
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1559	Numerical Modelling of Solids	Jože Korelc	45	0	0	45	0	90	180	6	Summer	yes
2.	1560	Coupled Problems	Dejan Zupan, Goran Turk	30	0	0	30	0	60	120	4	Summer	yes
3.	1762	Numerical Modelling of Geotechnical Structures	Boštjan Pulko, Janko Logar	45	0	0	30	0	75	150	5	Summer	yes
4.	1602	Numerical Methods in Fluid Dynamics	Matjaž Četina	45	0	0	30	0	75	150	5	Summer, Winter	yes
		Total		165	0	0	135	0	300	600	20		

Steel structures (module)

2nd year

				Contact hours								
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1526	Design of Steel Structures - Seminar	Primož Može	0	90	0	60	0	150	300	10	Summer	yes
2.	1574	Elective course SE 1		45	0	0	45	0	90	180	6	Summer	yes
3.	1533	Elective course SE 2		30	0	0	30	0	60	120	4	Summer	yes
		Total		75	90	0	135	0	300	600	20		

Concrete and masonry structures (module)

2nd year

				Contact hours								
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1525	Design of Concrete and Masonry Structures - Seminar	Drago Saje, Jože Lopatič, Sebastjan Bratina	0	90	0	60	0	150	300	10	Summer	yes
2.	1531	Elective course SE 1		45	0	0	45	0	90	180	6	Summer	yes
3.	1533	Elective course SE 2		30	0	0	30	0	60	120	4	Summer	yes
		Total		75	90	0	135	0	300	600	20		

Building information modelling - BIM A+ (division)

1st year, mandatory

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1617	Mathematics 3	Gašper Jaklič	45	0	30	0	0	75	150	5	Winter	no
2.	1453	Numerical Methods	Boštjan Brank	30	0	0	30	0	60	120	4	Winter	no
3.	1619	Geotechnics of Infrastructural Facilities	Janko Logar	45	30	45	0	0	120	240	8	Winter	no
4.	1455	Quality Control and Quality Assurance	Jana Šelih	30	0	30	0	0	60	120	4	Winter	no
5.	1456	Operative Planning and Monitoring of Projects	Jana Šelih	45	0	15	15	0	75	150	5	Winter	no
6.	1533	Elective course 1		30	0	30	0	0	60	120	4	Winter	yes
7.	1457	Real Estate Management	Maruška Šubic-Kovač	45	0	30	0	0	75	150	5	Summer	no
8.	1458	Design of Building Structures	Drago Saje	30	0	0	30	0	60	120	4	Summer	no
9.	1554	Intelligent Transport Systems	Tomaž Maher	30	0	15	0	15	60	120	4	Summer	no
10.	1485	Optimisation Methods in Civil Engineering	Marijan Žura	30	0	15	15	0	60	120	4	Summer	no
11.	1618	Theory of Probability and Statistics	Marjeta Kramar Fijavž	30	0	30	0	0	60	120	4	Summer	no
12.	1533	Elective course 2		30	0	30	0	0	60	120	4	Summer	yes
13.	1273	Elective course 3		45	0	30	0	0	75	150	5	Summer	yes
		Total		465	30	300	90	15	900	1800	60		

2nd year, mandatory

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1786	Management of information and collaboration in BIM	Tomo Cerovšek	30	15	30	0	0	75	150	5	Winter	no
2.	1787	Modelling in Architecture and Engineering	Žiga Turk	30	15	30	0	0	75	150	5	Winter	no
3.	1788	Parametric modelling in BIM	Matevž Dolenc, Vlado Stankovski	30	15	30	0	0	75	150	5	Winter	no
4.	1789	Advanced BIM data-systems and interoperability	Tomo Cerovšek, Žiga Turk	30	15	30	0	0	75	150	5	Winter	no
5.	1790	4D, 5D, 6D Modelling and Applications	Aleksander Srdić, Marijan Žura	30	15	30	0	0	75	150	5	Winter	no
6.	1791	BIM based rehabilitation and sustainability analysis	Mitja Košir, Vlatko Bosiljkov	30	15	30	0	0	75	150	5	Winter	no
7.	1792	Master thesis		0	0	0	0	450	450	900	30	Summer	no
		Total		180	90	180	0	450	900	1800	60		

Infrastructural engineering (division)

1st year, mandatory

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1617	Mathematics 3	Gašper Jaklič	45	0	30	0	0	75	150	5	Winter	no
2.	1453	Numerical Methods	Boštjan Brank	30	0	0	30	0	60	120	4	Winter	no
3.	1619	Geotechnics of Infrastructural Facilities	Janko Logar	45	30	45	0	0	120	240	8	Winter	no
4.	1455	Quality Control and Quality Assurance	Jana Šelih	30	0	30	0	0	60	120	4	Winter	no
5.	1456	Operative Planning and Monitoring of Projects	Jana Šelih	45	0	15	15	0	75	150	5	Winter	no
6.	1533	Elective course 1		30	0	30	0	0	60	120	4	Winter	yes
7.	1457	Real Estate Management	Maruška Šubic-Kovač	45	0	30	0	0	75	150	5	Summer	no
8.	1458	Design of Building Structures	Drago Saje	30	0	0	30	0	60	120	4	Summer	no
9.	1554	Intelligent Transport Systems	Tomaž Maher	30	0	15	0	15	60	120	4	Summer	no
10.	1485	Optimisation Methods in Civil Engineering	Marijan Žura	30	0	15	15	0	60	120	4	Summer	no
11.	1461	Computer-Integrated Construction	Žiga Turk	45	0	15	15	0	75	150	5	Summer	no
12.	1618	Theory of Probability and Statistics	Marjeta Kramar Fijavž	30	0	30	0	0	60	120	4	Summer	no
13.	1468	Practical Training	Andreja Istenič Starčič	6	0	0	0	80	34	120	4	Summer	no
		Total		441	30	255	105	95	874	1800	60		

2nd year, mandatory

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1496	Project Management	Jana Šelih	30	0	0	30	0	60	120	4	Winter	no
2.	1474	Road Construction Machinery and Technology	Marijan Žura, Matej Maček	60	0	15	30	0	105	210	7	Winter	no
3.	1475	Urban Roads	Peter Lipar	45	0	15	15	0	75	150	5	Winter	no
4.	1479	Information Modelling of Buildings	Tomo Cerovšek	30	15	15	30	0	90	180	6	Winter	no
5.	1533	Elective course 2		30	0	30	0	0	60	120	4	Winter	yes
6.	1533	Elective course 3		30	0	30	0	0	60	120	4	Winter	yes
7.	1481	Master thesis		0	0	0	0	150	150	300	10	Summer	no
		Total		225	15	105	105	150	600	1200	40		

Elective professional courses from division Infrastructural engineering

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1494	Traffic Flow Theory and Capacity Analysis	Tomaž Maher	45	0	0	15	0	60	120	4	Summer	yes
2.	1557	Construction planning and road maintenance	Marijan Žura	30	0	15	15	0	60	120	4	Summer	yes
3.	1482	Property Law	Ana Vlahek	30	0	30	0	0	60	120	4	Summer	yes
4.	1555	Real Estate Valuation	Maruška Šubic-Kovač	30	0	30	0	0	60	120	4	Summer	yes
5.	1493	Traffic Ecology	Tomaž Maher	30	0	15	15	0	60	120	4	Summer	yes
6.	1397	Urban Planning	Alma Zavodnik Lamovšek	30	0	30	0	0	60	120	4	Summer	yes
7.	1473	Design and Construction of Steel Buildings	Primož Može	30	15	15	0	0	60	120	4	Summer	yes
8.	1775	Engineering works and water Protection	Mario Krzyk, Nataša Atanasova, Sabina Kolbl Repinc	15	15	0	30	0	60	120	4	Summer, Winter	yes
		Total		240	30	135	75	0	480	960	32		

Municipal engineering (module)

2nd year

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1243	Municipal and Housing Economics	Maruška Šubic-Kovač	30	15	45	0	0	90	180	6	Summer	yes
2.	1627	Water supply and sewage systems	Franc Steinman, Mario Krzyk	60	30	0	60	0	150	300	10	Summer	yes
3.	1564	Project from Municipal Infrastructure	Maruška Šubic-Kovač	30	0	30	0	0	60	120	4	Summer	yes
		Total		120	45	75	60	0	300	600	20		

Organisation - building informatics (module)

2nd year

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1476	Process Modelling and Information Systems	Tomo Cerovšek	30	0	15	15	0	60	120	4	Summer	yes
2.	1477	Selected Chapters of Building Informatics	Žiga Turk	45	0	0	45	0	90	180	6	Summer	yes
3.	1459	Management in Civil Engineering	Jana Šelih	30	0	30	0	0	60	120	4	Summer	yes
4.	1628	Organisational Planning of Construction	Jana Šelih	30	30	15	15	0	90	180	6	Summer	yes
		Total		135	30	60	75	0	300	600	20		

Project (module)

2nd year

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1569	Construction Informatics Project	Tomo Cerovšek	0	60	0	0	0	60	120	4	Summer	yes
2.	1570	Project from Traffic Infrastructure	Marijan Žura	0	120	0	0	0	120	240	8	Summer	yes
3.	1571	Project from Municipal Economics	Maruška Šubic-Kovač	0	60	0	0	0	60	120	4	Summer	yes
4.	1631	Project from Construction Organisation and Contracting	Jana Šelih	30	30	0	0	0	60	120	4	Summer	yes
		Total		30	270	0	0	0	300	600	20		

Traffic engineering (module)

2nd year

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1577	Road Design	Peter Lipar	30	0	15	0	0	45	90	3	Summer	yes
2.	1566	Road Seminar	Peter Lipar	0	60	0	45	0	105	210	7	Summer	yes
3.	1567	Railway Design	Marijan Žura, Peter Lipar	30	0	15	0	0	45	90	3	Summer	yes
4.	1568	Railway Seminar	Tomaž Maher	0	45	0	60	0	105	210	7	Summer	yes
		Total		60	105	30	105	0	300	600	20		

According to the Self-Assessment Report and the Information booklet the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master's degree programme Water Science and Environmental Engineering:

Graduates of the master study programme Water Science and Environmental Engineering will acquire fundamental knowledge of natural sciences, as well as applicable expert (civil engineering) skills for solving demanding administrative procedures and designing, planning, implementing and maintaining more demanding (according to the Construction Act)

civil engineering structures (according to the uniform classification of types of constructions CC-SI) in the areas of water management, municipal and environmental engineering. Besides gaining general theoretic knowledge about hydraulics and geotechnics, students will also learn the modern principles of water science and the latest achievements of the profession in individual areas of environmental and civil engineering, presented in a modern way using state-of-the-art technology. By working in groups, involvement in project work, field work and by solving problem tasks, students will acquire essential teamwork and public speaking skills and will be able to coherently present scientific and engineering ideas to expert and lay public. They will become acquainted with project management in the fields of environmental civil engineering and water management, and especially designing specialised construction types and measures. The students will have the opportunity to test all the acquired expert knowledge to the largest possible extent within practical exercises and real-life case studies, which will help them, together with practical training as part of the study, to get involved in practical work after the finished master's study. Another goal of the programme is also to provide the students with sufficient basic engineering knowledge to allow the development of abstract thinking and successful continuation of the study at different third cycle (i.e. doctoral) programmes (e.g. civil engineering or environment protection).

General competences acquired by the graduates of the master study programme Water Science and Environmental Engineering are:

- general overview of academic areas,
- development of abilities to frame, comprehend and creatively solve problems, principles and theories,
- high level of creativity and innovation as a result of the interdisciplinary nature of the study,
- critical reading and understanding of relevant literature, independent knowledge gathering and literature search
- development of the abilities of critical, analytical and synthetic thinking,
- competences for transferring and applying theoretical knowledge into practice and solving demanding professional and practical problems,
- development of professional and ethical responsibilities,
- development of verbal and numerical literacy, public speaking skills and competences to communicate with clients as well as the lay and professional public,
- ability to use a foreign language in professional written and oral communication,
- ability to use information and communication technologies, also in an international setting,
- ability to establish local and international interdisciplinary connections,

- compliance with safety, functional, economic and environmental aspects of work,
- development of high ethical and moral standards (maintaining integrity when working with clients, providing unbiased advice, sustaining independence and expertise according to valid legislation),
- developing an objective view of the environment and society,
- accepting responsibilities to customers and employers as well as the society as a whole,
- ability to design and implement demanding constructions in compliance with quality and price standards and carry out independent technical evaluations supported by scientific analysis and synthesis, all based on the acquired in-depth knowledge of natural sciences and specialised expertise from the area of water science, environmental and environmental civil engineering,
- ability to recognise and take into account the environmental risk associated with construction and to consider the issues of environment protection in designing structures in the area of environmental civil engineering.

Course-specific competences the students acquire within the program Water Science and Environmental Engineering are mainly the following:

- understanding the role and importance of water management in modern society,
- taking part in planning, organisation, management and implementation of the construction of demanding civil engineering structures in the area of water management,
- designing individual elements as well as entire more demanding civil engineering structures in the area of water management,
- independently and creatively performing demanding tasks from the area of environmental civil engineering, environmental engineering and water management,
- managing groups in planning, design and implementation of different interventions into the aquatic environment, including construction in endangered areas,
- involvement in the preparation of spatial planning acts,
- coordinating work between investors, designers and contractors,
- knowing the legal, institutional and administrative system essential for water management and for managing and recording water resources and endangered areas,
- after suitable practical experience, the students are qualified to oversee larger water management companies.

The following **curriculum** is presented:

SYLLABUS OF STUDY PROGRAMME WITH FORESEEN COURSE COORDINATORS

1st year, mandatory

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1325	Hydraulic modelling	Franci Steinman, Matjaž Četina	45	15	0	60	0	120	240	8	Winter	no
2.	1587	Hydrological modelling	Mojca Šraj	30	0	0	60	0	90	180	6	Winter	no
3.	1588	Drinking water supply and treatment	Franc Steinman, Nataša Atanasova	45	15	0	55	5	120	240	8	Winter	no
4.	1496	Project management	Jana Šelih	30	0	0	30	0	60	120	4	Winter	no
5.	1634	Basics of spatial sociology	Matjaž Uršič	45	0	0	0	0	45	90	3	Winter	no
6.	1651	River engineering	Matjaž Mikoš, Simon Rusjan	60	30	15	0	15	120	240	8	Summer	no
7.	1652	Drainage and irrigation	Mojca Šraj	40	0	0	45	5	90	180	6	Summer	no
8.	1673	Water protection	Mario Krzyk, Nataša Atanasova	30	15	10	5	0	60	120	4	Summer	no
9.	1595	Open sea and coastal area	Dušan Žagar	30	0	20	0	10	60	120	4	Summer	no
10.	1329	Environmental geotechnics	Matej Maček	30	0	0	30	15	75	150	5	Summer	no
11.	1323	Remote sensing in environ. civil eng.	Mojca Kosmatin Fras	30	0	0	30	0	60	120	4	Summer	no
		Total		415	75	45	315	50	900	1800	60		

2nd year, mandatory

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1574	Elective course		45	0	45	0	0	90	180	6	Winter	yes
2.		Elective module		145	30	120	55	10	360	720	24	Winter	yes
3.	1654	Master thesis/work		0	0	0	0	450	450	900	30	Summer	no
		Total		190	30	165	55	460	900	1800	60		

Elective courses

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1752	Slope stabilisation	Matjaž Mikoš, Matej Maček	35	0	15	0	10	60	120	4	Winter	yes
2.	1753	Hydraulic machines and devices	Franci Steinman, Marko Hočevar	30	0	30	0	0	60	120	4	Winter	yes
3.	1334	Water policy	Andrej Kryžanowski	30	0	30	0	0	60	120	4	Winter	yes
4.	1754	Decision support systems in water management	Primož Banovec	45	15	0	15	0	75	150	5	Winter	yes
5.	1333	Landscape management	Mojca Golobič	30	0	0	30	0	60	120	4	Winter	yes
6.	1755	Introduction to research work	Matjaž Mikoš	30	15	0	15	0	60	120	4	Winter	yes
7.	1605	Project in infrastructural systems	Maruška Šubic-Kovač	30	30	0	0	0	60	120	4	Winter	yes
8.	1768	Selected topics from mathematics III	Marjeta Kramar Fijavž	30	0	30	0	0	60	120	4	Winter	yes
9.	1730	Ecohydrology	Matjaž Mikoš, Simon Rusjan	30	10	15	0	5	60	120	4	Winter	yes
10.	1731	Geotechnics of infrastructural facilities	Janko Logar	45	0	45	0	0	90	180	6	Winter	yes
11.	1653	Practical training	Andreja Istenič Starčič, Mario Krzyk	6	0	0	0	120	54	180	6	Winter	yes
		Total		341	70	165	60	135	699	1470	49		

Elective module Hydraulic engineering

2nd year

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1517	Hydraulic structures	Andrej Kryžanowski	60	0	60	0	0	120	240	8	Winter	no
2.	1337	Water management systems	Franci Steinman	10	15	30	0	5	60	120	4	Winter	no
3.	1550	Hydroelectric power	Andrej Kryžanowski	30	0	30	0	0	60	120	4	Winter	no
4.	1590	Urban drainage and wastewater treatment	Mario Krzyk, Nataša Atanasova	45	15		55	5	120	240	8	Winter	no
		Total		145	30	120	55	10	360	720	24		

Elective module Environmental engineering

2nd year

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1590	Urban drainage and wastewater treatment	Mario Krzyk, Nataša Atanasova	45	15	0	55	5	120	240	8	Winter	no
2.	1337	Water management systems	Franci Steinman	10	15	30	0	5	60	120	4	Winter	no
3.	1340	Torrent, erosion, rockfall and avalanche control	Matjaž Mikoš	35	0	15	0	10	60	120	4	Winter	no
4.	1757	Mathematical model. of environmental processes	Matjaž Četina	45	0	0	30	0	75	150	5	Winter	no
5.	1593	Meteorology	Gregor Skok	30	0	15	0	0	45	90	3	Winter	no
		Total		165	30	60	85	20	360	720	24		

Elective module Flood risk management

2nd year

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1548	Spatial planning for flood protection	Alma Zavodnik Lamovšek, Andrej Kryžanowski	37	38	0	0	0	75	150	5	Winter	no
2.	1547	Socio-economical assessment of flood risk	Aleksander Kešeljević, Drago Kos, Matjaž Mikoš	37	38	0	0	0	75	150	5	Winter	no
3.	1340	Torrent, erosion, rockfall and avalanche control	Matjaž Mikoš	35	0	15	0	10	60	120	4	Winter	no
4.	1602	Numerical methods in fluid dynamics	Matjaž Četina	45	15	0	30	0	90	180	6	Winter	no
5.	1601	Environmental technologies	Nataša Atanasova, Tjaša Griessler Bulc, Mario Krzyk	15	15	0	30	0	60	120	4	Winter	no
		Total		169	106	15	60	10	360	720	24		

According to the Self-Assessment Report and the Information booklet the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master's degree programme Geodesy and Geoinformatics:

The basic goal of the second cycle master study programme Geodesy and Geoinformatics is to educate experts capable of analytical and synthetic thinking, creative, critical, efficient, and constructive solving of complex research and development problems and project-applied tasks in the fields of geodesy and geoinformatics. The program ensures interdisciplinary integration of the experts and at the same time it provides excellent foundation for further studies at the third cycle of any natural science and technical programmes. At the same time, it enables students to obtain a license of Responsible Surveyor by the Slovenian

Chamber of Engineers. The study programme provides students comparability of educational attainment also in an international context.

General competences acquired by the graduates of the master's study programme Geodesy and Geoinformatics are:

- generally well-informed experts, knowledge about academic areas and scientific work methods,
- critical reading and understanding of texts, independent upgrading of knowledge and search for sources,
- ability to transfer and use theoretic knowledge in practice,
- development of high professional and ethical standards and professional, environmental and social responsibility,
- development of scientific literacy, skills of public appearance and communication with clients, transfer and presentation of knowledge and results,
- ability to use domestic and foreign professional language in written and oral communication, communications in international and national scientific circles,
- ability to use and develop geo-information technology,
- capacity to manage professional processes in the surveying companies, public services or agencies in the fields of geodesy or spatial planning.

With the second cycle master's study programme Geodesy and Geoinformatics the graduate acquires mainly the following course-specific competences:

- independently solves all kinds of professional and development tasks in the fields of geodesy and geoinformation,
- understands, applies and develops modern surveying methodologies and technology and is able to upgrade it,
- plans, organizes, manages and carries out surveying tasks for the establishment, maintenance and restoration of the basic geodetic reference system,
- plans, organizes, executes or leads geodetic works:
    - in the land surveying,
    - in the construction of all types of buildings or generally in all types of infrastructural development in the physical environment,
    - in the procedures of cadastral regulation and registration of real estate, in the fields of topography and cartography,
    - in the fields of photogrammetry and remote sensing,

- at the establishment, maintenance and upgrading of geographic, cartographic and land information systems
- participates in the preparation of spatial planning documents and
- knows the legal, administrative, and economic system, important for the surveyor.

The following **curriculum** is presented:

SYLLABUS OF STUDY PROGRAMME WITH FORESEEN COURSE COORDINATORS

16. No subdivision (study programme)

1st year, mandatory

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1386	Mathematics III	Marjeta Kramar Fijavž	45	0	30	0	0	75	150	5	Winter	No
2.	1404	Geoinformatics II	Anka Lisec, Krištof Oštir	30	0	0	30	0	60	120	4	Summer	No
3.	1741	Satellite Geodesy and Navigation	Miran Kuhar, Polona Pavlovčič Prešeren	45	0	0	30	0	75	150	5	Winter	No
4.	1721	Adjustment Computation III	Bojan Stopar	30	0	0	30	0	60	120	4	Winter	No
5.	1845	Practicum from spatial planning	Alma Zavodnik Lamovšek	15	0	0	45	0	60	120	4	Winter	No
6.	1393	Geodetic Measuring Systems	Dušan Kogoj	60	0	0	60	0	120	240	8	Winter	No
7.	1722	Physical Geodesy	Miran Kuhar	30	0	0	30	0	60	120	4	Summer	No
8.	1392	Spatial Data Analysis	Krištof Oštir, Samo Drobne	30	0	0	30	0	60	120	4	Summer	No
9.	1390	Remote Sensing and Photogrammetry II	Mojca Kosmatin Fras	60	0	0	60	0	120	240	8	Summer	No
10.	1394	Multimedia Cartography	Dušan Petrovič	45	0	0	60	0	105	210	7	Summer	No
11.	1763	Elective course I		60	0	45	0	0	105	210	7	Winter	Yes
		Total		450	0	75	375	0	900	1800	60		

2nd year, mandatory

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Independent work	Total hours	ECTS	Semester	Elective
1.	1395	Engineering Surveying II	Božo Koler	45	0	0	45	0	90	180	6	Winter	No
2.	1396	Spatial Statistics	Goran Turk	30	0	30	0	0	60	120	4	Winter	No
3.	1744	Land consolidation and rearrangement	Anka Lisec	30	0	0	30	0	60	120	4	Winter	No
4.	1391	Mass Real Estate Valuation	Marjan Čeh	30	0	30	0	0	60	120	4	Winter	No
5.	1764	Elective course II		90	0	90	0	0	180	360	12	Winter	Yes
6.	1745	Project task	Bojan Stopar, Dušan Petrovič	0	0	0	0	300	300	600	20	Summer	No
7.	1746	Master thesis		0	0	0	0	150	150	300	10	Summer	No
		Total		225	0	150	75	450	900	1800	60		

Elective courses

				Contact hours									
	Code	Course title	Lecturers	Lectures	Seminar	Tutorials	Clinical tutorials	Other study forms	Individ. work	Total hours	ECTS	Semesters	Elective
1.	1256	Physical Education	prof. dr. Branko Škof	0	0	0	0	45	45	90	3	Summer, winter	Yes
2.	1402	Field Project Work	Dušan Kogoj	0	0	0	0	60	60	120	4	Summer, winter	Yes
3.	1397	Urban Planning	Gregor čok	30	0	0	30	0	60	120	4	Summer, winter	Yes
4.	1689	Geoinformatics III	Krištof Oštir	30	0	0	30	0	60	120	4	Summer, winter	Yes
5.	1781	Project Work in Cartography	Dušan Petrovič	15	15	0	30	0	60	120	4	Summer	Yes
6.	1780	Close-Range Photogrammetry	Mojca Kosmatin Fras	30	0	0	30	0	60	120	4	Summer, winter	Yes
7.	1407	Geophysics	Miran Kuhar	30	0	0	15	0	45	90	3	Summer, winter	Yes
8.	1782	Quality assurance of the geodetic survey	Aleš Marjetič, Tomaž Ambrožič	15	15	0	30	0	60	120	4	Summer, winter	Yes
9.	1783	Optimization of geodetic networks	Bojan Stopar, Polona Pavlovčič Prešeren	15	15	0	30	0	60	120	4	Summer, winter	Yes
10.	1784	Selected topics from Geodesy and Geodetic Astronomy	Bojan Stopar, Miran Kuhar, Polona Pavlovčič Prešeren	30	0	0	30	0	60	120	4	Summer, winter	Yes
		Total		180	45	0	240	105	570	1140	38		