

DESCRIPTION OF THE STUDY SUBJECT

Title of the subject

DISCRETE MATHEMATICS

Scope of the subject

Semesters	Mode of studies	Structure*				Total number of hours	Number of credits	Group and type of subjects
		L	PS	C	S			
I	Full-time	20	24	8	55	107	4	Compulsory subjects of the study field
I	Part-time	8	16	28	55	107	4	

*L – lectures, PS – practical activities, seminars, LW – laboratory work, PR – practice, CP – course paper, C – consultations, S – self-study

Aim of the subject

To get familiarised with theories of sets, combinatorics, mathematical logic, graphs and coding, to analyze discrete objects and structures, to analyse real processes and phenomena, to create their discrete mathematical models, to apply known algorithms, realization principles and methods of solving practical problems.

Necessary background knowledge for studying the subject

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Content of the subject

Title of the topic and description of the content	Number of contact hours			S	Total number of hours
	L	PS	C		
1. Concepts of the set and subset, set operations. The power set. Combinatorics.	2	2	1	5	10
2. Binary, equivalence and order relations, properties, operations with relations.	2	2	1	4	9
3. Counting systems and codes. Coding of information (for assuring security of information, reduction of the volume of data, secrecy of information). Solving of typical problems.	2	2	1	4	9
Test No. 1.	-	2	-	-	2
4. The introduction to logic. Propositional algebra. Semantics of the formulae of logic.	2	2	-	7	11
5. Predicate logic. Quantifiers. Boolean functions. Solving of practical problems.	2	4	1	5	12
Test No. 2	-	2	-	-	2
6. Graphs and ways of their representation. Connectivity and transparency of graphs. Trees and forests. Operations with graphs.	4	2	-	6	12
7. Graph cycles. <i>Eulerian, Hamiltonian</i> , edge graphs.	4	2	1	6	13
8. Oriented graphs. Scheduling.	2	4	1	6	13
Preparation and taking the exam			2	12	14
Total number of hours	20	24	8	55	107

Assessment of learning outcomes

Ten-point criteria-based assessment system as well as cumulative assessment using individual cumulative index (ICI) are applied. The overall grade is the sum of marks for intermediate accountings and examination (E) marks multiplied by weighted coefficients. $ICI = 0,3 T1 + 0,3 T2 + 0,4 E$, where $T1, T2$ – tests.

Recommended literature

Key literature						
No.	Year of publishing	Author(s) and title of the publication	Publishing house	Number of copies and/or internet link		
				ŠSC library	Other premises	Other libraries *
1.	2008	Plukas K., Mačikėnas E., Jarašiūnaitė B., Mikuckienė I., Taikomoji diskrečioji matematika.	Technologija	2	1	44
2.	2005	Krylovas A., Diskrečioji matematika.	Technika	2	1	8
				http://www.techmat.vgtu.lt/~inga/Files/diskr_m.pdf		

Additional literature			
No.	Year of publishing	Author(s) and title of the publication	Publishing house and/or internet link
1.	2014	Macaitienė R., Nuotolinis kursas Discrete Mathematics	http://moodle.svako.lt
2.	2013	Macaitienė R., Diskrečiosios matematikos pagrindai (paskaitų konspektas).	http://moodle.svako.lt
3.	2013	Introduction to Discrete Mathematics	http://web.stanford.edu/~damle/refreshers/notes/discrete.pdf
4.	2008	Free Discrete Mathematics Books.	http://www.freebookcentre.net/Mathematics/Discrete-Mathematics-Books.html
5.	2006	Krylovas A., Suboč O., Diskrečiosios matematikos uždaviniai ir sprendimai.	Technika
6.	2005	Discrete Mathematics	http://www.cims.nyu.edu/~regev/teaching/discrete_math_fall_2005/dmbook.pdf
7.	2005	Šleževičienė R., Kriptografijos įvadas.	ŠUL
8.	2004	Krylovas A., Suboč O., Diskrečiosios matematikos uždavinynas.	http://www.techmat.vgtu.lt/~inga/Files/praktika.pdf

Databases

Bibliografinė matematikos mokslo duomenų bazė MathSciNet (dėstytojo nurodyti dokumentai):

<http://www.ams.org/mathscinet>

Elektroninė Lietuvos akademinė biblioteka eLABa (dėstytojo nurodyti dokumentai): <http://elaba.library.lt>

* ŠAVB – Šiauliai Region Povilas Višinskis Public Library, ŠU – library of Šiauliai University

Required material resources and their short description

- **Equipment (devices):** a computer with Internet access, multimedia projector.

The description prepared by:

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