Óbuda University
Sándor Rejtő Faculty of Light Industry and Environmental Engineering

TRAINING PROGRAM

Master's Degree in Environmental Engineering (MSc)

Budapest, 1 September 2023.

DEGREE PROGRAM CURRICULUM

1. Degree program name:

Environmental Engineering

2. Field of training: technical

3. Language of training: English/Hungarian

4. Training schedule(s) and duration of courses in semesters, number of contact hours:

full-time 4 semesters, 1078 hours
correspondence 4 semesters 379 hours

5. Optional specialisation:

Environment, Health and Safety (EHS) full-time/part-time

6. Number of credits to collect to earn MSc degree: 120 credits

7. Level of qualification and professional qualification as indicated in the degree certificate:

- level of qualification: master's degree (master's magister, master; abbreviation: MSc)
- professional qualification: Environmental Engineer
- title of the qualification in English: Environmental Engineer

8. Courses accepted as prerequisites for entry to the Master's programme

8.1 Full credits may be taken into account for: the Bachelor of Environmental Engineering.

8.2 The following may also be taken into account for the completion of the credits specified in section 9.4 of the CCC: bachelor's and master's degree programmes and programmes under Act LXXX of 1993 on Higher Education, which are accepted by the credit transfer committee of the higher education institution on the basis of a comparison of the knowledge on which the credit is based.

9. Study area classification of professional qualification according to the standard classification system of training areas: 851/0712

10. Educational objective:

The aim is to train environmental engineers who are able to identify and assess existing and potential environmental hazards, prevent and mitigate environmental damage, and plan and manage mitigation projects, based on up-to-date knowledge of natural sciences, ecology, engineering, economics and management. Based on up-to-date IT skills, they are able to perform complex engineering and scientific planning and analysis tasks using planning, modelling and simulation software. They develop and apply appropriate technological solutions to prevent environmental pollution and perform engineering design and management tasks in the field of waste treatment and recycling. They are able to optimise environmental protection technologies and environmental uses. They are prepared to pursue their studies at doctoral level.

11. Professional competencies to be mastered:

ENVIRONMENTAL ENGINEER

a) knowledge

- Knowledge and application of the environmental engineering profession
scientific and technical theory and practice.
- Knowledge of the measurement and analysis techniques related to the field of environmental engineering
comprehensive knowledge of measurement theory.
- Knowledge and application of environmental protection and remediation procedures
(operations, equipment, appliances), environmental remediation
methods.
- Knowledge of environmental protection installations (in particular water and waste water treatment landfills, hazardous and municipal waste landfills, incinerators),
and the possibilities for their development.
- Knowledge and application of environmental impact assessment, environmental technical
rules for preparing documentation.
- Knowledge of organisational and motivational tools related to leadership, and
the methods and legislation necessary for the practice of the profession.
- Knowledge and complex application of environmental informatics and modelling
methodology and tools.
- Knowledge of occupational health and safety and fire safety related to environmental engineering, security, information technology, legal, economics and management,
the basics of the disciplines, their limits and requirements.
- Knowledge of promotional and publicity activities related to environmental engineering
opinion-forming methods.

b) capabilities

- Ability to solve problems in the field of environment apply the acquired general and specific mathematical, scientific and social science principles, rules, contexts, procedures.
- Able to communicate both verbally and in writing in his/her mother tongue and in at least one foreign language, in respect of professional issues, and to continuously develop his/her professional skills as required.
- Ability to perform environmental management tasks.
- Ability to take on tasks in international or cross-border projects and provide test results, developed design documents in social and professional forums.

- In its work, the Commission examines the implications of setting research, development and innovation objectives opportunities and strives to realise them.
- Capable of soil, geological, water, air, noise and vibration, wildlife, remediation and waste reduction, to implement and maintain treatment and processing complex design of engineering interventions across disciplines.
- Ability to plan and carry out environmental sampling, comprehensive laboratory testing and analysis, the use of monitoring systems, to evaluate and document test results.
- Ability to apply complex environmental remediation methods, preparing and coordinating the remediation of damage.
- Ability to design and carry out environmental impact assessments and impact studies.
- Ability to apply integrated knowledge of environmental equipment, processes, technologies and related electronics and information technology in your area of expertise.
- Ability to model environmental engineering systems and processes, operate and manage.
- Ability to design, implement and manage environmental management systems to operate.
- Ability to carry out energy efficiency analyses, surveys and audits, identify and support the implementation of measures.
- Ability to plan complex (environmental-economic-social) works and to support their implementation.

c) attitude

- Open and receptive to the professionalism of the environmental field, to learn and adopt technological development and innovation, authentic to convey.
- Undertakes professional and moral responsibilities in the field of the environment values.
- Performs at a high professional level, either independently or in a working group plans and carries out its tasks.
- Strives to work in a systemic and process-oriented way, thinks in a complex approach.
- Strives to improve continuously both their own and their colleagues' knowledge through training.
- Committed to high standards of quality work and strives to achieve this to communicate this approach to the colleagues.
- Shares experiences with colleagues, thus promoting their development.

d) autonomy and responsibility

- Ability to solve environmental engineering problems independently, makes decisions carefully, with other (mainly legal, economic, energy) disciplines in consultation with its representatives taking responsibility for them.
- In his/her decisions, he/she takes into account the health and safety at work, the technical, economic and legal regulation, as well as the basic principles of engineering ethics specifications.
- Takes the initiative to solve environmental problems, identifies gaps in the technologies used, risks in processes and takes the initiative to reduce them.
- The knowledge and experience acquired through formal, non-formal and informal

information share with people in the field in information transfer formats.

- Evaluates the work of his/her subordinates, sharing his/her critical comments to help their professional development, their staff and subordinates in a responsible and ethical manner.
- Monitors the legislative, technical and regulatory developments in the field of technological and administrative changes.

12. The disciplines and specialisations leading to the qualification, from which the degree is drawn:

According to the Regulation of 18/2016. (VIII. 5.) EMMI	Credit point
Basics of Natural Sciences (10-40 credits)	**22**
Economic and Human Knowledge (10-20 credits)	**13**
Professional knowledge in environmental engineering (10-35 credits)	**23**
Optional skills (50-60 credits)	
Specialisation in Environmental Engineering - compulsory electives	**18**
Environmental Engineering Project Practice (minimum 6 credits)	**6**
Optional subjects (min. 6 credits)	**6**
Diploma thesis (30 credits)	**30**
Physical education	**2**
Total:	**120**

13. Criteria prescribed:

Physical Education: all full-time and part-time master's students are required to complete two semesters of Physical Education. The course is taught for 1 hour/week in full-time courses and 6 hours/semester in part-time courses.

Work placement: work placements must last at least four weeks. The internship criterion is required.

14. Foreign language requirements (for the degree):

The linguistic criterion for obtaining the final certificate is passing an internal language test. The internal language examination is based on a knowledge of the language corresponding to level B2 of the Common European Framework of Reference for Languages (CEFR) and a knowledge of the professional language of the training.

15. Knowledge verification

a) during the study period, by written or verbal reports, written (classroom) tests, by the evaluation of home assignments (designs, measurement records, etc.), mid-semester grading or signature,
b) by preliminary examination passed in the study period,
c) by examination or comprehensive examination passed in the examination period, and
d) by final examination.

16. Criteria for admission to a final examination:

a) Final completion certificate (absolutorium) granted,
b) Thesis accepted by supervisor.

To be admitted to the final examination, you must have obtained a final certificate. A final certificate is issued by the higher education institution to students who have fulfilled the study and examination requirements and the professional practice requirements of the curriculum, with the exception of the foreign language requirement and the thesis, and who have acquired the required credits.

17. Parts of the final examination:

The final examination consists of the defence of the thesis and oral examinations in the subjects prescribed in the curriculum (preparation time of at least 30 minutes per subject), which the student must take continuously on the same day.

The list of questions of the oral examination is made available to candidates 30 days before the date of the final examination.

Candidates may start the examination if their thesis has been accepted by the final examination board with at least sufficient (2) qualification. Criteria for correcting a failed thesis are defined by the competent institute.

18. Result of the final examination:

The weighted average of the marks awarded for the diploma thesis (*SZD)* and the oral part of the final examination, taking into account the number of subjects in the final examination, is as follows:

$$Z = (SZD + Z1+Z2+...+Zm)/(1+m).$$

19. Criteria for issuing a diploma:

a) Successful final examination,
b) Compliance with the foreign language requirement.

20. Dual training option:

Dual training is a joint training linked to the full-time undergraduate education of the university, in contractual cooperation between the university and a company (business company, enterprise, institution) and the student, in order to produce the best qualified professionals for the company. The conditions for dual training are set out in the contracts between the university and the company and between the company and the student.

21. Cooperative training option:

Co-operative training is a voluntary additional practical module to the full-time undergraduate course of the university, in which the university and a company, enterprise or institution cooperate in order to provide students with a work placement as defined in the training objective.

22. Number of credits to be credited for further studies in the field of training: ---

23. Date of entry into effect: 1 September 2023.

Budapest, 1 September 2023.

László Koltai Ph.D. Habil
Dean

C U R R I C U L U M

FULL-TIME

Óbuda University
Sándor Rejtő Faculty of Light Industry and Environmental Engineering

MSc Sample curriculum
Full time training
Environmental Engineering programme
Head of Profession: Rita Kendrovics Bodáné Ph.D.

Valid from 01.09.2024.
Approved by the council of RKK: 16.05.2024.
Decision number: RKK-KT-CIII/214/2024

Weekly teaching hours (Lecture (L), Classroom work (Cw), Laboratory work (Lw), Requirements (R; e-exam, tm-term mark, s-signature, a3:assessment3:failed, accepted, excellent), Credits (Cr)

	Code	Subjects	weekly hours	Credit	Semesters 1. L	Cw	Lw	R	Cr	2. L	Cw	Lw	R	Cr	3. L	Cw	Lw	R	Cr	4. L	Cw	Lw	R	Cr	Required prelineary knowledge Code	Course leader
Science basics (10-40 Cr)		**all:**	***19***	***22***	***6***	***2***	***4***	***0***	***14***	***3***	***2***	***2***	***0***	***8***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***		
1.	RKXMATEMNF	Applied mathematics	4	4	2	2	0	e	*4*																	Ágnes Bálint Mészárosné Ph.D.
2.	RKXKOKEMNF	Environmental chemistry	4	5	2	0	2	e	*5*																	Ágnes Bálint Mészárosné Ph.D.
3.	RKXMF1EMNF	Engineering physics (blended)	3	4						1	2	0	e	*4*												Lóránt Szabó Ph.D.
4.	RKXKBIEMNF	Environmental microbiology	4	4						2	0	2	tm	*4*												Hosam Bayoumi Hamuda Ph.D.
5.	RKXMOKEMNF	Engineering ecology	4	5	2	0	2	e	*5*																	Hosam Bayoumi Hamuda Ph.D.
Economic and human knowledge (10-20 Cr)		**all:**	**10**	***13***	***2***	***2***	***0***	***0***	***4***	***1***	***2***	***0***	***0***	***5***	***0***	***0***	***0***	***0***	***0***	***1***	***2***	***0***	***0***	***4***		
6.	RKXKGMEMNF	Circular economy management (blended)	3	*4*																1	2	0	e	*4*		Rita Kendrovics Bodáné Ph.D.
7.	RTXKI1EMNF	Research and innovation (blended)	4	*4*	2	2	0	tm	*4*																	Prof. Marianna Halász Ph.D.
8.	RKXDK1EMNF	Corporate communication (blended)	3	*5*						1	2	0	tm	*5*												Áron Takács Ph.D.
Professional knowledge in environmental engineering (10-35 Cr)		**all:**	**20**	**23**	**1**	**2**	**4**	**0**	**8**	**2**	**0**	**4**	**0**	**6**	**2**	**2**	**0**	**0**	**5**	**1**	**2**	**0**	**0**	**4**		
9.	RKXMKKEMNF	Occupational and environmental risk assasment and analysis	6	*6*						2	0	4	tm	*6*												Csaba Ágoston Ph.D.
10.	RKXKMOEMNF	Environmental modelling	4	*4*	0	0	4	tm	*4*																	Ágnes Bálint Mészárosné Ph.D.
11.	RKXIKTEMNF	Innovative environmental operations and technologies	3	*4*																1	2	0	e	*4*		Rita Kendrovics Bodáné Ph.D.
12.	RKXZE1EMNF	Green energy for residential and institutional use	3	*4*	1	2	0	tm	*4*																	Lóránt Szabó Ph.D.
13.	RKXKT1EMNF	Remediation technologies	4	*5*												2	2	0	e	*5*						Csaba Ágoston Ph.D.
		all of basics:	49	58	9	6	8	0	26	6	4	6	0	19	2	2	0	0	5	2	4	0	0	8		
				Exam (e)				3					1					1					2			
				Term mark (tm)				3					3					0					0			
				Experimental hours:		14					10					2					4					
				Total hours:	23					16					4					6						

László Koltai Habil Ph.D.
Dean

Óbuda University
Sándor Rejtő Faculty of Light Industry and Environmental Engineering

MSc Sample curriculum
Full time training
Environmental Engineering programme
Environment, Health and Safety (EHS) specialisation
Head of Profession: Hosam Bayoumi Hamuda Ph.D.

Valid from 01.09.2024.
Approved by the council of RKK: 16.05.2024.
Decision number: RKK-KT-CIII/214/2024

Weekly teaching hours (Lecture (L), Classroom work (Cw), Laboratory work (Lw), Requirements (R; e-exam, tm-term mark, s-signature, a3:assessment3:failed, accepted, excellent), Credits (Cr)

	Code	Subjects	weekly hours	Credit	Semesters																				Required prelineary knowledge	Course leader
					1.					2.					3.					4.						
					L	Cw	Lw	R	Cr	L	Cw	Lw	R	Cr	L	Cw	Lw	R	Cr	L	Cw	Lw	R	Cr	Code	
Environmental Engineering specialisation - compulsory and optional subjects (50-60 Cr including thesis)			**22**	***24***	**0**	**0**	**0**	**0**	***0***	**2**	**7**	**0**	**0**	***11***	**6**	**7**	**0**	**0**	***13***	**0**	**0**	**0**	**0**	***0***		
14.	RKWKMBEMNF	Environment and safety	4	*4*											2	2	0	e	*4*							**Lóránt Szabó Ph.D.**
15.	RKWKSMEMNF	Environmental pollution and monitoring	5	*5*											2	3	0	tm	*5*							**Prof. Zoltán Juvancz Ph.D.**
16.	RKWOKEEMNF	Ecotoxicology and environmental health	5	*5*						2	3	0	e	*5*												**Hosam Bayoumi Hamuda Ph.D.**
17.	RKWKMTEMNF	Certification in OH&S and in Environmental management systems (blended)	4	*4*											2	2	0	tm	*4*							**Tibor Gregász Ph.D.**
19.	RKPKBPEMNF	Environmental engineering project work	4	*6*						0	4	0	tm	*6*												**Krisztina Demény Ph.D.**
Optional subjects			**4**	***6***											**0**	**0**	**0**		**0**	**4**	**0**	**0**		***6***		
20.		**Optional subject 1**	**2**	***3***																2	0	0	tm	*3*		
21.		**Optional subject 2**	**2**	***3***																2	0	0	tm	*3*		
22.	**RKDKBSEMNF**	**Thesis 1**	0	***15***											0	0	0	tm	*15*							
23.	**RKDKBSFMNF**	**Thesis 2**	0	***15***																0	0	0	tm	*15*		
Compulsory subjects			**2**	**2**	0	1	0		1	0	1	0		1												
24.		Physical education I.	1	1	0	1	0	a3	1																	
25.		Physical education II.	1	1					0	0	1	0	a3	1												
Criteria requirement																										
26.		Professional internship	4 weeks																							
		Total:	**77**	**120**	**9**	**7**	**8**		**27**	**8**	**12**	**6**		**31**	**8**	**9**	**0**		**33**	**6**	**4**	**0**		**29**		
Basic + spec.		**Total weekly teaching hours**	**77**																							
		Total experimental teaching hours	**46**																							
		Ratio of experimental teaching hours (%) (balanced 40-60%)	**60**																							
		Exam (e)						0					1					1					0			
		Term mark (tm)						0					1					3					3			
		Assessment3 (a3)						1					1					0					0			

Subjects of the final exam:
Occupational and environmental risk measurement and analysis 6 Cr
Remediation technologies 5 Cr
Environment and occupational safety 4 Cr
Ecotoxicology and environmental health 5 Cr

László Koltai Habil Ph.D.
Dean

Óbuda University — **MSc Sample curriculum**

Sándor Rejtő Faculty of Light Industry and Environmental Engineering — **Full time training**

Environmental Engineering programme

Environment, Health and Safety (EHS) specialisation

Optional subjects

Weekly teaching hours (Lecture (L), Classroom work (Cw), Laboratory work (Lw), Requirements (R; e-exam, tm-term mark, s-signature, a3:assessment3:failed, accepted, excellent), Credits (Cr)

	Code	Subjects	weekly hours	*Credit*	Semesters																				Required prelineary knowledge
					1.					2.					3.					4.					
					L	Cw	Lw	R	*Cr*	L	Cw	Lw	R	*Cr*	L	Cw	Lw	R	*Cr*	L	Cw	Lw	R	*Cr*	Code
Optional subjects (6 Cr)																									
1.	RKVRHKEMNF	Radioactive waste management, radiation protection	2	*3*						2	0	0	tm	*3*	→										
2.	RKVTEIEMNF	Geoinformatic modelling	2	*3*						2	0	0	tm	*3*	→										
3.	RKVDK1EMNF	Dynamic cost analysis	2	*3*						2	0	0	tm	*3*	→										
4.	RMVII1EBNF	Integrated management systems	2	*4*						0	0	2	tm	*4*	→										
5.	RMVVI1EBNF	Systems Applications and Products in Data Processing (SAP)	2	*3*						0	0	2	tm	*3*	→										
6.	RKKCC1EBNF	Climate Changes and Environmental Health	2	*3*						2	0	0	tm	*3*	→										
7.	RKVFEKEMNF	Sustainability Challenges - Systems Thinking	2	*3*						2	0	0	tm	*3*	→										
8.	RKKKK1EBNF	Environmental Colloids	2	*3*						1	0	1	tm	*4*	→										
9.	RKVBI1EBNF	Biotechnology	2	*4*						2	0	0	tm	*4*	→										
10.	RKVSZLEBNF	Air pollution control issues of nuisance environmental odours	2	*3*						0	2	0	tm	*3*	→										

The dean decides on the start of the courses in a given semester based on the number of students and the teaching load.

László Koltai Habil Ph.D.

Dean

CORRESPONDENCE COURSE

Óbuda University
Sándor Rejtő Faculty of Light Industry and Environmental Engineering

MSc Sample curriculum
Correspondence training
Environmental Engineering programme
Head of Profession: Rita Kendrovics Bodáné Ph.D.

Valid from 01.09.2024.
Approved by the council of RKK: 16.05.2024.
Decision number: RKK-KT-CIII/211/2024

Weekly teaching hours (Lecture (L), Classroom work (Cw), Laboratory work (Lw), Requirements (R; e-exam, tm-term mark, s-signature, a3:assessment3:failed, accepted, excellent), Credits (Cr)

	Code	Subjects	weekly hours	Credit	Semesters 1.					2.					3.					4.					Required prelineary knowledge	Course leader
					L	Cw	Lw	R	Cr	L	Cw	Lw	R	Cr	L	Cw	Lw	R	Cr	L	Cw	Lw	R	Cr	Code	
Science basics (10-40 Cr)		**all:**	***95***	***22***	***30***	***10***	***20***	***0***	***14***	***15***	***10***	***10***	***0***	***8***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***		
1.	RKXMATEMLF	Applied mathematics	20	4	10	10	0	e	*4*																	Ágnes Bálint Mészárosné Ph.D.
2.	RKXKOKEMLF	Environmental chemistry	20	5	10	0	10	e	*5*																	Ágnes Bálint Mészárosné Ph.D.
3.	RKXMF1EMLF	Engineering physics (blended)	15	4						5	10	0	e	*4*												Lóránt Szabó Ph.D.
4.	RKXKBIEMLF	Environmental microbiology	20	4						10	0	10	tm	*4*												Hosam Bayoumi Hamuda Ph.D.
5.	RKXMOKEMLF	Engineering ecology	20	5	10	0	10	e	*5*																	Hosam Bayoumi Hamuda Ph.D.
Economic and human knowledge (10-20 Cr)		**all:**	**50**	***13***	***10***	***10***	***0***	***0***	***4***	***5***	***10***	***0***	***0***	***5***	***0***	***0***	***0***	***0***	***0***	***5***	***10***	***0***	***0***	***4***		
6.	RKXKGMEMLF	Circular economy management (blended)	15	*4*																5	10	0	e	*4*		Rita Kendrovics Bodáné Ph.D.
7.	RTXKI1EMLF	Research and innovation (blended)	20	*4*	10	10	0	tm	*4*																	Prof. Marianna Halász Ph.D.
8.	RKXDK1EMLF	Corporate communication (blended)	15	*5*						5	10	0	tm	*5*												Áron Takács Ph.D.
Professional knowledge in environmental engineering (10-35 Cr)		**all:**	**100**	**23**	**5**	**10**	**20**	**0**	**8**	**10**	**0**	**20**	**0**	**6**	**10**	**10**	**0**	**0**	**5**	**5**	**10**	**0**	**0**	**4**		
9.	RKXMKKEMLF	Occupational and environmental risk assessment and analysis	30	*6*						10	0	20	tm	*6*												Csaba Ágoston Ph.D.
10.	RKXKMOEMLF	Environmental modelling	20	*4*	0	0	20	tm	*4*																	Ágnes Bálint Mészárosné Ph.D.
11.	RKXIKTEMLF	Innovative environmental operations and technologies	15	*4*																5	10	0	e	*4*		Rita Kendrovics Bodáné Ph.D.
12.	RKXZE1EMLF	Green energy for residential and institutional use	15	*4*	5	10	0	tm	*4*																	Lóránt Szabó Ph.D.
13.	RKXKT1EMLF	Remediation technologies	20	*5*											10	10	0	e	*5*							Csaba Ágoston Ph.D.
		all of basics:	245	58	45	30	40	0	26	30	20	30	0	19	10	10	0	0	5	10	20	0	0	8		
		Exam (e)						3					1					1					2			
		Term mark (tm)						3					3					0					0			
		Experimental hours:				70					50					10					20					
		Total hours:			115					80					20					30						

László Koltai Habil Ph.D.
Dean

Óbuda University
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MSc Sample curriculum
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Environment, Health and Safety (EHS) specialisation
Head of Profession: Hosam Bayoumi Hamuda Ph.D.

Valid from 01.09.2024.
Approved by the council of RKK: 16.05.202
Decision number: RKK-KT-CIII/211/2024

Weekly teaching hours (Lecture (L), Classroom work (Cw), Laboratory work (Lw), Requirements (R; e-exam, tm-term mark, s-signature, a3:assessment3:failed, accepted, excellent), Credits (Cr)

	Code	Subjects	weekly hours	Credit	Semesters 1.					2.					3.					4.					Required prelineary knowledge	Course leader
					L	Cw	Lw	R	Cr	L	Cw	Lw	R	Cr	L	Cw	Lw	R	Cr	L	Cw	Lw	R	Cr	Code	
Environmental Engineering specialisation - compulsory and optional subjects (50-60 Cr including thesis)			**106**	***24***	**0**	**0**	**0**	**0**	***0***	**10**	**31**	**0**	**0**	***11***	**30**	**35**	**0**	**0**	***13***	**0**	**0**	**0**	**0**	***0***		
14.	RKWKMBEMLF	Environment and safety	20	*4*											10	10	0	e	*4*							**Lóránt Szabó Ph.D.**
15.	RKWKSMEMLF	Environmental pollution and monitoring	25	*5*											10	15	0	tm	*5*							**Prof. Zoltán Juvancz Ph.D.**
16.	RKWOKEEMLF	Ecotoxicology and environmental health	25	*5*						10	15	0	e	*5*												**Hosam Bayoumi Hamuda Ph.D.**
17.	RKWKMTEMLF	Certification in OH&S and in Environmental management systems (blended)	20	*4*											10	10	0	tm	*4*							**Tibor Gregász Ph.D.**
19.	RKPKBPEMLF	Environmental engineering project work	16	*6*						0	16	0	tm	*6*												**Krisztina Demény Ph.D.**
Optional subjects			**16**	***6***											**0**	**0**	**0**		**0**	**16**	**0**	**0**		***6***		
20.		**Optional subject 1**	**8**	***3***																8	0	0	tm	*3*		
21.		**Optional subject 2**	**8**	***3***																8	0	0	tm	*3*		
22.	**RKDKBSEMLF**	**Thesis 1**	0	***15***											0	0	0	tm	*15*							
23.	**RKDKBSFMLF**	**Thesis 2**	0	***15***																0	0	0	tm	*15*		
Compulsory subjects			**12**	**2**	0	6	0		1	0	6	0		1												
24.		Physical education I.	6	1	0	6	0	a3	1																	
25.		Physical education II.	6	1					0	0	6	0	a3	1												
Criteria requirement																										
26.		Professional internship	4 weeks																							
		Mindösszesen:	**379**	**120**	**45**	**36**	**40**		**27**	**40**	**57**	**30**		**31**	**40**	**45**	**0**		**33**	**26**	**20**	**0**		**29**		
Basic + spec.		**Total weekly teaching hours**	**379**																							
		Total experimental teaching hours	**228**																							
		Ratio of experimental teaching hours (%) (balanced 40-60%)	**60**																							
		Exam (e)						0					1					1					0			
		Term mark (tm)						0					1					3					3			
		Assessment3 (a3)						1					1					0					0			

Subjects of the final exam:
Occupational and environmental risk measurement and analysis 6 Cr
Remediation technologies 5 Cr
Environment and occupational safety 4 Cr
Ecotoxicology and environmental health 5 Cr

László Koltai Habil Ph.D.
Dean

Óbuda University

Sándor Rejtő Faculty of Light Industry and Environmental Engineering

MSc Sample curriculum

Correspondence training

Environmental Engineering programme

Environment, Health and Safety (EHS) specialisation

Optional subjects

Weekly teaching hours (Lecture (L), Classroom work (Cw), Laboratory work (Lw), Requirements (R; e-exam, tm-term mark, s-signature, a3:assessment3:failed, accepted, excellent), Credits (Cr)

	Code	Subjects	weekly hours	Credit	Semesters																				Required prelineary
					1.					2.					3.					4.					
					L	Cw	Lw	R	Cr	L	Cw	Lw	R	Cr	L	Cw	Lw	R	Cr	L	Cw	Lw	R	Cr	Code
Optional subjects (6 Cr)																									
1.	RKVRHKEMLF	Radioactive waste management, radiation protection	2	3						2	0	0	tm	3	→										
2.	RKVTEIEMLF	Geoinformatic modelling	2	3						2	0	0	tm	3	→										
3.	RKVDK1EBLF	Dynamic cost analysis	2	3						2	0	0	tm	3	→										
4.	RMVII1EBLF	Integrated management systems	2	4						0	0	2	tm	4	→										
5.	RMVVI1EBLF	Systems Applications and Products in Data Processing (SAP)	2	3						0	0	2	tm	3	→										
6.	RKKCC1EBLF	Climate Changes and Environmental Health	2	3						2	0	0	tm	3	→										
7.	RKVFEKEMLF	Sustainability Challenges - Systems Thinking	2	3						2	0	0	tm	3	→										
8.	RKKKK1EBLF	Environmental Colloids	2	3						1	0	1	tm	4	→										
9.	RKVBI1EBLF	Biotechnology	2	4						2	0	0	tm	4	→										
10.	RKVSZLEBLF	Air pollution control issues of nuisance environmental odours	2	3						0	2	0	tm	3	→										

The dean decides on the start of the courses in a given semester based on the number of students and the teaching load.

László Koltai Habil Ph.D.

Dean

SUBJECT DESCRIPTIONS

Science basics (40-60 cr):

Title of the course:	**Applied mathematics**
Knowledge to be acquired:	Linear combinations of vectors, lin. independence, lin. correlation, generator system, basis (and their E.B.T. decision). Matrices. Systems of linear equations. Determinants. Quadratic forms (matrix, transformation into a complete square, definiteness). Extreme values of bivariate functions. Conditional extremum search. Regression calculation. Methods of searching for zero space. Numerical integration methods. Lagrange and Hermite interpolation. Integral calculus of bivariate functions, applications. Spline function. Statistics and probability calculus. Averages, percentiles. Normal distribution. Measured value as a probability variable. Measurement uncertainty.
Required literatue:	• Viktor Scharnitzky: Matrix calculus. Technical Book Publishing House, Budapest, 2008. ISBN: 9789631630053 • Pál Rózsa: Introduction to matrix theory. Typotex, Budapest, 2009. Hungarian Technical Book Publisher. Budapest, 2016. ISBN: 9789631630695. • Gyula J. Obádovics:Probability and statistics. Scolar Publishing House, Budapest, 2023. ISBN: 9789635097128
Bibliographic data of the digitally available course material, access route (link):	• https://elearning.uni-obuda.hu/ • https://mateking.hu
Presentation of teaching methods and digital methodologies used in the transfer of knowledge:	lecture, exercises, discussion, explanation, group work, use of IT tools and techniques
The way to be held to account:	written exam To obtain the signature, you must have written the final papers (min. 30%) and completed the class assignments.

Title of the course:	**Environmental chemistry**
Knowledge to be acquired:	The Earth as a chemical reactor. Cycles of chemical elements, dynamic equilibria between the Earth's spheres, human influences. Anthropogenic pressures on the natural environment. Pollutants in the environment, their properties. Chemical elements, organic compounds as pollutants. Degradation of organic pollutants, intermediates and reaction products. Environmental chemistry of soil, adsorption, buffer capacity.

	Atmospheric aerosols, composition, formation, transformations. Pharmaceuticals, hormones. Chemical elements in biological systems: essential and toxic elements. Bio-accumulation. Gas chromatography, liquid chromatography, coupled techniques. Mass spectrometry, Elemental analysis, Photometry.
Required literatue:	• Dr. János Kristóf: Analytical Chemistry II, • Levente Albert: Inorganic and organic chemistry. University of Sopron, 2004. • Dr. Endre Berecz: Chemistry for technicians. National Textbook Publisher, Budapest, 1998, ISBN: 9631833232 • Sándor Papp, Rolf Kümmel: Environmental Chemistry. Textbook publisher, Budapest, 1992., ISBN: 9631843181
Bibliographic data of the digitally available course material, access route (link):	• https://elearning.uni-obuda.hu/
Presentation of teaching methods and digital methodologies used in the transfer of knowledge:	lectures, exercises, tests, experiments, measurements, group work, written and oral communication, use of IT tools and techniques
The way to be held to account:	oral and written exams Signature condition: Preparation and timely submission of measurement reports. Writing a final examination at the end of the semester and passing it with at least 50%.

Title of the course:	**Engineering physics**
Knowledge to be acquired:	An important part of creative engineering is the creative use of science. The subject emphasises the study of the principles of physics (mechanics). Mechanical properties of solid bodies, elasticity, elasticity dimensioning, fundamentals of plasticity. Mechanics of Newtonian fluids and gases. Volumetric flow and its measurement. Flow profiles. Laminar and turbulent flow, their practical significance. Introduction to quantum physics. Physical properties of crystalline solids, methods of investigation. Fundamentals of physics of metals and semiconductors. Magnetic properties of materials.
Required literatue:	• Erostyák J., Kürti J., Raics P., Sükösd Cs.: Physics III. National Textbook Publisher, Budapest, 2006. ISBN:963195806X; 9631958027

	• Geszti T.: Quantum mechanics, Typotex Publishing, 2007. ISBN: 978-963-2793-83-2 • J. Sólyom, Fundamentals of Modern Solid State Physics I-II-III, ELTE Eötvös Publishers 2009, 2010, 2011. ISBN: 9789633120668 / 978-9633120668 • J. Singleton: Band Theory and Electronic Properties of Solids, Oxford University Press, 2001, ISBN 0198506449
Bibliographic data of the digitally available course material, access route (link):	• http://www.sze.hu/~bertam/Oktatasi_anyagok/FizikaMernokoknek.pdf • https://moodle.ms.sapientia.ro/pluginfile.php/15018/mod_resource/content/1/Szilardsagtan.pdf • https://mek.oszk.hu/04900/04956/04956.pdf • https://elearning.uni-obuda.hu/
Presentation of teaching methods and digital methodologies used in the transfer of knowledge:	lecture, explanation, practice, demonstration, group work, use of IT tools and techniques
The way to be held to account:	written exam To obtain the signature, the written report (written examination) must be written at a minimum level of 40%.

Title of the course:	**Environmental microbiology**
Knowledge to be acquired:	The role of microbes in the biosphere. Methods to control microbial growth. Modern techniques in microbiology. Microbe-microbe, microbe-plant and microbe-animal interactions. Effect of environmental factors on microbial growth and distribution, biogeochemical cycling and interactions between microbial populations. Agricultural microbiology. Environmental quality, Waste and pollutant biodegradation and bioremediation. Fermentation industry. Food and industrial microbiology. Food preservation methods. Microbiological food production. Human microbiology. Microbes and energy production.
Required literatue:	• Tibor Pál (2013). Medicina Publishers, ISBN number: 978 963 226 772 2 • Kevei Ferenc, Kucsera Judit, Manczinger László, Pfeiffer Ilona, Varga János, Vágvölgyi Csaba (2013): Microbiological Exercises I. JATE Press, ISBN: 9789633150887

	• Judit Kucsera, Ferenc Kevei (2010): Microbiology I. JATE Press, ISBN: 3159780000926 • Andrea Borsodi, Tamás Felföldi, Katalin Jáger, Judit Makk, Károly Márialigeti, Csaba Romsics, Erika Tóth, Renáta Bánfi, Zsuzsanna Pohner, Balázs Vajna: Introduction to the World of Prokaryotes Eötvös Loránd University, 2013.
Bibliographic data of the digitally available course material, access route (link):	• https://docplayer.hu/8621140-Kornyezeti-mikrobiologia-es-remediacio.html • https://www.enfo.hu/keptar/11756 • https://www.synlab.hu/kornyezet-analitika/magazin/a-viz-mikrobiologiai-szennyezoi • https://elearning.uni-obuda.hu/
Presentation of teaching methods and digital methodologies used in the transfer of knowledge:	lectures, exercises, experiments, measurements, group work, communication in writing and in the classroom, use of IT tools and techniques
The way to be held to account:	mid-year ticket attending classes, active participation written report and written examination min. 50% must also be completed

Title of the course:	**Engineering Ecology**
Knowledge to be acquired:	The curriculum covers the environmental knowledge needed for the management and rehabilitation of aquatic, wetland and terrestrial habitats, ecological, microbial ecological environmental engineering practices used in waste management, wastewater treatment, water quality and conservation interventions. Near-natural flood protection. Ecosystem services. Groundwater consumers, wetlands - theory and case studies. Ecological floodplain management of small watercourses. Near-natural wastewater management.
Required literatue:	• Koncz P., Horváth L., Somogyi Z., Kottek P., Weidinger T., Ács F., Kröel-Dulay Gy., Fogarasi J., Molnár A., Pásztor L., Popp J. (2021): Firewood production, climate and microclimate regulation as ecosystem service assessment, Budapest, Ministry of Agriculture, Budapest, pp. 191 • Vári Á., Kozma Zs., Pataki B., Jolánkai Zs., Kardos M., Decsi B., Pásztor L., Bakacsi Zs., Tóth B., Laborczi A., Pinke Zs., Jolánkai G., Centeri Cs., Mattányi Zs., Dóka R., Kisné Fodor L., Zsembery Z. (2021).

	• Szilágyi F.; Fleit E.; Sándor D. (2011). BME Department of Water Utilities and Environmental Engineering. Budapest • Padisák J. (2005). ELTE Eötvös Publishing Ltd. ISBN: 978963463721
Bibliographic data of the digitally available course material, access route (link):	• Horváth B.; Pestiné dr. Rácz É. V. (2011). Digital Textbook Library, www.tankonyvtar.hu/ TAMOP 4.2.5 Tender book https://slideplayer.hu/slide/2211734/ • https://elearning.uni-obuda.h/
Presentation of teaching methods and digital methodologies used in the transfer of knowledge:	lecture, exercise, presentation, explanation, group work, communication-writing and oral
The way to be held to account:	Exam: oral Signature condition: attending classes, active participation written report and written examination min. 50% must also be completed

Economic and human knowledge (10-20 cr):

Title of the course:	**Circular economy management**
Knowledge to be acquired:	The link between sustainability and the circular economy. Definition and conceptual framework of the circular economy model; theoretical background and tools. The Ellen MacArthur Foundation. Macroeconomic interrelationship between energy and material use. Longevity and utility in the circular economy. Regulation of the circular economy model in the European Union and in our country. Spatial issues of resource use and options for addressing market exposure. Conditions for the creation of local energy and material flows. Renewable energy sources and their role in the circular economy. The concept and tools for integrated waste management. Implementation of the circular economy model, possibilities for its application in enterprises .
Required literatue:	• János Szlávik (2013). Budapest, CompLex Publishing, ISBN: 978 963 295 820 0 • Judit Oláh - József Popp (2021): Circular bioeconomy is the key to sustainable development, Szaktudás Kiadó Ház, ISBN/ISSN: 978-963-575-003-0 • Dr. János Szlávik (2005): Sustainable environmental and resource management - Environmental library 14. Complex Kiadó, ISBN:978963224770
Bibliographic data of the digitally available course material, access route (link):	• Kornél Németh: The basics of circular economy, Pannon University Publishing House, Veszprém, 2021, ISBN:978-963-396-189-62021, https://konyvtar.uni-pannon.hu/images/docman-files/efop343/e notes/Nemeth_Kornel_A_circular_economy_basjai.pdf • Gusztáv Báger, ed. (2005) Environmentally conscious farming and sustainable development in the light of regulatory and monitoring experience. Source: www.asz.hu/storage/files/files/Szakmai%20 kutat%C3%A1s/2005/kornyezet_gazd.pdf?ctid=736 • Rita Bodáné Kendrovics Bodáné: Methodology of teaching the circular economy approach for the preparation and training of employers in the sector, Recommendation on methodology, Hungarian Association of the Light Industry, 2021, GINOP-5.3.5-18-2018-00048 https://tex2green.hu/files/fajl/bodnri1.pdf • https://elearning.uni-obuda.hu/
Presentation of teaching methods and digital methodologies used in the transfer of knowledge:	presentation, practice, written and oral communication, use of IT tools and techniques

The way to be held to account:	exam Signature condition: written report and written examination min. at 40% level

Title of the course:	**Research and innovation**
Knowledge to be acquired:	Steps and methods of the research process. Design of experiments, processing and analysis of experimental data. Aims and methods of literature research, processing the literature. Management of references. Objective measures of the performance of the scientific institution or scientist. Publication databases, publication in journals, conference proceedings. Funding applications for scientific research. Ethical, political, legal and economic issues of research. Patents. Claims of creation. Drivers, types and strategies of innovation. Process of creation: idea search, selection, implementation, exploitation of results. Development of new products and services. Business process innovation, business model innovation. Tools to support creativity and innovation.
Required literatue:	• R. Fedor Anita, Huszti Éva (Eds.): Research Methodology Handbook (e-book). Debreceni University Press, 2016. • Gábor Széll: The theory and practice of scientific cognition and scientific research. 2018. /KVT-05/ • Csaba Deák:Innovation - The way of creation. 2021. Human Telex Consulting Ltd., ISBN: 978-615-81784-1-9, https://www.innovaciokonyv.hu/.
Bibliographic data of the digitally available course material, access route (link):	• https://elearning.uni-obuda.hu/ • R. Fedor Anita, Huszti Éva (Eds.): Research Methodology Handbook (e-book). Debreceni University Press, 2016. https://dea.lib.unideb.hu/server/api/core/bitstreams/e2a5f0fd-e40e-403d-99b2-ebaaaa3bee30/content • Gábor Széll: The theory and practice of scientific cognition and scientific research. 2018. /KVT-05/ https://lib.uni-obuda.hu/sites/lib.uni-obuda.hu/files/KVT05.pdf
Presentation of teaching methods and digital methodologies used in the transfer of knowledge:	lectures, classroom exercises, written and oral communication, use of IT tools and techniques

The way to be held to account:	mid-year ticket Intermediate grade basis: Exercise 1 - Literature processing on a chosen topic Exercise 2 - Candidacy essay

Title of the course:	**Corporate communication**
Knowledge to be acquired:	Communication and information. Verbal and non-verbal communication. The purpose of organisational communication and its contribution to business performance. The concept of the organisation as a group, forms of communication within the group. Requirements for organisational and corporate communication. Techniques and tools of intra-organisational communication. Communication between the organisation and its environment. Communication in the official process. Prescriptive functions of organizational communication product and process documentation. Fact-finding functions of corporate communication. Processes and dynamics of corporate communication. Channels of direct organisational communication. The relationship of organizational culture, corporate image and marketing to communication.
Required literatue:	• Dr. Áron Takács (ed), Dr László Koltai: Organisational and Management Skills MSC university note ÓE - RKK - 6085 • Katalin Szabó: Communication at the top-level Kossuth Kiadó, Bp. 2002.
Bibliographic data of the digitally available course material, access route (link):	• Borgulya-Somogyvári: Communication in the Business World, https://www.scribd.com/document/489556460/Borgulya-Somogyvari-kommunikacio-az-uzleti-vilagban
Presentation of teaching methods and digital methodologies used in the transfer of knowledge:	lectures, exercises, written and oral communication, group work
The way to be held to account:	mid-year ticket written report and written examination min. at 40% level

Professional knowledge in environmental engineering (10-35 cr):

Title of the course:	**Occupational and environmental risk assessments and analysis**
Knowledge to be acquired:	Concepts of risk, hazard, risk assessment. Identification of risks. Risk based activity assessment, activity organisation. Risky materials, risky activities. Concepts, calculation, estimation of dose. Concept, types, setting of limit values. Bioaccumulation. Occupational risk assessment. Environmental risk assessment. Monitoring of environmental elements, measuring the state of the environment. Main methods of environmental analysis. Measurement of occupational risks, chemical and biological risks. Design and implementation of workplace air quality studies. Legionella risk in the workplace. BEM tests.
Required literatue:	• Dr. Gyula Dura: Delamination Manual 3. Ministry of Environment, 2001, ISBN: 963-03-4604-4 • Natália Szvetnik: Deforestation Notebooks 6. Ministry of Environment 2001, ISBN: 963 03 7675 X, ISSN: 1417-9385
Bibliographic data of the digitally available course material, access route (link):	• https://www.mjsz.uni-miskolc.hu/files/egyeb/mjsz/201001/8_madisarolta.pdf • https://www.nnk.gov.hu/index.php/kozegeszsegugyi-laboratoriumi-foosztaly/kornyezetegeszsegugyi-laboratoriumi-osztaly/vizhigienes-laboratorium/legionarius-betegseg/1378-a-legionella-kockazatbecsles-modszertani-utmutato
Presentation of teaching methods and digital methodologies used in the transfer of knowledge:	lectures, exercises, demonstrations, measurements, experiments, group work, written and oral communication, use of IT tools and techniques
The way to be held to account:	exam Signature condition: Passing the written exam and written report with a pass mark of at least 50%

Title of the course:	**Environmental modelling**
Knowledge to be acquired:	Environmental modelling is the description of mathematical models of the environment and the use of computer software based on them. Learning how to use and actively use this software. Environmental modelling can be used to gain a better understanding of environmental systems and the processes that take place in them. It can help future graduate engineers in their future decision-making. The different models and the most important software are described.
Required literatue:	• Edward A. Bender: An Introduction to Mathematical Modeling, series Dover Books on Computer Science, Dover Publications, Inc. Mineola, New York, 1978, 99-054517 • Dr. Endre Domokos, Dr. Zoltán Gribovszki, Dr. Lajos Gulyás, Dr. Cecília Hodúr: Transport Processes in Environmental Protection, Environmental Engineering Knowledge Library, Series Editor: Dr. Endre Domokos, ISBN: 978-615-5044-47-2
Bibliographic data of the digitally available course material, access route (link):	• Ervin Szücs: The Theory and Practice of Modelling (http://web.axelero.hu/eszucs7/modell/Modell.htm#Tartalom • Prof. Dr. habil Bayoumi Hamuda Hosam: Environmental simulations, electronic note, in Moodle
Presentation of teaching methods and digital methodologies used in the transfer of knowledge:	lecture, computer lab exercises, written and oral communication
The way to be held to account:	Mid-year mark, conditional on student presentation on the topic and final test in Moodle min. 51% level.

Title of the course:	**Innovative environmental operations and technologies**
Knowledge to be acquired:	Principles of the National Environmental Policy Concept. The EU Environmental Technologies Action Plan. Eco-innovation. National Environmental Technology Innovation Strategy. Main objective: marketable products produced in an environmentally sound way. Law of the technological life cycle. Material and energy balances. Key element of a modern technology strategy: minimise the environmental impact of its activities. Theoretical and technological options to reduce pollution. Clean technologies. Examples of cleaning polluted air, water, soil using nano-, bio- and other advanced technologies. Waste recycling and recovery of natural materials using environmentally friendly processes.
Required literatue:	• Barótfi, I. (2003): Environmental Technology, Mezőgazda Lap- és Könyvkiadó Kft. ISBN:9789639239500 • Mészáros, G. (2008): Renewable energy sources in the EU and Hungary, Kamara Print Kft., ISBN: 9789639008939 • Márton Herczeg - Kálmán Kósi - László Valkó (2006): Environmental Management, Typotex Publishing House, ISBN: 978-963-9664-07-4
Bibliographic data of the digitally available course material, access route (link):	• Dr. Géza Horváth (2011) Environmental Engineering Technologies Environmental Engineering Knowledge Library, Series Editor: Dr. Endre Domokos, Volume 6, ISBN: 978-615-5044-31-1, https://tudastar.mk.uni-pannon.hu/anyagok/06-Kornytech.pdf
Presentation of teaching methods and digital methodologies used in the transfer of knowledge:	lectures, exercises, demonstrations, field trips, plant visits, written and oral communication, use of IT tools and techniques
The way to be held to account:	exam Signature condition: written report and written examination min. at 40% level

Title of the course:	**Green energy for residential and institutional use**
Knowledge to be acquired:	Humanity, with its explosive growth and ever more technologically advanced technology, has almost completely exhausted fossil energy sources in just a few hundred years. Renewable energy sources are mainly used for heat and power generation and, to a lesser extent, biofuels. Introduction of green (renewable) energy sources. Implementation of the green economy model at the residential and institutional level. Green economy measures must be implemented with particular attention to ensuring that they do not compromise the quality of the environment and that they ensure the sustainable use of resources. Identifying and developing energy efficiency measures.
Required literatue:	• G. Sándor Lukács: Green energy and rural development. Szaktudás Publishing House, ISBN/ISSN: 9789639736689, 221 pages. • Sándor G. Lukács: Economical Green Energy. Szaktudás Publishing House, ISBN/ISSN: 9789639935839, 259 pages. • Attila Bai: Biogas. Knowledge Publishing House, ISBN/ISSN: 9789637024306, 284 pages. • László Tóth:Conventional and renewable energy systems. ISBN/ISSN: 9786155224706, 268 pages.
Bibliographic data of the digitally available course material, access route (link):	• https://www.ksh.hu/sdg/3-37-sdg-7.html • https://hugas.met.com/hu/fyouture/energia/megujulo-energiaforrasok/1155 • https://napelem.us/megujulo-energiaforrasok-fajtai-es-felhasznalasa/ • https://elearning.uni-obuda.hu/
Presentation of teaching methods and digital methodologies used in the transfer of knowledge:	lectures, classroom exercises, field exercises, group work, use of IT tools and techniques
The way to be held to account:	mid-year ticket Mid-year mark is based on: a presentation of a mid-year assignment (on a topic of your choice) and a written mid-year report (written paper) with a minimum of 40%.

Title of the course:	**Remediation technologies**
Knowledge to be acquired:	Properties and behaviour of organic and inorganic pollutants in the environment. Characteristics of soil, surface water and groundwater pollution. Environmental pressures, pollution, environmental damage. The concept and purpose of remediation. Risk assessment, remediation target. Screening, preliminary investigation, fact-finding, technical intervention, post-monitoring. In situ and ex situ methods: physical methods, chemical methods, biological and biochemical methods. Fact-finding and technical intervention documents.
Required literatue:	• Dr. Ferenc Csáki: Manual for the Remediation of Damage 4. Ministry of Environment, 2003, ISBN: 963-03-4604-4 • Dr. Gyula Dura: Delamination Manual 3. Ministry of Environment, 2001, ISBN:963-03-4604-4 • Dear Paul: Damage Waiver Guide 2. Ministry of Environment and Spatial Development 1998, ISSN: 1417-9393
Bibliographic data of the digitally available course material, access route (link):	• http://fava.hu/kvvm/www.kvvm.hu/szakmai/karmentes/kiadvanyok/karmkezikk4/4-05.htm
Presentation of teaching methods and digital methodologies used in the transfer of knowledge:	lectures, exercises, group work, fieldwork, written and oral communication
The way to be held to account:	exam Signature condition: Passing the written exam and written report with a pass mark of at least 50%

ENVIRONMENT, HEALTH AND SAFETY (EHS) SPECIALISATION

Compulsory and optional (50-60 credits including thesis)

Title of the course:	**Environment and safety**
Knowledge to be acquired:	Environment, Health and Safety (EHS) is an applied safety science discipline, which aims to provide and demonstrate professional support for the environmental, health and safety and fire protection functions of business organisations. Today, however, the prevention and management of new hazards, in particular through the integration of occupational safety and health issues into corporate governance, is gaining ground throughout the European Union. The impact of work on health and the impact of health on the ability to work, protective equipment. Investigation of occupational health and occupational diseases, documentation and reporting.
Required literatue:	• József Horváth (2017): Work, fire and environmental protection. Budapest, Műszaki könyvkiadó, ISBN 9789632750569. • József Horváth (2018). Budapest, Műszaki könyvkiadó, ISBN 9789632751238, 224 pages, paperback. • Robert H. Friis (2019) Essentials of environmental health. ISBN:9781284123975, 3rd edition, 410 pages. Kavianian, Hamid R.:(1990): "Occupational and Environmental Safety Engineering and Management", Van Norstrand Reinhold Company, New York, ISBN 0-442-23822-3.
Bibliographic data of the digitally available course material, access route (link):	• https://ehs.mk.uni-pannon.hu/miazehs.html • http://samples.jbpub.com/9781284026337/78903_ch00_fmxx_5807.pdf • https://www.pdfdrive.com/engineering-safety-e165477.html https://elearning.uni-obuda.hu/
Presentation of teaching methods and digital methodologies used in the transfer of knowledge:	lectures, classroom exercises, demonstrations, use of IT tools and techniques.
The way to be held to account:	written test (v) To obtain the signature, the written report (written examination) must be written at a minimum level of 40%.

Title of the course:	**Environmental pollution and monitoring**
Knowledge to be acquired:	The concept of pollution; Types of pollution; Types of pollution: organic, inorganic and biological; Media of pollution: soil, water, air; Spread of pollution; Detection, containment and remediation of pollution; The concept of monitoring; Types of monitoring: exploratory regular and night monitoring; Soil monitoring; Natural water monitoring (WFD, Clean Water Act); Wastewater monitoring; Drinking water monitoring; Industrial and public waters (e.g. (e.g. swimming pools); Air monitoring
Required literatue:	• János Szlávik (2013). Budapest, CompLex Publishing, ISBN: 978 963 295 820 • J. Jeffrey Peirce, P. Aarne Vesilind, Ruth F. Weiner Environmental Pollution and Control, 4th ed. 1997, Elsevier, ISBN: 0750698993 • G. Bruce Wiersma (Ed) Environmental Monitoring, Taylor & Francis, 2004, ISBN: 9781566706414 • EU Water Framework Directive, ISBN 978-92-79-43586-7
Bibliographic data of the digitally available course material, access route (link):	• Gábor Szalkai, Péter László: Good Management Practices to reduce point source pesticide pollution https://hucpa.hu/wp-content/uploads/2017/09/Kezikonyv_Pontszeru_Szennyezesek.pdf • https://environment.ec.europa.eu/topics/water/water-framework-directive_en • https://www.digi.com/blog/post/what-is-environmental-monitoring • Endre Domokos, József Kovács, Edina Tóthné File, Environmental monitoring, 2014, ISBN: 978-615-5044-92-2, https://tudastar.mk.uni-pannon.hu/anyagok/25-Monitoring.pdf
Presentation of teaching methods and digital methodologies used in the transfer of knowledge:	lectures, exercises, group work, use of IT tools
The way to be held to account:	mid-year ticket The mid-term mark is based on the final examination (test) at the end of the semester and the essay submitted. 50% level.

Title of the course:	**Ecotoxicology and environmental health**
Knowledge to be acquired:	Introduction to ecotoxicology. Overview of ecotoxicological research. The relationship between ecotoxicology and environmental protection. Ecosystems and ecotoxicology Fate of toxic substances in environmental systems. Criteria for toxicological and ecotoxicological tests. Micropollutants as environmental stressors. Agricultural and industrial pollutants of greatest concern and their effects on the environment. Types of toxicological tests. Commonly used test organisations, common test methods. Ecotoxicology and risk assessment, types of early warning systems. Toxicological limit values, national and international standard systems, authorisation procedures.
Required literatue:	• Darvas Béla (ed.) Az Ökotoxikológia folyóirat 1. és 2. évfolyam, 1. és 2. szám 2019-2020. ISSN 2732-2556 • Béla Darvas - András Székács (ed.) (2006): Mezőgazdasági ökotoxikológia, L'Harmattan Kiadó, ISBN: 9637343393 • Haller G., Ocskó Z. (2017). Volume II. Agrinex Bt., Budapest. ISSN 1216 2191 • Katalin Grulz, Béla Horváth, Mónika Molnár (2001). Műegyetemi Kiadó
Bibliographic data of the digitally available course material, access route (link):	• Éva Milinki (2013):Ecotoxicology and environmental protection. Eszterházi Károly College. http://www.tankonyvtar.hu/hu/tartalom/tamop412A/2011-0038_03_milinki_hu/adatok.html • https://www.nnk.gov.hu/index.php/kemiai-biztonsagi-es-kompetens-hatosagi-fo/biocid/segedletek • https://echa.europa.eu/hu/guidance-documents/guidance-on-biocides-legislation • https://www.biokontroll.hu/noevenyvedszerek-koernyezetanalitikai-es-oekotoxikologiai-kockazatai/
Presentation of teaching methods and digital methodologies used in the transfer of knowledge:	lecture, practice, communication-written and oral, group work, lab work
The way to be held to account:	type of exam: oral Signature condition: attending classes, active participation written report and written examination min. 50% must also be completed

Title of the course:	**Certification in OH&S and in Environmental management systems**
Knowledge to be acquired:	The rationale for the operation of standardised (ISO) management systems. The objectives, structure and basics of the standard requirements of KIR and MEBIR. The role of documentation and audit in operations. Audit methodology and its practical application in reviewing the operation of management systems. Criteria for certification. The advantages and conditions for integrating management systems and the characteristics of their audit.
Required literatue:	• ISO 14001:2015 • ISO 45001:2018 • ISO 19011:2018 • Environmental Management Systems; Dr. Ákos Rédey; University of Pannonia - Institute of Environmental Engineering Veszprém, 2013, ISBN: 978-615-5044-43-4
Bibliographic data of the digitally available course material, access route (link):	• Occupational safety and health Employment surveillance / information page: http://www.ommf.gov.hu/index.html?akt_menu=581 • Göndör V., Dr. Gregász T., Kertész Z.: Advanced decision support tools (https://elearning.uni-obuda.hu/ <<EDT electronic note, Óbuda University, (2018.)>> • https://elearning.uni-obuda.hu/ <<course page educational materials>>
Presentation of teaching methods and digital methodologies used in the transfer of knowledge:	lectures, group work, exercises, presentations, written and oral communication, use of IT tools and techniques
The way to be held to account:	assignments to be handed in, contact

Title of the course:	**Environmental engineering project work**
Knowledge to be acquired:	Combining theoretical knowledge with practical experience by solving a specific environmental engineering problem. Students are involved in the research and application activities of the institute and participate in current industrial tasks. The task will be solved by the students in groups of 2-4 students, under the guidance of a mentor teacher: from problem identification through the workflow to the solution proposal. Students present the final product in a summary report.
Required literatue:	• Zsuzsa Angyal (ed.): Environmental Science Field Exercise ELTE TTK note 2012. • M. Nádasdi Mária: Theory and Practice of Project Education (2010), Association of Hungarian Talent Support Organisations, ISSN: 2062-5936 (https://tehetseg.hu/konyv/projektoktatas-elmelete-es-gyakorlata)
Bibliographic data of the digitally available course material, access route (link):	• Previous project work and project reports - portfolios as a sample in e-learning https://elearning.uni-obuda.hu/
Presentation of teaching methods and digital methodologies used in the transfer of knowledge:	practice, project work, written and oral communication, use of IT tools and techniques
The way to be held to account:	mid-year ticket Intermediate mark: written and oral report (detailed description of the problem - solution proposals)