UNIVERSITY OF PETROȘANI
FACULTY OF MINES

CURRICULUM

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

Field: **Mines, Oil and Gas**

Study programme: **Computerised Mine Surveying and Cadastre**

Graduate title: **Master**

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: **102**
- credits for optional subjects: **18**

10 credits for passing the dissertation examination

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	-

III. Number of hours per week

	Sem. I	Sem. II
Year I	26	26
Year II	26	26

IV. Dissertation examination

Period for the dissertation examination: **June-July session, September session**
Content of the dissertation examination:
Test 1: Presentation and defence of the dissertation thesis - **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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TOPOGRAFIE MINIERĂ INFORMATIZATĂ ŞI CADASTRU

Mission of the Computerised Mine Surveying and Cadastre study programme

As an integral part of the University of Petroşani, the Faculty of Mines has as its main mission the training of specialists in fields and specialisations required by the labour market, in the spirit of the values of democracy, equal opportunities and the development of the human personality. The mission of the master's programme "**Computerised Mine Surveying and Cadastre**" is to provide students with the cognitive and behavioural competences needed to become good specialists in the computerisation and evaluation of mine surveying and cadastre works for various purposes (mining, territorial organisation and planning, design, setting out and execution of infrastructure works, hydrotechnical structures, tunnels, subways, etc.) and targets:

- acquiring notions on the use of modern techniques and technologies in carrying out surveying and cadastre works, improving the methods of extracting useful mineral substances, and the possibilities of building and preserving underground and surface structures;
- the master's programme offers students the most modern methods for solving surveying and cadastre problems, performing a qualitative analysis of them in accordance with European norms and regulations in the field;
- The aspects targeted are multiple, including the practical-action approach, since the modernisation trends of technological processes inevitably involve structuring and improving the technical and methodological register used by the future specialist.

Objectives of the Computerised Mine Surveying and Cadastre study programme

- developing the capacities of diagnosis, communication, evaluation and strategic thinking;
- identifying problems that require a correct diagnosis, solving them appropriately and devising effective strategies for future development;
- promoting design techniques that offer trainees potential success, both in small design firms and within large organisations;
- acquiring the latest theories, mechanisms and approaches in the development and implementation of mine surveying and cadastre works, in line with trends in national and international specialist literature;
- the capacity to adapt to constantly changing competitive environments;
- developing an international and global vision of specific technological processes from a technical, organisational and economic point of view;
- developing managerial behaviour specific to professionals in the field of mine surveying and cadastre;
- making inter-, intra- and multidisciplinary correlations;
- using strategies designed to stimulate students' active participation in assimilating knowledge and developing skills, which favour the development of intellectual processes and the cultivation of a creative spirit.

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Field **MINES, OIL AND GAS**
Study programme **COMPUTERISED MINE SURVEYING AND CADASTRE**

CURRICULUM

No.	**YEAR I**	Subject	Subj.	Semester 1				Semester 2				Credit points		Ei, Ci, Vi		No. of teaching hours per subject			Total individual study hours	Total subject hours
crt.	Subject	code	type	C	S	L	P	C	S	L	P	Sem.1	Sem.2	Sem.1	Sem.2	Lect.*	Appl.**	Total		
1	Computerisation of Surveying Works	UPFMTMIC101	DF	3		3						6		E1		42	42	84	66	150
2	Current Methods for Processing Terrestrial Measurements	UPFMTMIC102	DS	3		1	2					6		E1		42	42	84	66	150
3	European Norms and Standards in Cadastre	UPFMTMIC103	DF	3	2							6		E1		42	28	70	80	150
4	Techniques and Technologies Used in Surveying, Geodesy and Cadastre Works	UPFMTMIC104	DF	2		3						6		E1		28	42	70	80	150
5	Professional internship	UPFMTMIC105	DS			4						6		C1		0	56	56	94	150
6	**Optional subject OP 11**	UPFMTMIC106	DS					3		3			6		E2	42	42	84	66	150
7	Special Mine Surveying Works	UPFMTMIC107	DS					3		1	2		6		E2	42	42	84	66	150
8	**Optional subject OP 12**	UPFMTMIC108	DS					3	2				6		E2	42	28	70	80	150
9	Quality Assessment of Surveying and Geodetic Works	UPFMTMIC109	DS					3	2				6		E2	42	28	70	80	150
10	Professional internship	UPFMTMIC110	DS							4			6		C2	0	56	56	94	150
TOTAL YEAR I				11	2	11	2	12	4	8	2	30	30	8E + 2C		322	406	728	772	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	Subj.	Semester 3				Semester 4				Credit points		Ei, Ci, Vi		No. of teaching hours per subject			Total study hours	Total hours
crt.	Subject	code	type	C	S	L	P	C	S	L	P	Sem.1	Sem.2	Sem.1	Sem.2	Lect.*	Appl.**	Total	individual	subject
11	Optimisation and Efficiency of Geodesy, Surveying and Cadastre Works	UPFMTMIC211	DS	3		3						6		E3		42	42	84	66	150
12	Management of Surveying and Cadastre Activities	UPFMTMIC212	DF	3		2						6		E3		42	28	70	80	150
13	Design of Mining Structures	UPFMTMIC213	DS	3		1	2					6		E3		42	42	84	66	150
14	**Optional subject OP 21**	UPFMTMIC214	DS	3		2						6		E3		42	28	70	80	150
15	Professional internship	UPFMTMIC215	DS			4						6		E3		0	56	56	94	150
16	Ethics and academic integrity	UPFMTMIC216	DC					1	2				4		E4	14	28	42	58	100
17	Management of Databases and Digital Plans	UPFMTMIC217	DS					2	1				6		E4	28	14	42	108	150
18	Internship for dissertation preparation	UPFMTMIC218	DS							10			10		C4	0	140	140	110	250
19	Preparation of the dissertation thesis	UPFMTMIC219	DS							10			10		C4	0	140	140	110	250
TOTAL year II				12	0	12	2	3	3	20	0	30	30	5E + 3C		210	518	728	772	1500
												60								
20	GIS in Mining Activities (elective)	UPFMTMIC120	DFA	2		2						4		E3		28	28	56	44	100

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DISTRIBUTION OF HOURS BY SUBJECT GROUPS					
Total lecture hours :			**532**		
Total application hours :			**476**		
Total hours (lectures, applications, internship, dissertation preparation) :			**1456**		
Total lecture hours / Total hours (%) :	532	/	1456	x 100	36,54
Total application hours / Total hours (%) :	476	/	1456	x 100	32,69
Total lecture hours / Total application hours :	532	/	476		1,12

SUBJECT GROUPS	No. hours	No. hours/Total hours (%)
Fundamental subjects DF	**294**	**20,19**
Specialisation subjects DS	**1120**	**76,92**
Complementary subjects DC	**42**	**2,88**
Optional subjects DOP	**224**	**15,38**
Elective subjects DFA	**56**	**3,85**

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

LEGEND: DF - fundamental subject, DS - specialisation subject, DC - complementary subject, DS - synthesis subject, DFA - elective subject C - lecture, S - seminar, L - laboratory, P - project, Apl - application hours
Ei, Ci, Vi - exam, colloquium, verification respectively in semester i, i =1 ÷ 4
The professional internship, the internship for dissertation preparation and the preparation of the dissertation thesis are partially assisted activities

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OPTIONAL SUBJECTS				
No.	Subject code	Year of study	Subject names	
6	OP 11	I	Monitoring of Subsidence Areas	Monitoring of Underground and Surface Mining Structures
8	OP 12	I	Remote Sensing	Interferometry
14	OP 21	II	Global Navigation Satellite Systems	National and International Geodetic Systems

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

2165 Cartographers and Surveyors

2146 Mining engineers, petroleum engineers, metallurgists and related professionals

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

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
Mine surveying researcher	214635	Mine surveying research engineer	2146.6
Mine surveying research engineer	214636	Mine surveying research engineer	2146.6
Mine surveying research assistant	214637	Mine surveying research engineer	2146.6

Competences for the Computerised Mine Surveying and Cadastre study programme

Professional competences

CP1. approaches problems critically
CP2. applies digital mapping
CP3. applies statistical analysis techniques
CP4. approves engineering designs
CP5. ensures compliance with safety legislation
CP6. collects data using GPS
CP7. creates cadastral maps
CP8. creates thematic maps
CP9. delineates the mining area
CP10. develops alternative mining methods
CP11. documents surveying operations
CP12. performs surveying calculations
CP13. performs scientific research
CP14. performs surveying measurements
CP15. evaluates mining development projects
CP16. deals with exceptional circumstances in the mining sector
CP17. uses geographic information systems
CP18. manages the cadastre
CP19. manages mine site data

CP20. manages staff
CP21. makes independent operational decisions
CP22. identifies process improvements
CP23. records survey data
CP24. maintains mine site plans
CP25. negotiates land acquisition

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CP26. advises architects
CP27. operates surveying instruments
CP28. prepares visual representations of information
CP29. prepares geological map sections
CP30. processes collected survey data
CP31. presents reports
CP32. complies with legal regulations
CP33. establishes property boundaries
CP34. studies aerial photographs
CP35. supervises mine construction operations
CP36. uses databases
CP37. uses CAD software
CP38. uses technical drawing software
CP39. uses mine planning software
CP40. uses data processing techniques

Transversal competences

CT1. takes responsibility
CT2. works in teams
CT3. is attentive to detail
CT4. complies with regulations
CT5. solves problems
CT6. plans
CT7. organises information, objects and resources

Learning outcomes for the Computerised Mine Surveying and Cadastre study programme
Knowledge generated by the learning outcomes for the Computerised Mine Surveying and Cadastre study programme

C1. The student/graduate can organise and lead the surveying and geodetic works corresponding to mining objectives carried out on the surface and underground.
C2. The student/graduate can design surveying and geodetic works in accordance with the required quality requirements.
C3. The student/graduate can optimise the database built for various works and processing methods.
C4. The student/graduate can apply mine surveying and cadastre operations through computerisation.
C5. The student/graduate can correlate surveying and cadastre documentation with the legislation in force.
C6. The student/graduate can perform 3D monitoring of structures and land located in subsidence areas and analyse the deformation forecast.

Skills generated by the learning outcomes for the study programme Computerised Mine Surveying and Cadastre Cadastre

A1. The student/graduate is able to use positioning systems for points materialised on the earth's surface and underground.
A2. The student/graduate is able to produce surveying documentation prepared by static and dynamic methods in 3D space.
A3. The student/graduate can establish the interdependence between different coordinate systems.
A4. The student/graduate is able to develop existing programming systems according to the requirements imposed by increasing the efficiency of mining activity.
A5. The student/graduate is able to substantiate the adoption of theories, principles and practical structures in the field of mine surveying.
A6. The student/graduate has the skills to use processing techniques in establishing survey networks.
A7. The student/graduate has the skills to use design, modelling and simulation software in the field of surveying and cadastre (AutoCAD, BricsCAD, TopoGraph, QGIS, Global Mapper).

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A8. The student/graduate can prepare papers, studies and projects in the field of Mines, Oil and Gas.

Responsibilities generated by the learning outcomes for the study programme Computerised Mine Surveying and Cadastre Cadastre

RA1. The student/graduate can responsibly implement research projects, provide qualified assistance in decision-making and take responsibility for his/her own decisions and actions.
RA2. The student/graduate can apply managerial and leadership skills to mine surveying and cadastre activities.
RA3. The student/graduate has the opportunity and the desire for professional and scientific improvement.
RA4. The student/graduate can apply the principles, rules and values of the code of professional ethics.

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