

Syllabus of the educational discipline «DISCRETE MATHEMATICS»

Cycle of Higher Education	<i>First cycle of higher education (Bachelor's degree)</i>
Field of Study	<i>F Information Technologies</i>
Specialty	<i>F7 Computer engineering</i>
Educational program	<i>Computer systems and networks</i>
Discipline status	<i>Normative</i>
Teaching language	<i>English</i>
Year of studies, semester	<i>1 year (1 semester)</i>
Number of credits ECTS	<i>3 credits</i>
Distribution by types of trainings and hours of study	<i>Lectures, Practical studies, Laboratory studies, Independent training</i>
Form of final assessment	<i>Exam</i>
Teacher	<i>Syniavska Olga Olexandrivna, associate professor of department of probability theory and mathematical analysis, PhD</i>
Teacher's contacts	<i>olga.synyavska@uzhnu.edu.ua</i>
Course Schedule	<i>According to the timetable</i>
<p>The purpose of the discipline "Discrete mathematics" to give fundamental knowledge of basics in widely applicable mathematical tools for computer science, including topics from set theory, combinatorics and graph theory and their usage in solving professional problems in the field of computer science and engineering. Topics include formal logic notation, proof methods; induction, well-ordering; sets, relations; elementary graph theory; integer congruences; asymptotic notation and growth of functions; permutations and combinations, and counting principles.</p> <p>At the end of this course, students should:</p> <ul style="list-style-type: none"> - use correctly the classical notions of logic: implications, equivalence, negation, proof by contradiction, proof by induction, quantifiers; - use set theory: union, intersection, complementary, maps, bijection, injection, surjection; - know the main formulas in combinatorics: enumerations of subsets, enumerations of injections, surjections, bijections; - know the main definitions, some classical theorems on graphs and apply graphs in concrete situations; - think systematically and apply creative abilities to form new ideas. 	
<p>Prerequisites for learning High School Mathematics Course</p>	
<p>Content of the educational discipline</p>	
<p>Module 1 Topic 1. Set theory. Topic 2. Relations and functions. Topic 3. Combinatorics. Calculation work Modular control work</p>	
<p>Module 2 Topic 4. Graph theory: basic definition and examples. Topic 5. Representation of graphs. Topic 6. Graph Traversal and Shortest path. Topic 7. Graphs and matrices. Topic 8. Trees. Topic 9. Coloring Graph. Calculation work Modular control work Examination</p>	

Material and technical support (software) of the discipline <i>Mathcad (Geogebra, Desmos)</i>			
Course page on the Moodle platform (personal training system)	<i>Syllabus of the educational discipline, hyperlinks to electronic publications of the discipline, recommended literature, students' attendance, lecture materials, presentations, questions for self-control, methodical materials for laboratory works, tests, task for checking students' knowledge.</i> https://moodle.uzhnu.edu.ua		
Recommended literature			
<p>1. Havdzyynskiy V.N., Korobova L.N. <i>Discrete Mathematics. For Students Studying a Course of Higher Mathematics in English.</i> Odessa: ODESSA NATIONAL A.S. POPOV ACADEMY OF TELECOMMUNICATIONS. 2011. 60 p.</p> <p>2. Lovasz L., Pelikan J., Vesztergombi K. <i>Discrete Mathematics</i>, 2003. 290 p.</p> <p>3. Bona Miklos, <i>A Walk Through Combinatorics: An Introduction to Enumeration and Graph Theory</i>, 3 rd ed., World Scientific Publishing, 2011. 546 p.</p> <p>4. Levin O. <i>Discrete Mathematics:</i> https://math.libretexts.org/Bookshelves/Combinatorics_and_Discrete_Mathematics/Discrete_Mathematics_(Levin)</p>			
Assessment system of learning outcomes			
<p><i>Current control carried out the semester and evaluated by the amount of points (max is 100 points). A minimum amount, that allows a student to get credit is 35 (max is 100 points).</i></p> <p><i>Modular control work is divided into two control works; maximum number of points for each test: 70 points (dilution of tasks is specified in the test). During the semester, students perform 2 computational works. Maximum number of points for each calculated work: 30 points.</i></p> <p><i>Final (semester) control is carried out in the form of exam and evaluated in points (max is 100 points, min is 35 points).</i></p>			
ECTS and national grading scale			
Mark scale	ECTS	Exam	Test
90 - 100	A	Excellent	Satisfied
82 - 89	B	Good	
74 - 81	C		
64 - 73	D	Satisfactory	
60 - 63	E		
35 - 59	FX	“Unsatisfactory” with possibility to pass the exam again	“Not satisfied” with possibility to pass the exam again
1 - 34	F	“Unsatisfactory” with obligatory repeated study of the discipline	“Not satisfied” with obligatory repeated study of the discipline