

## 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>	MRE812	<b>SEMESTER</b>	8
<b>COURSE TITLE</b>	MINING WITH EXPLOSIVES		
<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		2	
LABORATORY EXERCISES		2	
<b>COURSE TOTAL</b>		4	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/MRE160/">https://eclass.uowm.gr/courses/MRE160/</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 to enable students to</p> <ul style="list-style-type: none"> <li>• Plan surface and underground blasting</li> <li>• Choose suitable explosives for blasting</li> <li>• Choose suitable drilling equipment</li> <li>• Organize the storage and management of explosives</li> <li>• Optimize extraction by blasting based on the mining method.</li> <li>• Know about safety, environmental and legislation in the management and use of explosives.</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?

<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>	<i>Project planning and management</i>
<i>Adapting to new situations</i>	<i>Respect for difference and multiculturalism</i>
<i>Decision-making</i>	<i>Respect for the natural environment</i>
<i>Working independently</i>	<i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>
<i>Team work</i>	<i>Criticism and self-criticism</i>
<i>Working in an international environment</i>	<i>Production of free, creative and inductive thinking</i>
<i>Working in an interdisciplinary environment</i>	<i>.....</i>
<i>Production of new research ideas</i>	<i>Others...</i>
	<i>.....</i>

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Working independently
- Production of free, creative and inductive thinking
- Project planning and management
- Showing social, professional and ethical responsibility and sensitivity to gender issues

### (3) SYLLABUS

Explosives, drilling of perforations, drilling techniques, drilling equipment for surface and underground stopes, design of surface and underground blasting.

Storage and destruction of explosives. Special topics.

Laboratory exercises: exercises for air heaters (compressed air network), surface blasting design, deceleration calculations, design of underground blasting, design of special blasting (gentle blasting, protrusion), exercises in rock shattering, calculation of vibrations and air overpressure (noise), design of surface and underground blasting with computers.

Regulations and legislation.

#### (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 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;"><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.  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>	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th style="width: 60%;">Activity</th> <th style="width: 40%;">Semester workload</th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td>24</td> </tr> <tr> <td>Theory study</td> <td>40</td> </tr> <tr> <td>Laboratory exercises</td> <td>24</td> </tr> <tr> <td>Study and solving of exercises</td> <td>32</td> </tr> <tr> <td>Seminars</td> <td>30</td> </tr> <tr> <td>Course total</td> <td>150</td> </tr> </tbody> </table>		Activity	Semester workload	Lectures	24	Theory study	40	Laboratory exercises	24	Study and solving of exercises	32	Seminars	30	Course total	150
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<p style="text-align: center;"><b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure  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  Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>																
<p>Final written theory test (50%), weekly laboratory exercises (50%).</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:  Αγιουτάντης, Ζ.Γ., 2019, Στοιχεία Διάρθρωσης-Ανατίναξης, Εκδόσεις ΙΩΝ, 280 σελ.  Atlas Copco, 2007, Mining Methods in Underground Mining, 144 σελ.  Darling, P. (Ed), 2011, SME Mining Engineering Handbook, Society for Mining, Metallurgy and Exploration, 1846 σελ.  Hartman, H.L., 1987, Introductory Mining Engineering, John Wiley &amp; Sons, 633 σελ.  Hustrulid, W.A., Bullock, R.L. (Eds), 2001, Underground Mining Methods: Engineering Fundamentals and International Case Studies, Society for Mining, Metallurgy, and Exploration, 728 σελ.  Kennedy, B.A. (Ed), 1990, Surface Mining, 2nd Edition, Society for Mining, Metallurgy and Exploration, 1194 σελ.</p> <p>- Related academic journals:  Blasting and Fragmentation Journal, International Society of Explosives Engineers  International Journal of Mining Science and Technology, Elsevier  International Journal of Mining, Reclamation and Environment, Taylor &amp; Francis  Journal of Mining Science, Springer  Mining Journal, Aspermont Media  Mining Technology: Transactions of the Transactions of the Institutions of Mining and Metallurgy, Taylor &amp; Francis</p>
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