COURSE UNIT (MODULE) DESCRIPTION

Course unit (module) title	Code
Discrete Structures	

Annotation
In this course, fundamental knowledge on the mathematical logic, sets, relations, combinatorics, graph theory, binary relations and propositional logic are given.

Lecturer(s)	Department(s) where the course unit (module) is delivered
Coordinator: dr. Karolina Kanišauskienė **Other(s):**	Šiauliai Academy

Study cycle	Type of the course unit (module)
First	Compulsory

Mode of delivery	Semester or period when the course unit (module) is delivered	Language(s) of instruction
Face-to-face	1 semester	English

Requisites	
Co-requisites (if relevant): Course of School Mathematics	**Additional requirements (if any):**

Number of ECTS credits allocated	Student's workload (total)	Contact hours	Individual work
5	133	56	77

Purpose of the course unit (module)		
To provide basic knowledge of discrete structures and to develop the ability to apply this knowledge in practice.		
Learning outcomes of the course unit (module)	**Teaching and learning methods**	**Assessment methods**
Will be able to define principal discrete structures concepts, to illustrate them by examples and to apply for computer sciences studies.	Formal lectures, exercise classes, problem-based learning, independent study of scientific literature	Control works, Examination
Will be able to apply discrete structures knowledge to solve practical problems.		

Course content: breakdown of the topics	Contact hours							Individual work: time and assignments	
	Lectures	Tutorials	Seminars	Workshops	Laboratory work	Internship/work placement	**Contact hours, total**	**Individual work**	**Assignments**
1. Introduction to mathematical logic The concept of the proposition. Logical operators.	4						**4**	**3**	Perception and assimilation of the material, learning to solve problems, independent study of scientific literature
2. Sets, functions, relations The concept of the set. Kinds of sets. Subsets. Operations on sets. Function (Mapping). Recurrence relations.	4			2			**6**	**6**	
3. Combinatorics Basic counting principles. Permutation. Combination. Combinatorial numbers.	3			2	2		**7**	**7**	
Preparation for control work								**8**	
Control work (1)				2			**2**		
4. Fundamentals of the graph theory The concept of the graph. Metric characteristics. Matrices of graphs. Graph operations. Fundamental numbers of the graph theory. Trees. Eulerian and Hamiltonian circuits.	10			3	2		**15**	**14**	Perception and assimilation of the material, learning to solve problems, independent study of scientific literature
5. Binary relations	2						**2**	**2**	
Preparation for control work								**8**	
Control work (2)				2			**2**		
6. Propositional logic Classification of propositions. Equivalent propositions. Laws of propositional logic. Normalization of propositions. Normal forms. Duality.	9			3	4		**16**	**13**	Perception and assimilation of the material, learning to solve problems, independent study of scientific literature
Preparation for control work								**8**	
Control work (3)				2			**2**		
Preparation for the exam								**8**	Perception and assimilation of the material.
Total	**32**			**16**	**8**		**56**	**77**	

Assessment strategy	Weight, %	Deadline	Assessment criteria
Control work (1)	25	During the semester	Control work consist of 6–7 tasks assessed by 1-2 points each. The system of ten grades is being employed.
Control work (2)	25	During the semester	Control work consist of 6–7 tasks assessed by 1-2 points each. The system of ten grades is being employed.
Control work (3)	25	During the semester	Control work consist of 6–7 tasks assessed by 1-2 points each. The system of ten grades is being employed.
Exam	25	During the exam session	Exam consist of 10 short theoretical questions on graph theory and 10 short theoretical questions on mathematical and propositional logic assessed by 0.5 point each.

Author	Publishing year	Title	Issue of a periodical or volume of a publication; pages	Publishing house or internet site
Required reading				
K. H. Rosen	2012	Discrete Mathematics and Its Applications (7th ed.)		New York.
Recommended reading				
R. P. Grimaldi	2004	Discrete and Combinatorial Mathematics (5th ed.)		Boston &c: Pearson.
O. Levin	2013-2021	Discrete Mathematics (3rd ed.)		