COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF INFORMATION SCIENCES & TECHNOLOGY		
ACADEMIC UNIT	DEPARTMENT OF STATISTICS		
LEVEL OF STUDIES	1st Cycle (UNDERGRADUATE)		
COURSE CODE	**6051**	**SEMESTER**	**1st**
COURSE TITLE	**Linear Algebra I**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	4	7,5
Workshops	2	
Labs		

COURSE TYPE	Compulsory – Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO
COURSE WEBSITE (URL)	https://www.dept.aueb.gr/en/stat/content/linear-algebra-i-75-ects

(2) LEARNING OUTCOMES

Learning outcomes
In depth understanding of the concepts introduced in the course, so that the students can answer questions demonstrating this understanding, obtaining a geometric insight in concepts such as projection, and finally, applying this knowledge to solving exercises such as: obtaining the LDU factorization of a matrix, inverting a matrix and calculating a projection matrix.
General Competences
• Independent work • Promoting free, creative and inductive thinking

(3) SYLLABUS

Elements and calculus in $\mathbf{R}^n$, lines and planes in $\mathbf{R}^n$. Matrices and matrix multiplication, Elementary matrices. Linear systems: The Gauss algorithm and the factorization PA=LDU. Inverse and transposed matrices, the algorithm Gauss-

Jordan. Symmetric matrices and the Cholesky factorization. Vector spaces and subspaces. Linear systems: the solution of m equations with n unknowns and the rank of a matrix. Linear independence, bases and dimension. The four fundamental subspaces of a matrix. The fundamental theorem of Linear Algebra. Linear transformations of $\mathbf{R}^n$ and matrices. Orthogonal subspaces, and orthogonal complement of a subspace. Projections.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</td><td>YES, Teaching through slides, eclass</td></tr>
<tr><td>TEACHING METHODS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>52</td></tr>
<tr><td>Tutorial</td><td>26</td></tr>
<tr><td>Self Study</td><td>109.5</td></tr>
<tr><td>Course Total</td><td>187.5</td></tr>
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<tr><td>STUDENT PERFORMANCE EVALUATION
.</td><td>Written examination at the end of the semester.
Bonus based on delivering assignments.
Information is available at eclass</td></tr>
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(5) ATTACHED BIBLIOGRAPHY

- Gilbert Strang (1999), *Γραμμική Άλγεβρα και Εφαρμογές*, Πανεπιστημιακές Εκδόσεις Κρήτης.
- Lipschutz, S., LipsonMarcLars, Γραμμική Άλγεβρα, $5_η$ Έκδοση, Εκδόσεις Τζιόλα, 2013.
- Ε. Ξεκαλάκη & Ι. Πανάρετος (1993), *Γραμμική Άλγεβρα για Στατιστικές Εφαρμογές*, Αθήνα.
- Η. Φλυτζάνης (1999), *Γραμμική Άλγεβρα & Εφαρμογές, Τεύχος Α: Γραμμική Άλγεβρα*, Το Οικονομικό.
- Γ.Δονάτος-Μ.Αδάμ (2008), *Γραμμική Άλγεβρα Θεωρία και Εφαρμογές*, Gutenberg.
- Graybill, F. A. (1969), *Introduction to Matrices with Applications in Statistics,* Wadsworth, Belmont, CA.
- Harville, D. A. (1997), *Matrix Algebra from a Statistician's perspective,* Springer.
- Healy, M.J.R. (1995), *Matrices for Statistics*, Oxford University Press.
- Searle, S. R. (1982), *Matrix Algebra Useful for Statistics,* Wiley.