

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	SCHOOL OF ENGINEERING		
<b>ACADEMIC UNIT</b>	DEPARTMENT OF MINERAL RESOURCES ENGINEERING		
<b>LEVEL OF STUDIES</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	MRE601	<b>SEMESTER</b>	6
<b>COURSE TITLE</b>	UNDERGROUND MINING		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <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>		<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>
Lectures		3	3
Laboratory exercises		2	2
<b>Total</b>		5	5
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	Specialised knowledge		
<b>PREREQUISITE COURSES:</b>			
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.uowm.gr/courses/MRE146/">https://eclass.uowm.gr/courses/MRE146/</a>		

### (2) LEARNING OUTCOMES

<p><b>Learning outcomes</b></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"> <li>• <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i></li> <li>• <i>Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i></li> <li>• <i>Guidelines for writing Learning Outcomes</i></li> </ul>
<p>The course aims at the transfer of specialized knowledge of design and development of underground mining projects to enable students to:</p> <ul style="list-style-type: none"> <li>• Know the different methods of underground mining and their characteristics</li> <li>• Choose the appropriate method of underground exploitation</li> <li>• Design the parts of development, access and production of underground mines</li> <li>• Choose appropriate measures to support underground openings</li> <li>• Choose the appropriate mechanical equipment for the various stages and parts of an underground mine</li> <li>• Address operational and environmental issues of exploitation</li> </ul>

### 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	Project planning and management
Adapting to new situations	Respect for difference and multiculturalism
Decision-making	Respect for the natural environment
Working independently	Showing social, professional and ethical responsibility and sensitivity to gender issues
Team work	Criticism and self-criticism
Working in an international environment	Production of free, creative and inductive thinking
Working in an interdisciplinary environment	.....
Production of new research ideas	Others...
	.....

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

### (3) SYLLABUS

Methods of underground mining, parameters that affect the choice of method, types of mining stopes, mechanical equipment, examples of underground mines in Greece and abroad.

Stabilization measures and methods of their dimensioning for typical underground mines, such as the natural support of the rock for the exploitation of deposits with rooms and pillars, the artificial support by back-filling of stopes (cut and fill), and the beams or the hydraulic support for exploitation with longwall mining.

Anticipation and treatment of groundwater inflows.

Operational, economic, and environmental issues.

#### (4) TEACHING and LEARNING METHODS - EVALUATION

<p style="text-align: center;"><b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i></p>	<p>Face-to-face lectures, distance seminars, laboratory exercises on the computer using special mining software</p>	
<p style="text-align: center;"><b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<p>Use of a projection system, special mining design software installed on 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;"><b>TEACHING METHODS</b> <i>The manner and methods of teaching are described in detail. 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>	<b>Activity</b>	<b>Semester workload</b>
	Lectures	42
	Lectures theory study	30
	Lab exercises	28
	Bibliography study	10
	Homework exercises	20
	Seminars – site visits	20
Course total	<b>150</b>	
<p style="text-align: center;"><b>STUDENT PERFORMANCE EVALUATION</b> <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>Final written examination of theory and exercises (60% of the total grade of the course), intermediate written examination of theory (20%), assignments (20%). 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>Atlas Copco, 2007, Mining Methods in Underground Mining, 144 pages.</i>  <i>Bise, C.J., 2003, Mining Engineering Analysis, Second Edition, Society for Mining, Metallurgy, and Exploration, 313 pages</i>  <i>Darling, P. (Ed), 2011, SME Mining Engineering Handbook, Society for Mining, Metallurgy and Exploration, 1846 pages</i>  <i>Hartman, H.L., 1987, Introductory Mining Engineering, John Wiley &amp; Sons, 633 pages</i>  <i>Hustrulid, W.A., Bullock, R.L. (Eds), 2001, Underground Mining Methods: Engineering Fundamentals and International Case Studies, Society for Mining, Metallurgy, and Exploration, 728 pages</i></p> <p>- Related academic journals:</p> <p><i>International Journal of Mining Science and Technology, Elsevier</i>  <i>International Journal of Mining, Reclamation and Environment, Taylor &amp; Francis</i>  <i>Journal of Mining Science, Springer</i>  <i>Mining Journal, Aspermont Media</i>  <i>Mining Technology: Transactions of the Transactions of the Institutions of Mining and Metallurgy, Taylor &amp; Francis</i></p>
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