UNIVERSITY OF PETROȘANI
FACULTY OF MINES

CURRICULUM

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

Field**: Environmental Engineering**

Study programme: **Environmental Engineering and Protection in Industry**

Graduate title: **Engineer**

Duration of studies: **8 semesters**

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

I. Requirements for obtaining the diploma

240 credits, of which:

- Credits for compulsory subjects: **214**
- Credits for optional subjects: **26**

4 credits for the subject Physical Education

10 credits for passing the diploma examination

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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	12
Year III	14	14	3	3	3	3	1	12
Year IV	14	14	3	3	3	3	1	-

III. Number of hours per week

	Sem. I	Sem. II
Year I	26	26
Year II	26	26
Year III	26	26
Year IV	26	26

IV. Diploma examination

Period for the diploma examination: **June-July session, September session**
Content of the diploma examination:

- Test 1: Assessment of fundamental and specialist knowledge - **5 credits**
- Test 2: Presentation and defence of the diploma project - **5 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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INGINERIA ȘI PROTECȚIA MEDIULUI ÎN INDUSTRIE

Mission of the study programme Environmental Engineering and Protection in Industry

The study programme **Environmental Engineering and Protection in Industry** of the University of Petroşani – Faculty of Mines aligns its **mission** with **sustainable development** and **economic competitiveness**, responding to national and European requirements for compliance, pollution prevention and efficient use of resources. It trains **environmental engineers** able to integrate technical and managerial solutions in industry, carrying out the assessment, design, implementation, monitoring and optimisation of measures for preventing, controlling and remediating anthropic impact, through BAT/BREF, legislation and ISO 14001. The mission includes education, research and civic engagement, based on integrity and public responsibility, with scientific rigour and professional ethics, embraced by all students.

Objectives of the study programme Environmental Engineering and Protection in Industry

The study programme **Environmental Engineering and Protection in Industry** aims to train specialists in accordance with the **National Qualifications Framework** and the benchmarks of the **European qualifications framework (ESCO)**, as well as the current requirements of the labour market. The process of training future engineers is **designed and structured** so as to ensure the **achievement of the following objectives**:

(1) consolidating engineering and specialist knowledge for understanding industrial processes and their interactions with the environment;

(2) developing competences in the assessment, measurement, analysis and modelling of pollution phenomena;

(3) developing practical skills in designing/operating remediation solutions (water, air, soil) and waste management;

(4) acquiring the ability to prepare environmental studies and to substantiate decisions in accordance with legislation, **BAT/BREF** requirements and **ISO 14000/ISO 14001** standards;

(5) using modern tools (software applications, databases, GIS, monitoring) for integrated environmental management;

(6) increasing professional insertion and developing ethical conduct, communication and collaboration with institutions/companies and academic partners.

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Field **ENVIRONMENTAL ENGINEERING**

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No.	YEAR I	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
	Subject			C	S	L	P	C	S	L	P	Sem.1	Sem.2	Sem.1	Sem.2	Lect.	Appl.	Total		
1	Mathematical Analysis	MDPMFO101	F	2	2							5		E1		28	28	56	69	125
2	Linear Algebra, Analytic and Differential Geometry	MDPMFO102	F	2	2							5		E1		28	28	56	69	125
3	Chemistry	MDPMFO103	F	2		2						4		E1		28	28	56	44	100
4	Applied Computer Science I	MDPMFO104	F	2		3						5		E1		28	42	70	55	125
5	Descriptive Geometry	MDPMFO105	F	2		1						5		E1		28	14	42	83	125
6	Foreign Language I	MDPMCO106	C		2							3		C1		0	28	28	47	75
7	Physical Education and Sport I	MDPMCO107	C		1							1		A/R		0	14	14	11	25
8	**Optional subject OP 11**	MDPMSO108	S	2	1							3		C1		28	14	42	33	75
9	Technical Drawing and Computer Graphics	MDPMFO109	F					2		1			4		C2	28	14	42	58	100
10	Physics	MDPMFO110	F					2		2			4		E2	28	28	56	44	100
11	Mechanics	MDPMSO111	S					2		1			5		E2	28	14	42	83	125
12	Mineralogy and Petrology	MDPMSO112	S					2		2			5		E2	28	28	56	69	125
13	Applied Computer Science II	MDPMFO113	F					2		3			5		E2	28	42	70	55	125
14	**Optional subject OP 12**	MDPMFO114	F					2	2				5		E2	28	28	56	69	125
15	Physical Education and Sport II	MDPMCO115	C						1				1		A/R	0	14	14	11	25
16	Foreign Language II	MDPMCO116	C						2				2		C2	0	28	28	22	50
TOTAL YEAR I				12	8	6	0	12	5	9	0	30	30	10E + 6C		336	392	728	822	1550
												60								

Physical Education and Sport - credits in addition to the total of 60

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No.	**YEAR II**	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
	Subject			C	S	L	P	C	S	L	P	Sem.1	Sem.2	Sem.1	Sem.2	Lect.	Appl.	Total		
17	Strength of Materials	MDPMSO217	S	2		1						4		E3		28	14	42	58	100
18	Electrical Engineering	MDPMSO218	S	2		1						4		E3		28	14	42	58	100
19	Thermal Engineering	MDPMSO219	S	2		1						4		C3		28	14	42	58	100
20	Environmental Geology	MDPMSO220	S	2		2						4		E3		28	28	56	44	100
21	Environmental Physics	MDPMSO221	S	2		2						4		E3		28	28	56	44	100
22	Surveying	MDPMSO222	S	2		1						4		E3		28	14	42	58	100
23	**Optional subject OP 21**	MDPMSO223	S	2		1						4		E3		28	14	42	58	100
24	Physical Education and Sport III	MDPMCO224	C		1							1		A/R		0	14	14	11	25
25	Foreign Language III	MDPMCO225	C		2							2		C3		0	28	28	22	50
26	Ecology	MDPMFO226	F					2		2			4		E4	28	28	56	44	100
27	Environmental Chemistry	MDPMSO227	S					2		2			4		E4	28	28	56	44	100
28	Natural Resources Management	MDPMSO228	S					2	2				4		E4	28	28	56	44	100
29	Elements of Electrochemistry and Corrosion	MDPMSO229	S					2		2			4		C4	28	28	56	44	100
30	Fluid Mechanics	MDPMSO230	S					2		1			4		E4	28	14	42	58	100
31	Investigation of Environmental Factors	MDPMSO223	S					2		2			4		E4	28	28	56	44	100
32	Foreign Language IV	MDPMCO232	C						2				2		C4	0	28	28	22	50
33	Physical Education and Sport IV	MDPMCO233	C						1				1		A/R	0	14	14	11	25
34	Internship (3 weeks x 30 hours/week)	MDPMSO234	S								90		4		C4	0	90	90	10	100
TOTAL YEAR II				14	3	9	0	12	5	9	90	30	30	11E + 7C		364	454	818	732	1550
												60								
35	Entrepreneurship	MDPMCFA235	X	2	1							4		42		28	14	42	58	100

Physical Education and Sport - credits in addition to the total of 60

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CURRICULUM

No.	YEAR III	Subject code	Subj. type	Semester 5				Semester 6				Credit points		Ei, Ci, Vi		No. of teaching hours per subject			Total individual study hours	Total subject hours
	Subject			C	S	L	P	C	S	L	P	Sem.1	Sem.2	Sem.1	Sem.2	Lect.	Appl.	Total		
36	Physico-chemical Methods of Analysis	MDPMSO336	S	2		1						4		E5		28	14	42	58	100
37	Environmental Pollution	MDPMSO337	S	3		2	1					6		E5		42	42	84	66	150
38	Meteorology and Climatology	MDPMSO338	S	2		1						4		E5		28	14	42	58	100
39	Radiation Sources and Protection Techniques	MDPMSO339	S	2		2						4		E5		28	28	56	44	100
40	Mining Techniques and Technologies	MDPMSO340	S	2	1							4		C5		28	14	42	58	100
41	Pedology and Soil Improvement Techniques	MDPMSO341	S	2		2						4		E5		28	28	56	44	100
42	**Optional subject OP 31**	MDPMSO342	S	2		1						4		C5		28	14	42	58	100
43	Stability of Slopes and Hillsides	MDPMSO343	S					2	1		2		4		E6	28	42	70	30	100
44	Transfer Phenomena and Unit Operations	MDPMSO344	S					2	1				4		E6	28	14	42	58	100
45	Technologies Used in the Metallurgical and Energy Industries	MDPMSO345	S					2		2			4		C6	28	28	56	44	100
46	Air Pollution Control Technologies and Equipment	MDPMSO346	S					2		2			4		E6	28	28	56	44	100
47	Biotechnologies in Environmental Protection and Engineering	MDPMSO347	S					2		1			3		E6	28	14	42	33	75
48	Materials Science and Engineering	MDPMSO348	S					2		1			3		C6	28	14	42	33	75
49	**Optional subject OP 32**	MDPMSO349	S					2		2			4		E6	28	28	56	44	100
50	Specialised internship (3 weeks x 30 hours/week)	MDPMSO350	S								90		4		C6	0	90	90	10	100
TOTAL year III				15	2	8	1	14	2	8	92	30	30	10E + 5C		406	412	818	682	1500
												60								
51	Noise Pollution Control	MDPMFA351	X	3		2						4		C3		42	28	70	30	100
52	Sensor Systems in Environmental Engineering	MDPMFA352	X	3		2						4		C3		42	28	70	30	100
53	Technical Communication	MDPMFA353	X					2		2			3	C4		28	28	56	19	75

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No.	YEAR IV	Subject code	Subj. type	Semester 7				Semester 8				Credit points		Ei, Ci, Vi		No. of teaching hours per subject			Total individual study hours	Total subject hours
	Subject			C	S	L	P	C	S	L	P	Sem.1	Sem.2	Sem.1	Sem.2	Lect.	Appl.	Total		
54	Anthropic Impact on the Environment	MDPMSO454	S	2	1		2					5		E7		28	42	70	55	125
55	Rehabilitation of Degraded Land	MDPMSO455	S	2	1		2					5		E7		28	42	70	55	125
56	Waste Processing Technologies	MDPMSO456	S	2	1							4		E7		28	14	42	58	100
57	Environmental Monitoring	MDPMSO457	S	3		2						5		E7		42	28	70	55	125
58	Geographic Information Systems (GIS)	MDPMSO458	S	2		1						5		E7		28	14	42	83	125
59	Environmental Legislation	MDPMSO459	S	1	1							3		C7		14	14	28	47	75
60	**Optional subject OP 41**	MDPMSO460	S	2		1						3		C7		28	14	42	33	75
61	Use of Underground Space	MDPMSO461	S					2		1			3		C8	28	14	42	33	75
62	Integrated Environmental Management Systems	MDPMSO462	S					2	2				3		E8	28	28	56	19	75
63	Sustainable Development	MDPMSO463	S					1	1				3		C8	14	14	28	47	75
64	Wastewater Treatment Technologies	MDPMSO464	S					2		1	1		4		E8	28	28	56	44	100
65	Integrated Waste Management	MDPMSO465	S					2	1				4		E8	28	14	42	58	100
66	Soil Remediation Technologies and Equipment	MDPMSO466	S					2		1			3		E8	28	14	42	33	75
67	**Optional subject OP 42**	MDPMSO467	S					2		1			3		E8	28	14	42	33	75
68	Internship for diploma project preparation	MDPMSO468	S										3		C8	0	60	60	15	75
69	Preparation of the diploma project	MDPMSO469	S								4		4		C8	0	56	56	44	100
TOTAL year IV				14	4	4	4	13	4	4	5	30	30	10E + 6C		378	410	788	712	1500
												60								
71	Treatment of Toxic and Hazardous Waste	MDPMFA471	X	2		2						5		C3		28	28	56	69	125
72	Specific Machinery and Equipment in Environmental Engineering	MDPMFA472	X	2		2						4		C3		28	28	56	44	100
73	Environmental Balance	MDPMFA473	X					2		2			4	C4		28	28	56	44	100
74	Environmental Economics	MDPMFA474	X	2		1						3		C3		28	14	42	33	75

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OPTIONAL SUBJECTS				
No. crt.	Subject code	Year of study	Subject names	
8	OP 11	I	Demography and the Environment	Environmental Protection
14	OP12	I	Numerical Methods	Probability Theory and Mathematical Statistics
23	OP 21	II	Environmental Microbiology	Biology
42	OP31	III	Coastal Engineering	Engineering Geology
49	OP32	III	Hydrology and Hydrogeology	Water Management
60	OP 41	IV	Ethics and academic integrity	Fundamentals of Experimental Research
68	OP 42	IV	Low Environmental Impact Technologies	Analysis and Synthesis of Technological Processes

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Basic group from COR/ISCO-08/ESCO representative of the study programme Environmental Engineering and Protection in Industry

2141 Industrial and production engineers

Target occupations from the representative COR/ESCO basic group of the study programme Environmental Engineering and Protection in Industry

214305 - Environmental protection process engineer
214309 - Environmental protection research engineer
214311 - Environmental management systems auditor/assessor engineer
2143.1 - Environmental engineer
2143.3 – Wastewater engineer

Competences for the study programme Environmental Engineering and Protection in Industry

Professional competences

CP1. Assesses environmental impact
CP2. Performs environmental audits
CP3. Reports pollution incidents
CP4. Carries out environmental studies
CP5. Measures pollution levels
CP6. Investigates pollution
CP7. Advises on pollution prevention
CP8. Develops remediation strategies for contaminated sites
CP 9. Collects samples for analysis

CP 10. Analyses environmental protection data
CP 11. Advises on the remediation of contaminated sites
CP 12. Conducts environmental surveys
CP 13. Designs wastewater collection and wastewater treatment systems
CP 14. Performs scientific research
CP 15. Develops waste management procedures
CP 16. Communicates on the environmental impact of mining
CP 17. Manages environmental impact
CP 18. Inspects recycling procedures and technologies
CP 19. Ensures compliance with legislative regulations in the waste sector
CP 20. Provides staff training on recycling programmes

CP 21. Develops environmental policy
CP 22. Ensures compliance with environmental legislation
CP 23. Approves engineering designs
CP 24. Prepares scientific reports
CP 25. Keeps records of mining operations
CP 26. Communicates on the environmental impact of mining
CP 27. Approaches problems critically
CP 28. Obtains the appropriate licences
CP 29. Updates licences
CP 30. Ensures quality control

Transversal competences

CT1. Thinks analytically
CT2. Applies scientific, technological and engineering knowledge
CT3. Works in teams
CT4. Complies with regulations
CT5. Complies with workplace safety rules

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Learning outcomes for the study programme Environmental Engineering and Protection in Industry

Knowledge generated by the learning outcomes for the study programme Environmental Engineering and Protection in Industry

C1. Identifies and describes fundamental concepts, principles and methods in the field of environmental engineering, industrial environmental protection and sustainable technologies.
C2. Identifies the technological processes and equipment used for pollution reduction and industrial waste management.
C3. Explains the physical, chemical and biological phenomena involved in environmental protection and interprets the technical documentation specific to industrial processes.
C4. Describes the legislative framework, standards and environmental policies applicable to industrial activities.

Skills generated by the learning outcomes for the study programme Environmental Engineering and Protection in Industry

A1. Applies methods of analysis, modelling and simulation of environmental protection and pollutant treatment processes.
A2. Applies techniques for monitoring, controlling and assessing environmental quality using modern instruments and digital technologies.
A3. Applies methods for sampling, analysing and interpreting environmental data for water, air, soil and waste, complying with specific standards and procedures.
A4. Applies engineering solutions for reducing emissions, treating wastewater and managing waste from industrial processes.
A5. Applies principles of design, optimisation and energy efficiency of technological and environmental installations.
A6. Evaluates the performance of industrial installations, the efficiency of treatment processes and their impact on the environment and population health.
A7. Assesses the environmental risks associated with industrial activities and proposes prevention, control and remediation measures.
A8. Applies principles of waste management, environmental risk management and sustainable development in engineering activities.
A9. Applies IT tools and specialised software (CAD, GIS, SCADA) for the design, monitoring and analysis of environmental processes.
A10. Evaluates the environmental impact of industrial technologies, identifies non-conformities and proposes sustainable technical-economic solutions for pollution reduction.

Responsibility and autonomy generated by the learning outcomes for the study programme Environmental Engineering and Protection in Industry

RA1. Develops the ability to work autonomously and in multidisciplinary teams for the design and optimisation of ecological industrial processes.
RA2. Initiates and manages actions to improve environmental performance and compliance with environmental protection regulations.
RA3. Takes responsibility for technical and engineering decisions, respecting ethical, safety and sustainability principles.
RA4. Continuously develops professional competences through self-learning and adaptation to the evolution of environmental protection technologies.

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