



UNIVERSITY OF MITROVICA “ISA BOLETINI”

Course Curriculum Model (Syllabus)

Faculty:	Faculty of Mechanical and Computer Engineering	
Department:	Computer Science and Engineering	
Level:	Bachelor	
Code of the course:	CSE101	
Course:	Mathematics I	
Course Status:	Mandatory	
Semester:	I	(winter)
Number of hours per week:	3+2	
ECTS:	7	
Time / location:	Tuesday	
Year of studies:		
Lecturer:	Prof. asoc. dr Faton Merovci	
Assistant:	Ma.Arbëri Krasniqi, Phd Candidate	
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Course Description	This course introduces fundamental concepts and methods of linear algebra and mathematical logic. It covers mathematical logic, sets and set operations, algebraic structures, real and complex numbers, matrices and matrix operations, determinants, and systems of linear equations. The course also includes vector algebra, equations of lines and planes in space, relative positions and distances between geometric objects, and quadratic surfaces. Emphasis is placed on both theoretical understanding and practical problem-solving skills.
Course Purpose / Course Goals	The purpose of this course is to provide students with a solid understanding of the concepts and methods of linear algebra, as described in detail in the syllabus. The course aims to help students develop the ability to solve mathematical problems using linear algebra, to connect linear algebra with other fields both within and beyond mathematics, and to foster abstract and critical reasoning through the study of logical proofs and the axiomatic method as applied to linear algebra.

Intended Learning Outcomes (ILOs)	Knowledge • K1: Explain fundamental concepts of mathematical logic, sets, and algebraic structures. • K2: Describe properties of real and complex numbers, matrices, determinants, and systems of linear equations. • K3: Understand geometric concepts related to vectors, lines, planes, and quadratic surfaces. Skills • S1: Perform operations with complex numbers, matrices, and vectors. • S2: Solve systems of linear equations using Gaussian elimination, Cramer's rule, and the inverse matrix method. • S3: Apply vector algebra and analytic geometry techniques to solve mathematical problems. Competences • C1: Formulate and analyze mathematical arguments and proofs using the rules of logic. • C2: Model and solve real-world problems using concepts and methods of linear algebra. • C3: Integrate abstract reasoning and linear algebraic techniques in further studies and related scientific fields.	
Program	Weeks	Lecture
	First week:	Mathematical logic.
	Second week:	Sets and set operations.
	Third week:	Algebraic structures.
	Fourth week:	Sets of real and complex numbers. Arithmetic operations with complex numbers.
	Fifth week:	Multiplication and division of complex numbers in trigonometric form. Exponentiation of complex numbers. De Moivre's formula. n -th roots of complex numbers.
	Sixth week:	Matrices, matrix operations, and special types of matrices.
	Seventh week:	Determinants and their properties.
	Eighth week:	First colloquium.
	Ninth week:	Systems of linear equations and their solutions using Cramer's rule and Gaussian elimination.
	Tenth week:	Systems of linear equations and their solutions using the inverse matrix method.
	Eleventh week:	Vector algebra. Vectors as a geometric concept. Linear operations on vectors. Coordinate systems.

	Twelfth week:	Vector algebra. Scalar, vector, and mixed products of vectors and their applications.		
	Thirteenth week:	Equations of lines and planes in space.		
	Fourteenth week:	Relative positions of lines and planes. Distances between points, lines, and planes. Quadratic surfaces.		
	Fifteenth week :	Second colloquium.		
Literature	Principal literature: - Kuttler, K. (2023). <i>A first course in linear algebra</i> (Version 2023-B-D; with contributions by C. Laflamme). Vretta-Lyrx Inc. https://lyryx.com/first-course-linear-algebra/ - Hamiti, E.(2018). Matematika I, Shtëpia Botuese Libri Shkollor, Prishtinë. - Neri, F. (2019). Linear algebra for computational sciences and engineering. Springer International Publishing. Recommended Literature: Sadiku, S., Merovci, F. (2008). Matematika I-përmbledhje detyrash të zgjidhura, GrafoBeni, Prishtinë.			
Teaching methodology	Lectures, discussions, group work, exercises, homework assignments, and seminar papers.			
	Contribution to student workload (which should correspond to student learning outcomes - 1 ECTS credit = 25 hours)			
	Activity	Hours	Days/weeks	Total
	Lectures	3	15	45
	Exercise sessions (with TA)	2	15	30
	Practical work	-	-	-
	Office hours	-	-	-
	Fieldwork			
	Midterms, seminars	2	2	4
	Homework	2	10	20
	Self-study	4	15	60
	Final exam preparation	5	2	10
	Time spent in exams	2	1.5	3
	Projects, presentations, etc	3	1	3
	Total			175

Evaluation	Teaching methodology: (according to the Statute and Regulation for studies of UMIB)	
	Tests / Colloquia	40%
	Seminary work	20%
	Final exam	40%
	Student gets the passing grade by collecting 50% at least.	