

## 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>	<b>MRE101</b>	<b>SEMESTER</b>	<b>1</b>
<b>COURSE TITLE</b>	MATHEMATICS I		
<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		
IN-CLASS EXERCISES	2		
<b>COURSE 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>	General background		
<b>PREREQUISITE COURSES:</b>			
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	No		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.uowm.gr/courses/MRE112/">https://eclass.uowm.gr/courses/MRE112/</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>Upon successful completion of the course, students will be able to:</p> <ul style="list-style-type: none"> <li>• examine the convergence of sequences and rows of real numbers, as well as power series,</li> <li>• calculate infinite sum values,</li> <li>• fully study functions of a real variable,</li> <li>• produce parametrically certain and in interlaced form functions,</li> <li>• identify tangent lines on flat curves described in various ways,</li> <li>• calculate vaguely, certain and generalized integrals,</li> <li>• use the system of polar coordinates,</li> <li>• calculate surface areas of flat passages and lengths of flat curves,</li> <li>• approach functions with polynomials.</li> <li>• use matrices in the modeling of linear systems</li> <li>• calculate eigenvalues and eigenvectors</li> </ul>

- study and solve linear systems

### 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...
	.....

- Working independently
- Production of free, creative and inductive thinking

### (3) SYLLABUS

Vector calculus, Matrice algebra, Horizons, Systems of linear equations, Vector spaces and subspatials, Base and Dimension of Vector Spaces, Linear representations in finite dimension and linear representation tables, Interpolation of matrices: Eigenvalues and eigenvectors, Quadratic forms, Differential of functions of a variable and applications, Inverse trigonometric functions, Excessive functions, Certain and vague integrals, Integration techniques, Generalized integrals, Sequences, Series of real numbers.

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

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Face to face	
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	Use of projection system, organization and programming of the course and communication with students through the asynchronous e-learning platform open eclass.	
<b>TEACHING METHODS</b> <i>The manner and methods of teaching are described in detail.</i> <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>  <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>	<i>Activity</i>	<i>Semester workload</i>
	Lectures	42
	In-class exercises	28
	Study of theory and exercises	80
	Course total	150
<b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure</i>  <i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-</i>	Mid-term written exam (40%), final written exam (60%). The evaluation criteria are given on the relevant page of the course on the asynchronous e-learning platform	

*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.*

open e-class and are analyzed to the students at the beginning of the semester.

## (5) SUGGESTED BIBLIOGRAPHY

*- Suggested bibliography:*

*Ayres F.Jr., Mendelson E., 2008, Schaum's Διαφορικός και Ολοκληρωτικός Λογισμός, Εκδόσεις Κλειδάριθμος, 592 pages*  
*Πετράκης Α., Πετράκη Δ., Πετράκης Α., 2017, Μαθηματικά Ι, Εκδόσεις ΘΑΛΗΣ, 896 pages*

*- Related academic journals:*

*International Journal of Mathematics, World Scientific*  
*Mathematical Reviews, American Mathematical Society*