

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF MINERAL RESOURCES ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	MRE815	SEMESTER	8
COURSE TITLE	MINE PLANNING		
INDEPENDENT TEACHING ACTIVITIES <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>		WEEKLY TEACHING HOURS	CREDITS
LECTURES		1	2
LABORATORY EXERCISES		3	3
TOTAL		4	5
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Specialised knowledge		
PREREQUISITE COURSES:	Surface Mining (MRE501), Underground Mining (MRE601)		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)	https://eclass.uowm.gr/courses/MRE163/		

(2) LEARNING OUTCOMES

<p>Learning outcomes</p> <p><i>The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> • <i>Guidelines for writing Learning Outcomes</i>
<p>The course aims to enable students to:</p> <ul style="list-style-type: none"> • Know the stages and objectives of mining planning • Create databases for the storage and management of drilling, topographical and other data related to mining planning • Choose the appropriate techniques and types of models for the design of a mine • Use special mine planning software packages • Optimize the design of a mine taking into account physical, technical and economic parameters

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information,
with the use of the necessary technology

Adapting to new situations

Decision-making

Working independently

Team work

Working in an international environment

Working in an interdisciplinary environment

Production of new research ideas

Project planning and management

Respect for difference and multiculturalism

Respect for the natural environment

Showing social, professional and ethical responsibility and
sensitivity to gender issues

Criticism and self-criticism

Production of free, creative and inductive thinking

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Others...

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- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Working independently
- Production of new research ideas
- Project planning and management

(3) SYLLABUS

The course of mine planning covers all the subjects of modern mine planning using advanced software packages and real data from the mining industry. The following are covered:

- Principles of use of computers,
- drilling and vector databases,
- drilling data assessment
- topographical models,
- geological modelling of stratigraphic and non-stratigraphic deposits,
- grade estimation and resource calculation in grid and block models,
- optimisation of surface mine boundaries (Floating Cone, Lerchs-Grossman, Push-Relabel),
- surface mine design and calculation of mineral reserves in accordance with international reporting codes,
- design of underground mines,
- networks for the ventilation of underground mines
- design of access roads to surface and underground mines
- mine scheduling
- Algorithms and types of models used in mine planning.
- Laboratory exercises that cover all the steps of mine planning.

(4) TEACHING and LEARNING METHODS - EVALUATION

<p style="text-align: center;">DELIVERY</p> <p style="text-align: center;"><i>Face-to-face, Distance learning, etc.</i></p>	<p>Face-to-face lectures, distance seminars, laboratory exercises on the computer using special mine planning software</p>	
<p style="text-align: center;">USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</p> <p style="text-align: center;"><i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<p>Use of a projection system, special mine planning software installed in computer units of a special laboratory, organization and scheduling of the course and communication with students through the asynchronous e-learning platform open eclass.</p>	
<p style="text-align: center;">TEACHING METHODS</p> <p><i>The manner and methods of teaching are described in detail.</i></p> <p><i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i></p> <p><i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i></p>	Activity	Semester workload
	Lectures	14
	Interactive computer lab exercises	42
	Theory study	28
	Lab exercises study	42
	Seminars	24
Course total	150	
<p style="text-align: center;">STUDENT PERFORMANCE EVALUATION</p> <p><i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>Weekly examination of interactive laboratory exercises on the computer (50% of the total grade of the course), final written examination of the theory (25% of the total grade of the course) and final written examination of laboratory exercises (25% of the total grade of the course).</p> <p>The evaluation criteria are given on the relevant page of the course on the asynchronous e-learning platform open e-class and are analyzed to the students at the beginning of the semester.</p>	

(5) SUGGESTED BIBLIOGRAPHY

<p>- Suggested bibliography:</p> <p><i>Badiozamani, K., Computer Methods, Mining Engineering Handbook, Vol. 2, Society of Mining Engineers, American Institute of Mining, Metallurgical, and Petroleum Engineers, Inc. 1992.</i></p> <p><i>Barnes, M.P., Computer-Assisted Mineral Appraisal and Feasibility, Society of Mining Engineers, American Institute of Mining, Metallurgical, and Petroleum Engineers, Inc. 1980.</i></p> <p><i>Coombes, J., The Art and Science of Resource Estimation, Coombes Capability, 2008.</i></p> <p><i>Dimitrakopoulos, R., (Ed), Advances in Applied Strategic Mine Planning, The Australasian Institute of Mining and Metallurgy, Springer, 2018.</i></p> <p><i>Lane, K F, 1988. The Economic Definition of Ore (Mining Journal Books Limited: London).</i></p> <p><i>Lerchs, H, and Grossmann, I F, 1965. Optimum design of open pit mines, Trans Canadian Institute of Mining and Metallurgy, 68:17-24.</i></p> <p><i>Novak, T., Sanford, R., Wang, Y., (Eds), Proceedings of the 2nd Conference on the Use of Computers in the Coal Industry, Society of Mining Engineers of the American Institute of Mining, Metallurgical, and Petroleum Engineers, 1985.</i></p> <p><i>Rendu, J.M., An Introduction to Cut-Off Grade Estimation, Society for Mining Metallurgy & Exploration, 2008.</i></p> <p><i>Rossi, M., Deutsch, C., Mineral Resource Estimation, Springer, 2014.</i></p> <p><i>Sinclair, A.J., Blackwell, G.H., Applied Mineral Inventory Estimation, Cambridge University Press, 2002.</i></p> <p><i>Whittle Four-X Strategic Planning Software for Open Pit Mines, Reference Manual, Whittle Programming Pty Ltd, 1998.</i></p> <p><i>Καπαγερίδης, Ι., Εισαγωγή στη Γεωστατιστική, Εκδόσεις ΙΩΝ, 2006.</i></p> <p><i>Καπαγερίδης, Ι., Εισαγωγή στη Μεταλλευτική Πληροφορική, Εκδόσεις σοφία, 2017.</i></p>
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- Related academic journals:

Applied Computing and Geosciences, Elsevier

Computers & Geosciences, Elsevier

International Journal of Mining Science and Technology, Elsevier

Mathematical Geosciences, Springer-Verlag