

Environmental Engineering

2.nd cycle master study programme

1 General description of the programme

The master study programme of the second cycle “Environmental Engineering” within the Faculty of Mechanical Engineering lasts two years. A student has to acquire 120 ECTS points. The study programme is aligned with the Bologna directives. It represents the basis for the the doctoral (PhD) study of environmental engineering at the third cycle.

Students of the Environmental Engineering study programme complement their knowledge of engineering with courses in environmental sciences.

The study programme is related to other study programmes in Europe. Three study programmes “Environmental Engineering” from the high-ranked universities (according to Shanghai university rankings) were taken as the benchmark and comparison: University di study Udine, Italy, TU Delft, Netherlands and TU Lisbon, Portugal. The Environmental Engineering study programme contains a balanced combination of knowledge that is in alignment with the recommendations of the European Society for Engineering Education (SEFI).

A graduate of the programme is able to understand and apply knowledge for designing and planning of products in the field of environmental engineering. The graduate possesses broad theoretical knowledge and specific professional skills. His (hers) competences allow him (her) to work professionally, but the main goal is to prepare him (her) for further study and engineering study programmes on the second cycle, especially environmental engineering. The professional study is finished on the second cycle, and graduates of the second cycle are able to work independently, they can produce new knowledge and develop new technologies in Slovenia and worldwide economy. They can also continue their studies on the PhD study programmes, which are also offered at our faculty.

The study programme covers the following areas and subjects: advanced natural science subjects, technological subjects, applicative subjects, interdisciplinary subjects that are the focus of the study programme, project work and master thesis.

The study programme is intended to provide industry with a new breed of environmental engineers with a broad knowledge of engineering, technology, computer science, etc. that will be fully qualified to take leadership, professional, development and management positions. Graduates of the environmental engineering master programme have numerous employment opportunities in the non-business sector, such as public surveys, local, municipal and state offices, where environmental issues are being considered. Our

graduates will be the environmental policy makers on the state and EU level and provide systematic laws, acts and rules for environmental protection.

2 Short description of the study modules

The Environmental Engineering study programme does not include any study modules.

3 General learning outcomes and competencies of the students

Graduates of the master program “Environmental Engineering” will use research methods and process knowledge from a wide spectrum of environmental engineering, so that they will be able to build, design, form, plan and realize technical solutions in the area of environmental engineering, while considering professional excellence, benefits for the society, ethical responsibility and measurements for environmentally friendly design. They will use systematic concepts and universal principles, and be able to make a technical independent assessment on the scientific basis. They will be able to align new informations in the context of the fundamental disciplines in environmental engineering as well as establish connections with other disciplines. Students will learn how to combine theoretical and practical knowledge to analyse problems, eliminate unimportant effects, make a synthesis and find possible solutions. They will be encouraged to use individual creative thinking, search for new solutions and to implement the scientific working procedures in application and assessment of existing and new environmental technologies.

4 The main subject-specific learning outcomes and competencies of the students

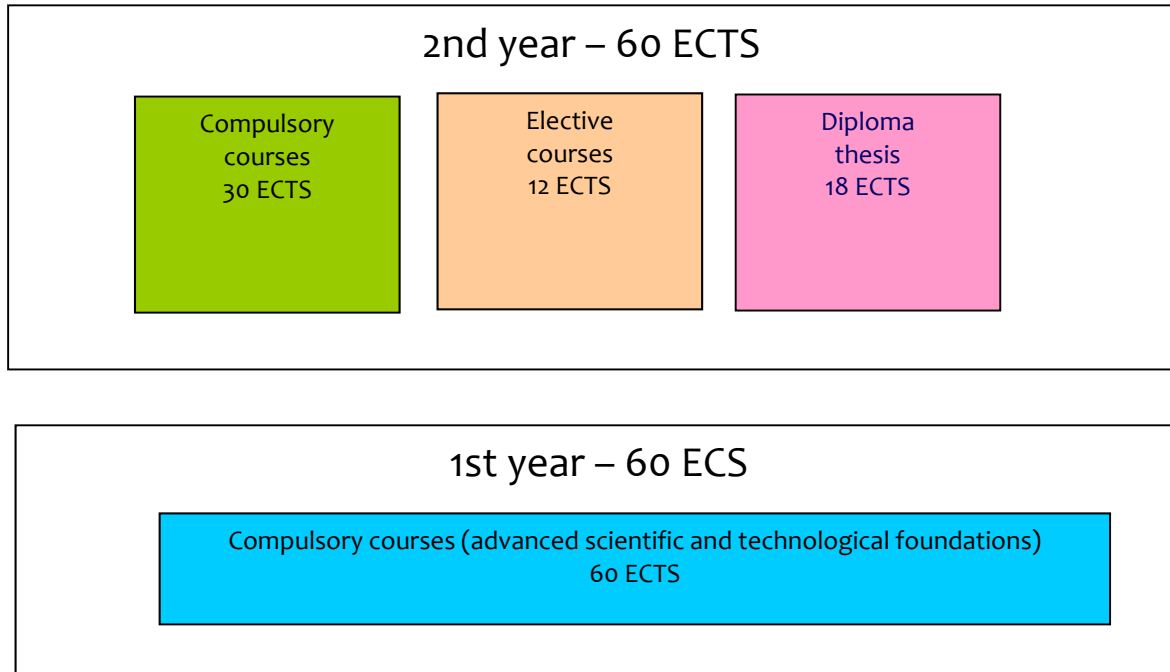
The main subject-specific competencies that can be obtained by the Environmental Engineering master study programme are:

- improvement of the technical skills in a specific research area (for example construction of technical and environmental systems, computer and experimental modelling of technical and environmental systems, advanced concepts in managing environmental protection),
- qualification to plan, evaluate and develop new technologies, innovation of products and systems, that can be or will be sold in the world market,
- mastering new technological procedures and processes,
- mastering new procedures in environmental process techniques,
- mastering procedures in processing of industrial waste,
- qualification to combine skills from other disciplines with a wider spectrum of environmental engineering skills,

- coherent process based knowledge and fundamental knowledge,
- understanding and using methods in environmental analytics,
- qualification to model complex environmental systems,
- qualification to use modern computer simulating tools for virtual modelling of environmental systems,
- understanding of the economy of the environment,
- knowledge of new methods for water cleaning,
- the impact of generating the power on the environment and prevention of the negative impact on the environment,
- knowledge on the toxic elements, that are emitted into the environment,
- knowledge of the law, strategy and control in the environment protection,
- mastering the transport phenomena in the environment.

5 General curriculum

The master study programme of Environmental Engineering is divided into the following parts:



6 Detailed curriculum

7 1. year							
Subject	1 st semester			Cont. hours	Individ. work	Hours	ECTS
	L	S	T				
METHODOLOGY OF EXPERIMENTAL WORK	45	0	30	75	105	180	6
TRANSPORT PHENOMENA	45	0	15	60	120	180	6
ENVIRONMENTAL ANALYTICS	45	0	15	60	120	180	6
PROCESS ENGINEERING	40	0	20	60	120	180	6
COMBUSTION AND ECOLOGY	35	5	20	60	120	180	6
Together semester:	210	5	100	315	585	900	30

Subject	2 nd semester			Cont. hours	Individ. work	Hours	ECTS
	L	S	T				
ENERGY AND ENVIRONMENT	30	0	30	60	120	180	6
AIR POLLUTION METEOROLOGY	30	5	15	50	130	180	6
ENVIRONMENTAL ENGINEERING	35	10	30	75	105	180	6
SOIL POLLUTION	45	0	30	75	105	180	6
OPERATIONS IN WASTEWATER TREATMENT	30	0	20	50	130	180	6
Together semester:	170	15	125	310	590	900	30
Together year:	380	20	225	625	1175	1800	60

2. year							
Subject	3 rd semester			Cont. hours	Individ. work	Hours	ECTS
	L	S	T				
MODELLING AND SIMULATION OF ENVIRONMENTAL SYSTEMS	45	0	30	75	105	180	6
MATERIAL AND ENERGY WASTE RECOVERY	30	15	0	45	135	180	6
MATERIALS FOR SUSTAINABLE DEVELOPMENT	30	5	20	55	125	180	6
FUELS FOR SUSTAINABLE DEVELOPMENT	20	20	0	40	140	180	6
ELECTIVE SUBJECT 1	40	5	15	60	120	180	6
Together semester:	165	45	65	275	625	900	30

Subject	4 th semester				Cont. hours	Individ. work	Hours	ECTS
	L	S	T	K				
PROJECT WORK	0	15	0	0	15	165	180	6
ELECTIVE SUBJECT 2	15	5	20	0	40	140	180	6
MASTER'S THESIS	0	0	0	5	5	535	540	18
Together semester:	15	20	20	5	60	840	900	30
Together year:	180	65	85	5	335	1465	1800	60
Together 2 years:	560	85	310	5	960	2640	3600	120

L – lectures, S – seminar; T – tutorial; K-konsultation

Elective subject 1

Subject	3 rd semester			Cont. hours	Individ. work	Hours	ECTS
	L	S	T				
DYES AND DECOLOURATION OF WASTE WATER	25	0	20	45	135	180	6
METHODS OF RECYCLING OF POLYMER MATERIALS	25	10	10	45	135	180	6
SURFACE PROPERTIES OF POLYMER MATERIALS	45	0	30	75	105	180	6

Elective subject 2

Subject	4 th semester			Cont. hours	Individ. work	Hours	ECTS
	L	S	T				
ANTHROPOGENIC INFLUENCE ON ENVIRONMENT	45	0	15	60	120	180	6
PRODUCTION AND PROJECT MANAGEMENT	20	10	10	40	140	180	6
EXPERIMENTAL METHODS IN POWER AND PROCESS ENGINEERING	20	5	15	40	140	180	6