COURSE OUTLINE

GENERAL

SCHOOL	Sciences and Engineering		
ACADEMIC UNIT	Computer Science		
LEVEL OF STUDIES	1st Cycle		
COURSE CODE	MATH-280	**SEMESTER**	Fall, Spring
COURSE TITLE	Linear Algebra I		

INDEPENDENT TEACHING ACTIVITIES *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*	**WEEKLY TEACHING HOURS**	**CREDITS**
	2.5	6
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	special background
PREREQUISITE COURSES:	MATH-195
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	English
IS THE COURSE OFFERED TO ERASMUS STUDENTS	
COURSE WEBSITE (URL)	

LEARNING OUTCOMES

Learning outcomes

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.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

After completion of the course students are expected to be able to:

- Solve linear systems using the general theory of linear systems as well as the matrix theory.
- Understand the basic concepts of -vectors and their representation on .
- Comprehend the basic theory of Linear transformations and their applications on systems theory.
- Handle abstract vector spaces and prove basic theorems related to the notions of linear independence, span, basis, and dimension of the vector space.
- Comprehend the theory of matrices and be able to calculate the eigenvalues and eigenvectors of square matrices.

- Apply vector space theory on some problems from Computer Science and Data Science. These could be data information, partitioning, transformation, efficiency, stability, resonance.

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…*
	…….

Adapting to new situations

Decision-making

Working independently

Criticism and self-criticism

Production of free, creative and inductive thinking

SYLLABUS

1.Linear systems and Matrices
- General theory of Linear systems.
- Theory and properties of Matrices, Invertibility of Matrices, Determinant of a Matrix.

2.Vectors and Linear Transformations
- Vectors in the plane and vectors.
- Introduction to the theory of linear Transformations.

3.Vector Spaces
- Vector spaces and subspaces.
- The basis and the dimension of a vector space.
- The Rank of a Matrix and its applications.
- Data information, partitioning, redundancy, transformation, efficiency.

4.Further theory of square Matrices
- Eigenvalues and Eigenvectors of square matrices.
- Diagonalization of Matrices.
- Data stability and resonance

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	*Use of ICT in teaching / Χρήση ΤΠΕ* *Communication with students / Επικοινωνία με Φοιτητές*
TEACHING METHODS *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*	
STUDENT PERFORMANCE EVALUATION *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.*	- Midterm Examination - Final Examination - Homework Assignments/Quizzes

Activity	***Semester workload***
Lectures	35
Homework/Quizzes	36
Midterm Exam Preparation	35
Final Exam Preparation	44
Course total	***150***

ATTACHED BIBLIOGRAPHY

Required Textbooks / Readings:

Title	**Author(s)**	**Publisher**	**Year**	**ISBN**
Elementary Linear Algebra	B. Kolman and D. Hill	Pearson 9th Ed.	2017	9780134718538

Recommended Textbooks / Readings:

Title	**Author(s)**	**Publisher**	**Year**	**ISBN**
Linear Algebra and its Applications	S. Lay and J. McDonald	Pearson 5th Ed.	2015	9780321982384