COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF INFORMATION SCIENCES & TECHNOLOGY
ACADEMIC UNIT	DEPARTMENT OF STATISTICS
LEVEL OF STUDIES	1st Cycle (UNDERGRADUATE)
COURSE CODE	6082
COURSE TITLE	**Linear Algebra II**

COURSE CODE	6082	**SEMESTER**	2nd

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

COURSE TYPE	Compulsory - General Background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	
COURSE WEBSITE (URL)	https://www.dept.aueb.gr/en/stat/content/linear-algebra-ii-75-ects

(2) LEARNING OUTCOMES

Learning outcomes
In-depth understanding of the concepts of the course so that students be able to answer questions demonstrating this understanding. Understanding the interplay between matrices and the geometric viewpoint in the study of projections, determinants, eigenvalues, and eigenvectors. Applying these techniques to problems in least squares approximation, matrix diagonalization, and the analysis of quadratic forms.
General Competences
- Search, analysis and synthesis of data and information, using the necessary technologies   - Adaptation to new situations   - Autonomous work   - Promotion of free, creative and inductive thinking

(3) SYLLABUS

Inner Product, Orthogonal Subspaces, Least Squares, Projections and Orthogonal matrices, the Gramm-Schmidt orhogonalization and QR factorization. Determinants. Change of basis and similar matrices. Eigenvalues and

characteristic polynomial, eigenvectors and eigen spaces. Matrix diagonization. Matrix powers and spectral theorem for symmetric and Hermitian matrices. Quadratic forms in symmetrical matrices: positive definite matrices, Raleygh quotient, ellipsoids in n – dimensions. Examples from the multivariate normal distribution. Singular values decomposition. Complex matrices, hermitian, unitary.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	YES, use in teaching, eclass

TEACHING METHODS	Activity	Semester workload
	Lectures	120
	Tutorial	67.5
	Course total	187.5

STUDENT PERFORMANCE EVALUATION .	Written examination at the end of the semester Information is available on eclass

(5) ATTACHED BIBLIOGRAPHY

- Gilbert Strang (1999), Γραμμική Άλγεβρα και Εφαρμογές, Πανεπιστημιακές Εκδόσεις Κρήτης.
- 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.
- Sheldon Axler (2024), Matrices for Statistics, Oxford University Press.
- Searle, S. R. (1982), Matrix Algebra Useful for Statistics, Wiley.