COURSE UNIT (MODULE) DESCRIPTION

Course unit title	Course unit code
DISCRETE MATHEMATICS IN COMPUTER SCIENCE	

Lecturer (s)	Department where course unit is delivered
Assoc. Prof. Dr Liepa Bikulčienė	Institute of Social Sciences and Applied Informatics Kaunas Faculty 8 Muitines st., LT-44280 Kaunas

Cycle	Level of course unit	Type of the course unit
Bachelor	1/2	Compulsory

Mode of delivery	Semester or period when the course unit is delivered	Language of instruction
Face-to-face	2nd Semester	Lithuanian

Prerequisites and corequisites	
Prerequisites: Advanced Mathematics, Informatics	**Corequisites:**

Number of ECTS credits allocated	Student's workload	Contact work hours	Individual work hours
5	130	48	82

Purpose of the course unit: programme competences to be developed		
The aim is to introduce students to discrete mathematics and its applications in computer science. Topics to be covered include a number systems, sets, functions and relations, logic and proof theory, Boolean algebra and logic circuits, mathematical reasoning , combinatorics and discrete probability, graphs and trees and recurrence relations. Applications to computer studies and other related areas will be presented. During the tutorials the practical test of all methods and statistical problems will be conducted with specialized program MathCad for Windows.		
Learning outcomes of course unit	**Teaching and learning methods**	**Assessment methods**
Students will be able to apply the concepts and methods of discrete mathematics in computer science studies and use formal logic, sets, and graph theory knowledge in solving specific economic challenges.	Lectures, exercises, independent work Active learning techniques (group discussion, case studies) Individual homework Colloquium	Colloquium, test
Students will be able to apply discrete mathematical models in order to analyse business situations.	Lectures, exercises, independent work Active learning techniques (group discussion, case studies) Individual homework assignments Colloquium	Colloquium, test Final examination.

Course content: breakdown of the topics	Contact work hours							Individual work hours and tasks	
	Lectures	Consultations	Seminars	Practice classes	Laboratory	Practice	**All contact work**	**Individual work**	**Tasks**
1. Formal logic Logical statements. Predicates and quantifier Logical operators and the formulation of conclusions. Proof methods. Induction. Recursion.	3			6			9	10	Homework assignments using Mathcad
2. Binary relationships Binary function Boolean algebra	3			6			9	15	Homework assignments using Mathcad
3. Set theory elements Set of concept and set theory paradoxes Operations with sets. Venn diagrams.	3			3			6	10	Homework assignments using Mathcad. Preparation for the test
4. Graphs, Networks and Trees Graphs and trees. Search trees. Routes, chains, cycles. Networks. Shortest path algorithm.	3			9			12	15	Homework assignments using Mathcad, Preparation for the test.
5. Functions and Relationships Representation of the relationships and functions by computer. Cohesion and function databases.	2			4			6	10	Homework assignments using Mathcad
6. Algorithms theory. Problem formalization and decision-making. Algorithms making essence. Turing machine. Markov algorithm. Algorithms and its Complexity. Searching and sorting algorithms.	2			4			6	10	Homework assignments using Mathcad. Preparation for the test.
7. Preparation for the final examination.		4					4	12	Preparation for the final examination
Total:	16	4		32			52	82	

Assesment strategy	**Comparative weight percentage**	**Date of examination**	**Assesment criteria**
Test 1	10%	Scheduled time	The test consists of 20 questions involving all the theory and there are few answers with only one correct. Students need to find the correct one. Multiple-choice test
Test 2	10%	Scheduled time	The test consists of 20 questions involving all the theory and there are few answers with only one correct. Students need to find the correct one. Multiple-choice test
Colloqium with Mathcad	30%	Scheduled time	The test with Mathcad includes several tasks of practical assignments on all the theoretical material. Overall evaluation is the average of all exercises.
Final examination	50%	During session	The examination consists of specific tasks for the entire course material. It is conducted in a written form. Students need to solve the practical task and work with some practical problems from discrete Mathematics area.

Final score: 0.1+0.1+0.3+0.50=1				
Author	**Year**	**Title**	**Number of periodical publication or publication Volume**	**The place of publication and publisher or online link**
Compulsory reading				
Plukas K., Mačikėnas E. ir kt.	2001	*Taikomoji diskrečioji matematika*		Kaunas: Technologija
Stanat, Donald F., Mcallister David F	1997	*Discrete Mathematics in Computer Science*		Prentice-Hall
Dierker, Paul F.	1986	*Discreet Mathematics*		
Mišeikis F.	1989	*Diskretinės matematikos pradmenys*		Vilnius: VU
Diskretinės matematikos pradmenys	1997	*Skaičiuojamoji matematika*		Vilnius
Optional reading				
Novikov F.A.		*Diskretnaja matematika dla programistov*	2004	S-Peterburg. Piter,
S-Peterburg. Piter,		*Skaitiniai metodai ir algoritmai*	2001	Kaunas
Gorbatov V.A		*Osnovy Diskretnoj matematiki*	1986	Moskva
Norgėla S		*Matematinės logikos įvadas*	1985	Vilnius: VU