

## COURSE OUTLINE

### 1. GENERAL

<b>SCHOOL</b>	Of Engineering		
<b>DEPARTMENT</b>	of Environmental Engineering		
<b>LEVEL OF STUDIES</b>	First cycle, General Education		
<b>COURSE CODE</b>	TMC159	<b>SEMESTER</b>	1st
<b>COURSE TITLE</b>	<b>Mathematics I</b>		
<b>TEACHING ACTIVITIES</b>		<b>TEACHING HOURS PER WEEK</b>	<b>ECTS CREDITS</b>
		6	5
<b>COURSE TYPE</b>	Compulsory		
<b>PREREQUISITES:</b>			
<b>TEACHING &amp; EXAMINATION LANGUAGE:</b>	Greek		
<b>COURSE OFFERED TO ERASMUS STUDENTS:</b>	No		
<b>COURSE URL:</b>	<a href="https://eclass.duth.gr/courses/TMC295/">https://eclass.duth.gr/courses/TMC295/</a>		

### 2. LEARNING OUTCOMES

<b>Learning Outcomes</b>
The scopus of the course is to introduce the students to basic concepts concerning Integral Calculus, Series, Vector spaces, Matrices, Functions of Several Variables and Vector Functions which are necessary for all students of School of Engineering.
<b>General Skills</b>
Search, analysis and synthesis of data and information, Critical thinking Promoting free, creative and inductive reasoning

### 3. COURSE CONTENT

Matrices and determinants. Rank of a matrix. Elementary Transformations. Inverse matrix. Linear systems. Eigenvalues and eigenvectors. Computation of the matrix $A^n$ . Vector spaces. Linear dependence and linear independence. Basis and dimension of a vector space. Inverse Trigonometric Functions. Hyperbolic Functions. Definite and indefinite integrals. Integration techniques. Applications of integration. Improper integrals. Sequences. Series of real numbers. Power Series. Taylor series. Functions of Several Variables. Partial Derivatives of Functions of Several Variables. Chain Rules. Local Exrema. Conditional Exrema. Vector Functions of one variable. Derivative of a Vector function. Vector Functions of Several Variables. Differential Operators (Gradient, Divergence, Rot).
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### 4. LEARNING & TEACHING METHODS - EVALUATION

<b>TEACHING METHOD.</b>	Face to face
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<b>USE OF INFORMATION &amp; COMMUNICATIONS TECHNOLOGY (ICT)</b>	The lectures are uploaded on the e-class platform in the form of pdf files. Use of ICT in Teaching (power point, Geogebra, Excel etc.) . Communication with students through the platform e-class.
<b>TEACHING ORGANIZATION</b>	Lectures
<b>STUDENT EVALUATION</b>	Written examination at the end of the semester

## 5. SUGGESTED BIBLIOGRAPHY

1. Advanced Mathematics (Schaum's Outline Series), Murray R. Spiegel, Translation J. Schinas, 1982, ISBN 07-060229-8.
2. Introduction to Linear Algebra, C.J. Schinas and G. Papaschinoulos, Tziolas, ISBN 978-960-418-375-3.
3. Calculus of Functions of one Variable with Vector and Linear Algebra, X. Terzides, Christodoulides, ISBN 960-8183-56-1.
4. Exercises of Calculus of a Function of one Real Variable, B. Fragou, Ziti, 2005, ISBN 960-431-677-X.

## ANNEX OF THE COURSE OUTLINE

### Alternative ways of examining a course in emergency situations

<b>Teacher (full name):</b>	Garyfallos Papaschinopoulos / Gesthimani Stefanidou
<b>Contact details:</b>	gstefani@env.duth.gr
<b>Supervisors: (1)</b>	
<b>Evaluation methods: (2)</b>	Written (60%) and oral (40%) examinations at the end of the semester
<b>Implementation Instructions: (3)</b>	<ul style="list-style-type: none"> <li>➤ The student ought <ul style="list-style-type: none"> <li>• to enroll in platform eclass in the course " Mathematics I ",</li> <li>• to use exclusively his/her institutional account for his/her participation in the video conferencing platform and for his entry in eclass,</li> <li>• to shows his / her student ID before the start of the examination or whenever requested.</li> </ul> </li> <li>➤ Digital platforms to be used: <ul style="list-style-type: none"> <li>• simultaneous use of Microsoft Teams and platform eclass</li> </ul> </li> <li>➤ Required technological equipment: <ul style="list-style-type: none"> <li>• Ability to connect to the internet,</li> <li>• use of camera, speakers, microphone,</li> <li>• ability to scan / photograph the manuscript and create a PDF file,</li> <li>• ability to read a GIF (photo) file.</li> </ul> </li> <li>➤ Throughout the exam, the students are connected to Microsoft Teams with an open camera and microphone so that there is seamless visual and audio contact between examiner and examinee. At the same time, they must be able to connect to the eclass to read the exam questions and upload the answers.</li> <li>➤ For the written examination the examinees have <ul style="list-style-type: none"> <li>• To read the examination test that will be posted in eclass in the "Tasks" or in the "Exercises" of the course,</li> <li>• To write their answers on an A4 paper, to digitize it (scan / photograph), to create a PDF file and to upload it to eclass</li> </ul> </li> <li>➤ For the oral examination <ul style="list-style-type: none"> <li>• the students initially are waiting in the lobby,</li> <li>• the students are inserted into the virtual room (Microsoft Teams) one by one.</li> <li>• 3-4 questions will be asked.</li> <li>• The examination will take about 5 minutes (for each one).</li> </ul> </li> </ul>