



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:	CSE304	
Course:	Discrete Mathematics	
Course Status:	Mandatory	
Semester:	III	Winter
Number of hours per week:	2+2	
ECTS:	5	
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 topics of discrete mathematics that are essential for computer science. It covers mathematical logic, set theory, relations and functions, mathematical induction and recursion, countability and counting arguments, graphs and trees, Boolean algebra, and basic concepts of computation modeling. The course also introduces formal languages, language recognition, Turing machines, and basic notions of coding theory. Emphasis is placed on abstraction, formal reasoning, and the development of problem-solving skills relevant to computer science.
Course Purpose / Course Goals	The purpose of this course is to prepare computer science students with a strong foundation in abstraction, notation, and critical thinking in mathematics that is directly related to computer science. The course aims to develop students' ability to reason formally, construct and verify mathematical arguments, and apply discrete mathematical concepts to computational problems.

Intended Learning Outcomes (ILOs)	Knowledge K1: Explain fundamental concepts of mathematical logic, set theory, relations, and functions. K2: Describe principles of mathematical induction, recursion, counting methods, and combinatorics. K3: Understand basic concepts of graphs, trees, Boolean algebra, formal languages, computability, and coding theory. Skills S1: Construct and analyze mathematical arguments using logical connectives, quantifiers, and truth tables. S2: Verify the correctness of arguments using propositional and predicate logic. S3: Develop recursive definitions and algorithms based on mathematical induction. S4: Solve problems using counting techniques, combinatorics, and discrete structures. S5: Use graphs and trees to model, visualize, and simplify computational problems. Competences C1: Apply discrete mathematical concepts to model and solve problems in computer science. C2: Analyze computational problems using formal reasoning and abstraction. C3: Integrate knowledge of logic, discrete structures, and computability into further studies and practical applications in computer science.	
Program	weeks	Lecture
	First week:	Logic and Proofs
	Second week:	Set theory
	Third week:	Relations
	Fourth week:	Functions
	Fifth week:	Induction, and Recursion
	Sixth week:	Algorithms
	Seventh week:	Number Theory and Cryptography
	Eighth week:	I colloquium.
	Ninth week:	Countability and counting arguments
	Tenth week:	Combinatorics
	Eleventh week:	Graphs
	Twelfth week:	Trees
	Thirteenth week:	Boolean Algebra

	Fourteenth week:	Modeling Computations. Languages recognitions. Turing Machine. Basic meanings of codification theory		
	Fifteenth week :	II colloquium.		
Literature	Principal literature: Levin, O. (2021). <i>Discrete Mathematics: an open introduction</i> . University of Northern Colorado. http://discrete.openmathbooks.org/pdfs/dmoi-tablet.pdf Gjonbalaj, Q. & Haxha, Sh.(2017) Permbledhje Detyrash nga Matematika 3 me Matematike Diskrete Recommended Literature: Rosen, K. H., & Krithivasan, K. (2021). <i>Discrete mathematics and its applications: with combinatorics and graph theory</i> . Tata McGraw-Hill Education.			
Teaching methodology	Lecture, discussion, group work, exercises, homework, seminar papers			
	Contribution to student workload (which should correspond to student learning outcomes - 1 ECTS credit = 25 hours)			
	Activity	Hours	Days/weeks	Total
	Lectures	2	15	30
	Exercise sessions (with TA)	2	15	30
	Practical work	-	-	-
	Office hours	-	-	-
	Fieldwork			
	Midterms, seminars	4	2	8
	Homework	2	12	24
	Self-study	1	15	15
	Final exam preparation	7	1	7
	Time spent in exams	3	1	3
	Projects, presentations, etc	8	1	8
	Total			125

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.	