UNIVERSITY OF PETROŞANI
FACULTY OF MINES

CURRICULUM

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

Field: **Mines, Oil and Gas**

Study programme: **Mine Surveying**

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: **212**
- credits for optional subjects: **28**

4 credits for Physical Education and Sport **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	2	3	1	12
Year II	14	14	3	3	2	3	1	12
Year III	14	14	3	3	2	3	1	12
Year IV	14	14	3	3	2	3	1	-

III. Number of hours per week

	Sem. I	Sem. II
Year I	26	26
Year II	27	27
Year III	27	28
Year IV	26	28

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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TOPO TOPOGRAFIE MINIERĂ

Mission of the Mine Surveying study programme

The mission of the bachelor's study programme "**Mine Surveying**" is consistent with the mission assumed by the University of Petroșani at academic, socio-economic, regional and national level in a European context and by the Faculty of Mines, and targets:

- ***the teaching (educational) mission***, designed as an interdisciplinary specialisation that trains specialists able to provide efficient solutions for design, execution and operation in the field of mining works and terrestrial measurements for various purposes (mine surveying, surveying, engineering surveying, cadastre works, monitoring of ground behaviour, planning, etc.);
- ***the scientific research mission***, consisting in organising and carrying out, under legal conditions, scientific research, technological development, design, consultancy and expertise activities;
- ***the civic and cultural mission***, consisting in organising the cultural, artistic and sports life of the university so that the Faculty of Mines also acquires the attributes of a centre of education, civilisation and culture for the socio-economic community of the area in which it operates.

Objectives of the Mine Surveying study programme

- ***training specialists*** so that graduates can work both in fields that require mine surveying specialists and in fundamental or applied research. The flexibility of the curricula enables future engineers to easily move towards other fields as well, so that they can access the labour market easily and quickly;

- ***employment of graduates*** according to the competences acquired in the field of mining engineering: graduates of the "**Mine Surveying**" specialisation have employment opportunities in underground mining operations or in quarries for surface mining, in design institutes in the field and in education, as well as in companies whose activity is the exploitation of mineral resources, land-use planning, terrestrial measurements and cadastre.
- ***growing, training and modernising*** an elite university teaching staff, producing research that aims to have scientific prestige and an active influence on industrial modernisation and cultural progress;
- ***developing research projects*** within the regional socio-economic development programme, with practical applicability in the industrial processes of economic operators;
- ***developing partnerships*** based on protocols on education and research issues with universities in Romania and abroad, and mobility of teaching staff and students;
- ***partnerships with EU countries*** for accessing international teaching and research programmes financed from European funds.

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UNIVERSITY OF PETROȘANI
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Field **MINES, OIL AND GAS**
Study programme **MINING ENGINEERING, MINE SURVEYING**

CURRICULUM

No. crt.	**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	Mathematical Analysis	MNTCFO101	F	2	2							5		E1		28	28	56	69	125
2	Linear Algebra, Analytic and Differential Geometry	MNTCFO102	F	2	2							5		E1		28	28	56	69	125
3	Chemistry	MNTCFO103	F	2		2						5		E1		28	28	56	69	125
4	Applied Computer Science I	MNTCFO104	F	2	0	2						4		E1		28	28	56	44	100
5	Descriptive Geometry	MNTCFO105	F	2		3						5		E1		28	42	70	55	125
6	Physical Education and Sport I	MNTCCO106	C		1							1		V1		0	14	14	11	25
7	Foreign Language I	MNTCCO107	C		2							2		C1		0	28	28	22	50
8	Ethics and academic integrity	MNTCCO108	C	1	1							3		C1		14	14	28	47	75
9	**Optional subject OP 11**	MNTCFO109	F					2	2				5		E2	28	28	56	69	125
10	**Optional subject OP 12**	MNTCFO110	F					2		1			4		E2	28	14	42	58	100
11	Physics	MNTCFO111	F					2		2			5		E2	28	28	56	69	125
12	Mechanics	MNTCFO112	F					2	2				4		E2	28	28	56	44	100
13	Applied Computer Science II	MNTCFO113	F					2	0	2			4		E2	28	28	56	44	100
14	Technical Drawing and Computer Graphics	MNTCFO114	F					2		2			5		C2	28	28	56	69	125
15	Physical Education and Sport II	MNTCCO115	C						1				1		V2	0	14	14	11	25
16	Foreign Language II	MNTCCO116	C						2				2		C2	0	28	28	22	50
TOTAL YEAR I				11	8	7	0	12	7	7	0	30	30	10E + 4C +2V		322	406	728	772	1500
												60								

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No.	**YEAR II**	Subject	Subj.	Semester 3				Semester 4				Credit points		Ei, Ci, Vi		No. of teaching hours per subject			Total individual	Total subject
crt.	Subject	code	type	C	S	L	P	C	S	L	P	Sem.1	Sem.2	Sem.1	Sem.2	Lect.	Appl.	Total	study hours	hours
17	Prospecting and Exploration	MNTCFO217	F	2		2						5		E3		28	28	56	69	125
18	Electrical Engineering	MNTCFO218	F	2		2						5		E3		28	28	56	69	125
19	Surveying	MNTCFO219	F	3		2						5		E3		42	28	70	55	125
20	**Optional subject OP 21**	MNTCFO220	F	2		1						4		E3		28	14	42	58	100
21	General and Stratigraphic Geology	MNTCFO221	F	3		2						4		C3		42	28	70	30	100
22	Underground Mining	MNTCFO222	F	2		1						4		E3		28	14	42	58	100
23	Physical Education and Sport III	MNTCCO223	C		1							1		V3		0	14	14	11	25
24	Foreign Language III	MNTCCO224	C		2							2		C3		0	28	28	22	50
25	Strength of Materials	MNTCFO225	F					2		1			4		E4	28	14	42	58	100
26	Mineralogy and Petrology	MNTCFO226	F					3		2			4		E4	42	28	70	30	100
27	Rock Mechanics	MNTCFO227	F					2		2			4		E4	28	28	56	44	100
28	Surface Mining I	MNTCFO228	F					2		2			4		E4	28	28	56	44	100
29	Underground Mining Construction	MNTCFO229	F					2		2			4		E4	28	28	56	44	100
30	Environmental Protection	MNTCFO230	F					2		2			3		C4	28	28	56	19	75
31	Foreign Language IV	MNTCCO231	C						2				2		C4	0	28	28	22	50
32	Physical Education and Sport IV	MNTCCO232	C						1				1		V4	0	14	14	11	25
33	Field internship (3 wks. x 30 hrs/wk.)	MNTCFO233	F								90		4		C4	0	90	90	10	100
TOTAL year II				14	3	10	0	13	3	11	90	30	30	10E + 5C+ 2V		378	468	846	654	1500
												60								

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CURRICULUM

No.	YEAR III	Subject	Subj.	Semester 5				Semester 6				Credit points		Ei, Ci, Vi		No. of teaching hours per subject			Total study hours	Total hours
	Subject	code	type	C	S	L	P	C	S	L	P	Sem.1	Sem.2	Sem.1	Sem.2	Lect.	Appl.	Total	individual	code
34	Geodetic Astronomy	MNTMSO334	S	2		1						5		E5		28	14	42	83	125
35	Surveying II	MNTMSO335	S	2		2						5		E5		28	28	56	69	125
36	**Optional subject OP 31**	MNTMSO336	S	3		2						5		C5		42	28	70	55	125
37	Geodetic Instruments and Measurement Methods	MNTMSO337	S	3		2						5		C5		42	28	70	55	125
38	Theory of Measurement Errors	MNTMSO338	S	3		2						5		E5		42	28	70	55	125
39	Mine Surveying I	MNTMSO339	S	2		3						5		E5		28	42	70	55	125
40	**Optional subject OP 32**	MNTMSO340	S					2		1			3		E6	28	14	42	33	75
41	Geodesy I	MNTMSO341	S					2		2			4		E6	28	28	56	44	100
42	Photogrammetry and Remote Sensing	MNTMSO342	S					3		2			4		E6	42	28	70	30	100
43	Engineering Surveying I	MNTMSO343	S					2		1			4		E6	28	14	42	58	100
44	Computer Graphics	MNTMSO344	S					2		2	1		4		C6	28	42	70	30	100
45	Mine Surveying II	MNTMSO345	S					2			2		3		C6	28	28	56	19	75
46	**Optional subject OP 33**	MNTMSO346	S					2		2			4		C6	28	28	56	44	100
47	Specialised internship (3 wks. x 30 hrs/wk.)	MNTMSO347	S								90		4		C6	0	90	90	10	100
TOTAL year III				15	0	12	0	15	0	10	93	30	30	8E + 6C		420	440	860	640	1500
												60								
48	Industrial Explosives	MNTMSF348	X	2		2						4		E5		28	28	56	44	100
49	Foundations	MNTMSF349	X	2		2						4		E5		28	28	56	44	100
50	Geostatistics and Deposit Evaluation	MNTMSF350	X	2		1						3		E5		28	28	56	19	75
51	Construction Economics and Legislation	MNTMSF351	X					2		2			4	E6		28	28	56	44	100
52	Stability of Slopes and Hillsides	MNTMSF352	X					2		2			4	E6		28	28	56	44	100

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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		
53	Geodesy II	MNTMSO453	S	2		2	2					5		E7		28	56	84	41	125
54	Engineering Surveying II	MNTMSO454	S	2		2						4		E7		28	14	42	58	100
55	Engineering Surveying III	MNTMSO455	S				1					2		C7		0	28	28	22	50
56	Geographic Information Systems	MNTMSO456	S	2		2						5		C7		28	28	56	69	125
57	Territorial Organisation and Planning	MNTMSO457	S	2		1						4		C7		28	14	42	58	100
58	Cadastre I	MNTMSO458	S	2		2						5		E7		28	28	56	69	125
59	Automation of Topo-Geodetic Works	MNTMSO459	S	2		2						5		E7		28	28	56	69	125
60	Satellite Geodesy	MNTMSO460	S					2		2			5		E8	28	28	56	69	125
61	Cadastre II	MNTMSO461	S					2		1			4		C8	28	14	42	58	100
62	Monitoring of Ground and Structure Behaviour	MNTMSO462	S					2		2			4		E8	28	28	56	44	100
63	**Optional subject OP 41**	MNTMSO463	S					2		1			4		E8	28	14	42	58	100
64	**Optional subject OP 42**	MNTMSO464	S					1		1			3		E8	14	14	28	47	75
65	Preparation and Drafting of Plans and Maps	MNTMSO465	S					2		1			4		E8	28	14	42	58	100
66	Preparation of the diploma project	MNTMSO466	S								9		6		C8	0	126	126	24	150
TOTAL year IV				12	0	10	4	11	0	8	9	30	30	9E + 5C		322	434	756	744	1500
												60								
67	Mine Transport and Installations	MNTMSF467	X	2		1						4		E7		28	14	42	58	100
68	Occupational Safety and Health	MNTMSF468	X	2		1						4		E7		28	14	42	58	100
69	Computer-Aided Mine Design	MNTMSF469	X	2		1						4		E7		28	14	42	58	100

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OPTIONAL SUBJECTS				
No. crt.	Subject code	Year of study	Subject names	
9	OP 11	I	Numerical Analysis	Probability Theory and Mathematical Statistics
10	OP 12	I	Materials Technology	Materials Science
20	OP 21	II	Management	Computer-Aided Design
36	OP 31	III	Mathematical Cartography	Digital Cartography
40	OP 32	III	Land-Use Planning and Urbanism	Theory and Practice of Urbanism
46	OP 33	III	Geometrisation of Deposits	Topographic Records Management
63	OP 41	IV	Real Estate Valuation	Mining Cadastre
64	OP 42	IV	Tunnels	Communication Routes

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DISTRIBUTION OF HOURS BY SUBJECT GROUPS						
Total lecture hours :	**1442**					
Total application hours :	**1748**					
Total hours :	**3190**					
Total lecture hours / Total hours (%) :	1442	/	3190	x 100		**45.20**
Total application hours / Total hours (%) :	1748	/	3190	x 100		**54.80**
Total lecture hours / Total application hours (%) :	1442	/	1748	x 100		**82.49**

SUBJECT GROUPS	No. hours	No. hours/Total hours (%)
Fundamental subjects DF	**1378**	**43.20**
Specialisation subjects DS	**1616**	**50.66**
Optional subjects	**378**	**11.85**
Complementary subjects	**196**	**6.14**
Elective subjects	**406**	**12.73**

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Basic group from COR/ISCO-08/ESCO representative of the Mine Surveying study programme

2165 Cartographers and Surveyors

Target occupations from the representative COR/ESCO basic group of the Mine Surveying study programme

Occupation title (COR)	COR code	Similar occupation title (ESCO)	ESCO code
Geodetic engineer	216502	Surveying analyst	2165.4
Surveying engineer	216504	Surveying analyst	2165.4
Mine surveying engineer	216505	Mine surveying analyst	2165.4.2
Cadastre advisor	216507	Cadastre engineer	2165.1
Cartographer	216501	Cartographer	2165.2

Competences for the Mine Surveying study programme
(according to ESCO)

Professional competences

CP1. The student/graduate adjusts surveying equipment
CP2. The student/graduate applies cartography
CP3. The student/graduate approves engineering designs
CP4. The student/graduate ensures compliance with safety legislation
CP5. The student/graduate collects cartographic data
CP6. The student/graduate collects geological data
CP7. The student/graduate collects data using GPS
CP8. The student/graduate creates cadastral maps
CP9. The student/graduate creates thematic maps
CP10. The student/graduate creates reports GIS
CP11. The student/graduate delineates the mining area
CP12. The student/graduate develops geological databases
CP13. The student/graduate documents surveying operations
CP14. The student/graduate performs surveying calculations
CP15. The student/graduate performs scientific research
CP16. The student/graduate performs surveying measurements
CP17. The student/graduate appraises properties
CP18. The student/graduate performs analytical mathematical calculations
CP19. The student/graduate uses geographic information systems
CP20. The student/graduate manages the cadastre
CP21. The student/graduate manages staff
CP22. The student/graduate identifies GIS issues
CP23. The student/graduate prepares work reports
CP24. The student/graduate maintains mine site plans
CP25. The student/graduate advises architects

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CP26. The student/graduate advises on environmental issues related to mining

CP27. The student/graduate operates surveying instruments
CP28. The student/graduate prepares scientific reports
CP29. The student/graduate prepares visual representations of information
CP30. The student/graduate prepares geological map sections
CP31. The student/graduate processes collected survey data
CP32. The student/graduate designs specific equipment
CP33. The student/graduate answers questions
CP34. The student/graduate complies with legal regulations

CP35. The student/graduate solves location and navigation problems using GPS

CP36. The student/graduate establishes property boundaries
CP37. The student/graduate studies aerial photographs
CP38. The student/graduate keeps records of mining operations
CP39. The student/graduate uses databases

CP40. The student/graduate uses application-specific interfaces
CP41. uses spreadsheet software

CP42. The student/graduate uses software CAD
CP43. The student/graduate uses technical drawing software

CP44. The student/graduate uses presentation software
CP45. The student/graduate uses data processing techniques

Transversal competences

CT1. The student/graduate takes responsibility

CT2. The student/graduate works in teams
CT3. The student/graduate is attentive to detail
CT4. The student/graduate complies with regulations
CT5. The student/graduate solves problems

CT6. The student/graduate plans
CT7. The student/graduate organises information, objects and resources

Learning outcomes for the Mine Surveying study programme

Knowledge

C1. The student/graduate identifies and describes basic concepts, principles and methods of mathematics, physics, chemistry, technical drawing, economics and computer science.

C2. The student/graduate explains and interprets theoretical and experimental results in mathematics, physics, chemistry, economics, technical drawing and computer science.

C3. The student/graduate describes the defining characteristics of the mining/ petroleum space consisting of the deposit, mining works, the natural and anthropic setting, human communities, etc.

C4. The student/graduate identifies and describes the technologies used in the extraction/ transport/ processing of mineral substances.

C5. The student/graduate describes software systems for database management, monitoring and modelling of extraction/ transport/ processing technologies.

C6. The student/graduate classifies and compares the principles and methods of designing extraction/ transport/ processing technologies.

C7. The student/graduate formulates and explains the physical and mathematical principles used in determining spatial shapes and positions.

C8. The student/graduate explains the principles and operation of the instruments used in geodetic engineering.

C9. The student/graduate describes graphic representations and explains how topographic maps and plans are prepared.

C10. The student/graduate identifies and describes the software systems used for processing, database management, graphics and modelling.

C11. The student/graduate analyses and compares geodetic, topographic, cartographic and photogrammetric methods for solving well-defined situations.

Skills

A1. The student/graduate operates with con-

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cepts, principles and basic methods of mathematics, physics, chemistry, technical drawing, economics and computer science.
A2. The student/graduate solves mathematics, physics and chemistry problems applicable in engineering and validates the solution obtained.
A3. The student/graduate performs engineering and economic calculations of medium complexity and associates them with hand-drawn or computer-aided design graphic representations.
A4. The student/graduate describes physico-chemical and economic phenomena and processes.
A5. The student/graduate applies assessment criteria and methods for the identification, modelling, experimentation, analysis and qualitative and quantitative appraisal of phenomena and processes specific to the fundamental field, including by using digital technologies.
A6. The student/graduate acquires and processes data, interprets theoretical and experimental results.
A7. The student/graduate devises solutions, in compliance with relevant standards, for engineering problems of medium complexity that meet specified needs, respecting requirements of public health, safety, welfare, environment, sustainability and economic factors, as well as other specific constraints.

A8. The student/graduate prepares execution and assembly technical drawings, hand-drawn or computer-aided.
A9. The student/graduate applies modern project management techniques, economic and decision-making techniques, including in a multidisciplinary framework.
A10. The student/graduate examines the geological shape and structure of the deposit, as well as the properties of the rocks hosting the useful mineral deposit.
A11. The student/graduate evaluates the exploitable useful mineral substance of the deposit, quantitatively and qualitatively.
A12. The student/graduate discovers and interprets the interdependencies between the components of the operating environment: deposit, mining works, natural and anthropic setting, human communities.
A13. The student/graduate debates and applies the legal framework governing mining and petroleum activities, in correlation with related legislation.
A14. The student/graduate uses and develops graphic representations associated with extraction/ transport/ processing technologies.

A15. The student/graduate uses specific theories and tools for evaluating structures or phenomena in the field.
A16. The student/graduate operates software systems for database management, monitoring and modelling of extraction/ transport/ processing technologies.

A17. The student/graduate develops customised software tools for solving specific problems.
A18. The student/graduate develops professional projects of medium complexity by selecting, combining and using concepts, principles and methodologies from the field.

A19. The student/graduate plans and organises the stages specific to the exploitation and processing of resources under conditions of sustainability and environmental protection.
A20. The student/graduate develops and applies occupational safety and health measures.
A21. The student/graduate operates with physical and mathematical principles for determining spatial shapes and positions.
A22. The student/graduate operates with reference and projection systems and examines the correlations between them.
A23. The student/graduate operates geodetic instruments for carrying out terrestrial measurements.
A24. The student/graduate performs the specific topographic surveys needed to prepare maps, topographic plans and thematic plans.
A25. The student/graduate performs topographic setting-out to transfer engineering designs onto the ground.
A26. The student/graduate draws up site, execution, cadastral and thematic topographic maps and plans.
A27. The student/graduate examines topographic and cadastral plans for revision.

A28. The student/graduate uses dedicated software, CAD and GIS tools for surveying, photogrammetry, cartography and cadastre applications.
A29. The student/graduate selects and applies basic concepts, principles and methods of the field for the digital modelling of terrain and engineering structures.
A30. The student/graduate operates with mathematical theories to validate the

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acquired data, to adjust field measurements and to evaluate the accuracy of the results obtained.

A31. The student/graduate develops professional projects for establishing and developing the geodetic or topographic networks needed for detail surveys or for setting out engineering objectives.

Responsibility and autonomy

RA1. The student/graduate applies the values of the ethics and deontology of the engineering profession.

RA2. The student/graduate practises logical reasoning, evaluation and self-evaluation in decision-making.

RA3. The student/graduate communicates effectively about engineering activities with a wide range of audiences.

RA4. The student/graduate is engaged in lifelong learning to acquire and implement knowledge as needed, using strategies of appropriate learning.

RA5. The student/graduate promotes dialogue, cooperation, respect for others and interculturality.

RA6. The student/graduate works effectively as a team member or team leader.

RA7. The student/graduate selects and uses bibliographic sources specific to the field.

RA8. The student/graduate demonstrates learning autonomy on issues specific to the field.

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