Univerza *v Ljubljani*
Fakulteta *za gradbeništvo in geodezijo*

Presentation of the study programme

2nd cycle master study programme

WATER SCIENCE AND ENVIRONMENTAL ENGINEERING (MA)

Valid from study year 2025/2026 | Valid study programme from 20/01/2025

University of Ljubljana, Faculty of Civil and Geodetic Engineering

INFORMATION ABOUT THE STUDY PROGRAMME

1. Basic Data

Programme name	Water science and environmental engineering
Programme characteristics	
Type	Master
Cycle	second cycle
KLASIUS-SRV	Master higher education (second cycle Bologna)/Master higher education (second cycle Bologna) (17003)
ISCED	• architecture, urbanism and civil engineering (58)
KLASIUS-P	• Civil engineering (other) (5829)
KLASIUS-P-16	• Civil engineering (0732)
Frascati	• Technical sciences (2)
Level SOK	Level SOK 7
Level EOK	Level EOK 6
Level EOVK	Second cycle
Areas/modules/orientations	• No subdivision (study programme) • Hydraulic engineering (module) • Environmental engineering (module) • Flood risk management (module)
Member of University of Ljubljana	• Faculty of Civil and Geodetic Engineering, Jamova 2, 1000 Ljubljana, Slovenia
Duration (years)	2
Number of ECTS per year	60
Implementation of study	full time

2. Basic goals of the programme

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 civil and water engineering structures 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).

3. General competences

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.

4. Course-related competences

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.

5. Conditions for enrolment

The second cycle Master's degree programme in Water Science and Environmental Engineering is available to the following candidates:

(a) graduates of a first cycle study programme with at least 180 credits in the field of Civil Engineering or an equivalent programme of studies obtained in accordance with the existing regulations in the Republic of Slovenia or abroad;

(b) graduates of a first-degree study programme (at least 180 credits) in another field of study or an equivalent programme of studies completed in accordance with the existing regulations in the Republic of Slovenia or abroad, provided that the student has completed the study requirements prior to enrolment which are essential for continuing his/her studies. These requirements are determined by the Study Board of the Department of Environmental Civil Engineering of the UL FGG and range from 10 to a maximum of 60 credits.

6. Selection criteria when enrolment is restricted

In case of restricted enrolment, the following conditions shall be considered: grade obtained in the first cycle study (100%).

7. Criteria for recognising knowledge and skills acquired before enrolment in the programme

Certain knowledge and skills comparable to the content and scope of the programme *Water Science and Environmental Engineering* can be recognised by the Study Board of the Department of Environmental Civil Engineering of UL FGG. The Board makes decisions regarding the recognition of knowledge and skills acquired before enrolment based on the student's written application, enclosed certificates and other documents evidencing successfully acquired knowledge and contents, and in accordance with the Rules on the procedure and criteria for the acknowledgement of informally acquired knowledge and skills, adopted on 29 May 2007 at the 15th meeting of the UL Senate.

The recognition process considers the following:

- certificates and other documents (recognition of »non-typical certificates«, portfolios, documents about finished courses and other forms of education),
- evaluation of finished products, services, publications and other original works of the student (possibility of performing study obligations – e.g. exams, preliminary exams, etc.
  – by evaluating products, e.g. projects, made by the student before the enrolment),
- evaluation of knowledge acquired by the student with self-education or empirical learning (possibility of completing study obligations without participation at lectures, practical work, seminars),
- adequate work experience (e.g. recognition of practical training and other course units of the program that are based on practical work and experience).

Should the Study Board of the department establish that the acquired knowledge may be recognised, this shall be evaluated with the same number of credits according to ECTS as the number of credits in the subject.

8. Methods of assessment

The assessment methods are in accordance with the Statute of University of Ljubljana and listed in the Course Syllabi.

9. Conditions for progression through the programme

Students may enrol in a higher year if they complete all the obligations foreseen by the study plan amounting to at least 45 ECTS credits by the end of the study year.

Exceptionally, a student may apply for admission to a higher year if he/she has completed the compulsory subjects in accordance with the study programme and has achieved at least 40 credits in the current year, and if he/she has good reasons. The exceptional enrolment is decided by the Study Board of the Department of Environmental Civil Engineering, UL FGG.

A student who has not completed all the requirements specified in the study programme for entry to a higher year of study may repeat the year once during the period of study, provided that he/she has achieved at least 30 ECTS.

10. Transfers between study programmes

Transfer between programmes shall mean termination of education in the student's original study programme (first programme) and continuation of education in the second cycle master study programme of *Water Science and Environmental Engineering* (second programme), in which a part of the completed study requirements from the first study programme are recognised as completed.
Transfers are possible from the second cycle study programmes, and until their expiration also from the undergraduate academic study programmes adopted before June 11, 2004, where the competences of the finished studies are comparable and according to the acknowledgement criteria at least half of the obligations according to ECTS from the first study programme related to compulsory courses of the second study programme can be acknowledged. Considering the scope of acknowledged obligations from the first study programme in the Republic of Slovenia or abroad student may enrol to the same or higher year in the second study programme. Transferring students shall fulfil the conditions for the enrolment to the second study programme.

Applications of candidates for the transfer to the second cycle master study programme *Water Science and Environmental Engineering* and the scope of acknowledged obligations in the study programme will be examined individually by the Study Board of the Department of Environmental Civil Engineering. If in the procedure of acknowledging obligations for the purpose of transfer the candidate is approved at least the amount of credit points and those point that are required for the enrolment to the second year of the second cycle master study programme *Water Science and Environmental Engineering*, the candidate may enrol to the second year of the second cycle master study programme *Water Science and Environmental Engineering*.

11. Conditions for completion of the study

Students finish the study by accomplishing all the prescribed obligations totalling 120 points according to ECTS.

12. Conditions for completion of individual parts of the programme

The study is uniform.

13. Qualification, professional or academic title

- magister inženir okoljskega gradbeništva (male)
  (second cycle graduate in environmental civil engineering)
- magistrica inženirka okoljskega gradbeništva (female)
  (second cycle graduate in environmental civil engineering)

14. Qualification, professional or academic title (abbreviation)

- mag. inž. ok. grad.

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.	0035019	Hydraulic modelling	Gašper Rak, Gorazd Novak, Matjaž Četina	45	15	0	60	0	120	240	8	1. Semester	no
2.	0035020	Hydrological modelling	Mojca Šraj	30	0	0	60	0	90	180	6	1. Semester	no
3.	0035021	Drinking water supply and treatment	Nataša Atanasova	45	15	0	55	5	120	240	8	1. Semester	no
4.	0035022	Project management	Robert Klinc	30	0	0	30	0	60	120	4	1. Semester	no
5.	0035029	Basics of spatial sociology	Matjaž Uršič	45	0	0	0	0	45	90	3	1. Semester	no
6.	0035023	River engineering	Matjaž Mikoš, Simon Rusjan	60	30	15	0	15	120	240	8	2. Semester	no
7.	0035024	Drainage and irrigation	Mojca Šraj	40	0	0	45	5	90	180	6	2. Semester	no
8.	0035025	Water protection	Mario Krzyk, Nataša Atanasova	30	15	10	5	0	60	120	4	2. Semester	no
9.	0035026	Open sea and coastal area	Dušan Žagar	30	0	20	0	10	60	120	4	2. Semester	no
10.	0035027	Environmental geotechnics	Matej Maček	30	0	0	30	15	75	150	5	2. Semester	no
11.	0035028	Remote sensing in environ. civil eng.	Dejan Grigillo	30	0	0	30	0	60	120	4	2. Semester	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.	0038712	Elective course		45	0	45	0	0	90	180	6	1. Semester	yes
2.	0639886	Elective module		165	30	60	85	20	360	720	24	1. Semester	yes
3.	0035030	Master thesis/work		0	0	0	0	450	450	900	30	2. Semester	no
		Total		210	30	105	85	470	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.	0037810	Slope stabilisation	Matej Maček, Matjaž Mikoš	35	0	15	0	10	60	120	4	1. Semester	yes
2.	0037811	Hydraulic machines and devices	Gašper Rak, Marko Hočevar	30	0	30	0	0	60	120	4	1. Semester	yes
3.	0035034	Water policy	Andrej Kryžanowski	30	0	30	0	0	60	120	4	1. Semester	yes
4.	0037812	Decision support systems in water management	Primož Banovec	45	15	0	15	0	75	150	5	1. Semester	yes
5.	0035012	Landscape management	Mojca Golobič	30	0	0	30	0	60	120	4	1. Semester	yes
6.	0037813	Introduction to research work	Matjaž Mikoš	30	15	0	15	0	60	120	4	1. Semester	yes
7.	0035013	Project in infrastructural systems	Maruška Šubic-Kovač	30	30	0	0	0	60	120	4	1. Semester	yes
8.	0035014	Selected topics from mathematics III	Marjeta Kramar Fijavž	30	0	30	0	0	60	120	4	1. Semester	yes

9.	0035015	Ecohydrology	Matjaž Mikoš, Simon Rusjan	30	10	15	0	5	60	120	4	1. Semester	yes
10.	0035016	Geotechnics of infrastructural facilities	Janko Logar	45	0	45	0	0	90	180	6	1. Semester	yes
11.	0035036	Practical training	Andreja Istenič Starčič, Mario Krzyk	6	0	0	0	120	54	180	6	1. Semester	yes
12.	0643355	R software in water management	Mojca Šraj, Nejc Bezak	15	45	0	30	0	90	180	6	1. Semester	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.	0038710	Hydraulic structures	Andrej Kryžanowski	60	0	60	0	0	120	240	8	1. Semester	no
2.	0037809	Water management systems	Mateja Škerjanec	10	15	30	0	5	60	120	4	1. Semester	no
3.	0037815	Hydroelectric power	Andrej Kryžanowski	30	0	30	0	0	60	120	4	1. Semester	no
4.	0037816	Urban drainage and wastewater treatment	Mario Krzyk, Nataša Atanasova	45	15		55	5	120	240	8	1. Semester	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.	0037816	Urban drainage and wastewater treatment	Mario Krzyk, Nataša Atanasova	45	15	0	55	5	120	240	8	1. Semester	no
2.	0037821	Water management systems	Mateja Škerjanec	10	15	30	0	5	60	120	4	1. Semester	no
3.	0037817	Torrent, erosion, rockfall and avalanche control	Matjaž Mikoš	35	0	15	0	10	60	120	4	1. Semester	no

4.	0037823	Mathematical model. of environmental processes	Matjaž Četina	45	0	0	30	0	75	150	5	1. Semester	no
5.	0038711	Meteorology	Gregor Skok	30	0	15	0	0	45	90	3	1. Semester	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.	0035017	Spatial planning for flood protection	Alma Zavodnik Lamovšek, Andrej Kryžanowski, Simon Rusjan	45	10	20	0	0	75	150	5	1. Semester	no
2.	0035018	Socio-economical assessment of flood risk	Aleksander Keševljević, Drago Kos, Matjaž Mikoš	37	38	0	0	0	75	150	5	1. Semester	no
3.	0037817	Torrent, erosion, rockfall and avalanche control	Matjaž Mikoš	35	0	15	0	10	60	120	4	1. Semester	no
4.	0037818	Numerical methods in fluid dynamics	Matjaž Četina	45	15	0	30	0	90	180	6	1. Semester	no
5.	0037819	Environmental technologies	Nataša Atanasova, Darja Istenič, Mario Krzyk	15	15	0	30	0	60	120	4	1. Semester	no
		Total		177	78	35	60	10	360	720	24		

15. Possibilities of elective courses and mobility

The master's study programme Water Science and Environmental Engineering foresees elective courses totalling 13 ECTS. Students shall select professional elective courses from the 2nd cycle study programmes Water Science and Environmental Engineering or Civil Engineering – Orientation Geotechnical and Hydraulic Engineering. Subjects in the amount of 6 ECTS (5%) may be selected freely. Elective courses are selected at student's own discretion or among other elective courses at other master study programmes. In this respect, students are recommended to select courses from the 2nd cycle study programmes Civil Engineering (Orientations Geotechnical and Hydraulic Engineering and Infrastructural Engineering) or the 2nd cycle study programme Geodesy and Geoinformation. Subjects at other faculties of the University of Ljubljana, other Universities in Slovenia or abroad may also be chosen.

Students may also choose elective courses from other faculties that are members of UL, other universities and higher education institutions in Slovenia, or internationally. They are recommended to select courses from the areas of law, economics, administration, statistics, geophysics, computer science, foreign languages, geomorphology, etc.

Students may transfer 30 ECTS credits of the programme (one study semester, regardless of compulsory and elective units) from any other environmental or hydraulic engineering programme in Slovenia or abroad, provided that UL FGG has a signed agreement with the institution in question.