UNIVERSITY OF PETROȘANI
FACULTY OF MINES

CURRICULUM

(valid starting with the academic year **2026-2027**)

Field: **Environmental Engineering**

Study programme**: Environmental Quality Control and Monitoring**

Duration of studies: **4 semesters**

Form of education: **full-time (IF)**

I. Requirements for obtaining the diploma

120 credits, of which:

- credits for compulsory subjects: **107**
- credits for optional subjects: **13**

II. Course of studies (in number of weeks)

Year	Teaching activities		Exam sessions			Holiday		
	Sem. I	Sem. II	I	V	R	Winter	Inter-semester	Summer
Year I	14	14	3	3	3	3	1	12
Year II	14	14	3	3	3	3	1	-

III. Number of hours per week

	Sem. I	Sem. II
Year I	20	20
Year II	20	14

IV. Dissertation examination

Period for the dissertation examination: June-July session, September session

Content of the dissertation examination:

- Presentation and defence of the dissertation - **10 credits**

V. Method of choosing the optional subjects

One subject is chosen from the package of optional subjects for each semester

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ENVIRONMENTAL QUALITY CONTROL AND MONITORING

Mission of the study programme *Environmental Quality Control and Monitoring*

The mission of the study programme *Environmental Quality Control and Monitoring* is to train specialists with advanced training, able to apply scientific, technical and legislative knowledge for the control, assessment and monitoring of environmental quality, in diverse institutional and organisational contexts.

The programme aims to develop the competences needed to identify, analyse and manage environmental problems, using modern methods of measurement, analysis and modelling, as well as to substantiate decisions in the field of environmental protection, in accordance with the requirements of sustainable development, the legislation in force and the principles of professional ethics.

Objectives of the study programme *Environmental Quality Control and Monitoring*

General objective

Training graduates able to contribute competently and responsibly to the control, assessment and monitoring of environmental quality, through the integrated application of specialist knowledge, professional skills and the principles of responsibility and autonomy, within public institutions, economic operators and organisations involved in environmental protection.

Specific objectives

- Developing the competences needed for the control, assessment and monitoring of environmental quality, by applying the scientific, technical and legislative knowledge specific to the field.
- Developing practical skills for the use of modern methods and techniques for measuring, analysing and interpreting environmental data, in order to substantiate decisions.
- Developing the ability to apply environmental legislation and regulations in control, monitoring and environmental quality management activities, in diverse institutional and economic contexts.
- Developing the competences of professional communication, responsibility, ethics and lifelong learning required to carry out activities specific to the field of environmental protection.

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Field **ENVIRONMENTAL ENGINEERING**

Study programme **ENVIRONMENTAL QUALITY CONTROL AND MONITORING**

CURRICULUM

No.	YEAR I Subject	Subject code	Subj. type	Semester 1				Semester 2				Credit points		Ei, Ci, Vi		No. of teaching hours per subject			Total individual study hours	Total subject hours
				C	S	L	P	C	S	L	P	Sem.1	Sem.2	Sem.1	Sem.2	Lect.*	Appl.**	Total		
1	Ecological analysis and assessment of ecosystem status	UPFMCMCM101	DF	2		1	1					5		E1		28	28	56	69	125
2	Instrumental methods for measuring physical quantities	UPFMCMCM102	DF	1		2						5		E1		14	28	42	83	125
3	Meteorology, global warming and climate risks	UPFMCMCM103	DF	2	1							5		E1		28	14	42	83	125
4	Management of protected natural areas for the conservation of bio- and geodiversity	UPFMCMCM104	DS	2	1		1					5		E1		28	28	56	69	125
5	Sampling and sample processing techniques	UPFMCMCM105	DF	1	2							5		C1		14	28	42	83	125
6	Optional subject OP 11	UPFMCMCM106	DS	1		2						5		C1		14	28	42	83	125
7	Management of research projects and European funding in the environmental field	UPFMCMCM107	DC					2			2		4		E2	28	28	56	44	100
8	Environmental health - ecotoxicology, risk assessment and sustainability	UPFMCMCM108	DS					2	2				5		E2	28	28	56	69	100
9	Advanced methods of environmental chemical analysis	UPFMCMCM109	DF					2		2			4		E2	28	28	56	44	125
10	Metrology, statistical processing and interpretation of experimental data	UPFMCMCM110	DF					1		2			4		E2	14	28	42	58	100
11	Regulations and legislation on environmental quality control	UPFMCMCM111	DS					1	1				4		E2	14	14	28	72	100
12	Optional subject OP 12	UPFMCMCM112	DS					2	1				4		C2	28	14	42	58	100
13	Professional internship (3 wks. X 40 hrs/ wk.)	UPFMCMCM113	DS							120			5		C2	0	120	120	5	125
TOTAL YEAR I				9	4	6	1	10	4	4	2	30	30	9E +4C		266	414	680	820	1500
												60								

* - Delivery mode: 50% Face to face (FF) and 50% Synchronous online (OS)

** - Delivery mode: 65% Face to face (FF) and 35% Synchronous online (OS)

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No.	YEAR II Subject	Subject code	Subj. type	Semester 3				Semester 4				Credit points		Ei, Ci, Vi		No. of teaching hours per subject			Total individual study hours	Total subject hours
				C	S	L	P	C	S	L	P	Sem. 1	Sem. 2	Sem 1	Sem 2	Lect.*	Appl.**	Total		
14	Modern techniques for environmental quality control and monitoring	UPFMCMCM214	DS	2		1	1					5		E3		28	28	56	44	100
15	Energy resources management	UPFMCMCM215	DS	1	1							3		C3		14	14	28	47	75
16	Advanced technologies for decontamination of polluted sites	UPFMCMCM216	DS	2		1						5		E3		28	14	42	83	125
17	Management of waste and hazardous substances	UPFMCMCM217	DS	1		2						5		E3		14	28	42	83	125
18	Life cycle assessment, circular economy and green accounting	UPFMCMCM218	DS	1	2							5		E3		14	28	42	83	125
19	Ethics and academic integrity	UPFMCMCM219	DC	1	1							3		C3		14	14	28	47	75
20	Optional subject OP 21	UPFMCMCM220	DS	2	1							4		E3		28	14	42	58	100
21	Internship for dissertation preparation	UPFMCMCM221	DS							8			10		C4	0	112	112	138	250
22	Preparation of the dissertation thesis	UPFMCMCM222	DS								14		20		C4	0	196	196	304	500
TOTAL YEAR II				10	6	3	1	0	0	0	14	30	30	4E +4C		140	448	588	887	1500
												60								
23	Creativity and innovation (elective)	UPFMCMCM223	DFA	2	1							4		C3		28	14	42	58	100

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DISTRIBUTION OF HOURS BY SUBJECT GROUPS					
Total lecture hours:				**406**	
Total application hours:				**434**	
Total internship hours:				**428**	
Total hours :				**1268**	
Total lecture hours / Total hours (%) :	406	/	1268	x 100	32,02
Total application hours / Total hours (%)	434	/	1268	x 100	34,23
Total application hours / Total lecture hours	434	/	406		1,07
Total individual study hours / Total teaching hours	1707	/	1268		1,35
SUBJECT GROUPS				No. hours	No. hours/Total hours (%)
Fundamental subjects DF				**280**	**22,08**
Specialisation subjects DS				**904**	**71,29**
Complementary subjects DC				**84**	**6,62**
Compulsory subjects DOB				**1142**	**90,06**
Optional subjects DOP				**126**	**9,94**
Elective subjects DFA				**42**	**3,31**

REMARKS : For one credit point, 25 teaching and individual study hours are allocated

LEGEND : DF - fundamental subject; DS - specialisation subject; DC - complementary subject
DOB – compulsory subject; DOP – optional subject; DFA - elective subject
C - lecture, S - seminar, L - laboratory, P - project, Appl. - application hours
Ei, Ci, Vi - exam, colloquium, verification respectively in semester i, i =1 ÷ 4

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OPTIONAL SUBJECTS				
No.	Subject code	Year of study	Subject names	
6	DOP 11	I	Sustainable transport and connectivity systems	Transport ecology and control of pollutant emissions
12	DOP 12	I	Cultural and tourism heritage	Archaeology and assessment of historical sites
20	DOP 21	II	Accident risk assessment – SEVESO directives	Environmental risks

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ESCO competences from basic groups 2143 - Environmental protection engineers
2133 - Environmental protection professionals

Target occupations from the representative COR/ESCO basic group

214304 – Environmental protection engineer in the energy sector 214306 – Environmental pollution control engineer
214309 – Environmental protection research engineer

2133.3 - Environmental conservation researcher
2133.7 - Environmental protection researcher

Competences for the study programme ENVIRONMENTAL QUALITY CONTROL AND MONITORING

Professional competences

CP1 – analyses environmental protection data
CP2 – collects samples for analysis

CP3 – performs laboratory tests
CP4 – interprets scientific data
CP5 – applies scientific methods
CP6 – uses software tools for site simulation

CP7 – measures water quality parameters
CP8 – performs water chemical analysis
CP9 – analyses chemical samples
CP10 – prepares chemical samples
CP11 – uses environmental management monitoring devices
CP12 – performs environmental site assessments
CP13 – assesses environmental impact
CP14 – investigates pollution
CP15 – performs environmental audits
CP16 – performs risk analysis
CP17 – manages the environmental management system
CP18 – ensures compliance with environmental legislation
CP19 – develops environmental policy
CP20 – implements environmental protection measures
CP21 – performs scientific research
CP22 – drafts scientific and academic papers and technical documentation
CP23 – synthesises information
CP24 – prepares visual representations of information
CP25 – manages research data

CP26 – communicates scientific findings
CP27 – carries out environmental studies
CP28 – manages air quality
CP29 – measures pollution levels
CP30 – monitors water quality
CP31 – uses habitat monitoring techniques

CP32 – implements action plans in the field of biodiversity
CP33 – advises on nature conservation
CP34 – applies the principles of research ethics and scientific integrity in research activities
CP35 – applies health and safety standards

Transversal competences

CT1 – identifies problems
CT2 – critically evaluates information and its sources
CT3 – evaluates the impact of individual behaviour on the environment
CT4 – adopts ways to reduce pollution
CT5 – applies scientific, technological and engineering knowledge
CT6 – works in teams
CT7 – complies with regulations

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Learning outcomes for the study programme

KNOWLEDGE

C1. The graduate can describe the principles of metrology applied in the monitoring of environmental factors.
C2. The graduate can identify the ecological analysis methods used to assess natural and anthropised ecosystems.
C3. The graduate can explain climate mechanisms and the impact of global warming on environmental quality
C4. The graduate can identify the chemical methods used to determine environmental quality indicators.
C5. The graduate can describe the criteria for identifying land uses and the methods for recognising them.
C6. The graduate can identify standardised techniques for sampling and preserving environmental samples.
C7. The graduate can explain the principles of natural and anthropic landscape design used in assessing environmental quality.
C8. The graduate can describe the instrumental methods for measuring physical quantities relevant to the environment.
C9. The graduate can describe environmental quality control procedures in public and private organisations.
C10. The graduate can explain the relationship between environmental factors and the health status of the population in the urban environment.
C11. The graduate can describe the structure and content of environmental quality monitoring programmes.
C12. The graduate can identify the legislative and regulatory framework applicable to environmental quality control.
C13. The graduate can explain ecotoxicological mechanisms and the effects of pollutants on organisms and ecosystems.
C14. The graduate can analyse methods for interpreting experimental data and environmental measurements.
C15. The graduate can describe, identify and summarise fundamental concepts and principles in the field of environmental engineering

SKILLS

A1. The graduate is able to apply metrological methods to validate the results of environmental measurements.
A2. The graduate is able to analyse the status of ecosystems based on specific ecological indicators.
A3. The graduate is able to use climate data in assessing environmental risks.
A4. The graduate is able to perform chemical analyses to determine the quality of environmental factors.
A5. The graduate is able to identify and map land uses within environmental studies.
A6. The graduate is able to correctly carry out the sampling and processing of environmental samples.
A7. The graduate is able to assess the impact of anthropic developments on the landscape.
A8. The graduate is able to use measuring instruments to determine the physical parameters of the environment.
A9. The graduate is able to apply instrumental chemical analysis techniques in environmental quality control activities.
A10. The graduate is able to analyse the relationship between the state of the environment and population health.
A11. The graduate is able to develop environmental quality monitoring programmes.
A12. The graduate is able to apply environmental legislation in control and inspection activities.
A13. The graduate is able to interpret ecotoxicological data in environmental risk assessment.
A14. The graduate is able to process and interpret experimental data in order to prepare environmental reports.

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A15. The graduate is able to carry out applied studies and research papers.

RESPONSIBILITY AND AUTONOMY

RA1. The graduate complies with the rules of professional ethics in environmental control and monitoring activities.
RA2. The graduate takes responsibility for the accuracy of the data and reports prepared.
RA3. The graduate organises environmental monitoring activities within a team.
RA4. The graduate acts autonomously in solving professional problems specific to the field.
RA5. The graduate collaborates with public institutions and economic operators in activities specific to the environmental field.
RA6. The graduate integrates legislative requirements into the professional decision-making process.
RA7. The graduate shows the ability to adapt to technological and legislative changes.
RA8. The graduate takes responsibility for continuous professional training and career development.

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