Bialystok University of Technology									
Field of study	**Computer Science**							**Degree level and programme type**	**Engineer's degree full-time programme**
Specialization/ diploma path	**---**							**Study profile**	academic
Course name	**Discrete Mathematics**							**Course code**	**FCS-00054**
								Course type	obligatory
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	**Semester**	3
	30	30						**No. of ECTS credits**	**6**

Entry requirements	
Course objectives	The main goal is to familiarize students with basic notions, theorems and methods of combinatorics and graph theory which are the base of mathematical models and algorithms having applications in computer science.
Course content	Lecture: Mathematical induction; recursion and chosen methods of its solving. Basics of arithmetics of integers; modular arithmetics. Basic notions and objects of combinatorics, their properties and techniques of counting, in particular the Pigeon Hole Principle and the Principle of Inclusion - Exclusion Principle. Generating functions. Basic notions and theorems of graph theory, in particular, a characterization of Euler and Hamiltonian graphs, properties of connected graphs, planar graphs and trees, counting of spanning trees, colourings of graphs. Classes: Induction and recurtion Arthmetic of integers Modular arithmetics, Permutation, combination, variation, Graph theory problems: Euler and Hamilton graph, connected graph, planar graph, colouring of graphs
Teaching methods	informative lecture, lecture problem, subject exercises,
Assessment method	Evaluation of lectures on a base of written examination, evaluation of classes on a base of the written test of solving problems and on evaluation of activity.

Symbol of learning outcome	**Learning outcomes**	**Reference to the learning outcomes for the field of study**
LO1	knows the basic notions of combinatorics and graph theory and their properties and can illustrate them by examples	K_W01
LO2	knows and understand most of theorems, understands ideas of their proofs and can apply them in solving problems	K_W01 K_U01
LO3	can describe properties of combinatorial objects and graphs, explain relations between them using learned theorems, methods and techniques	K_U01
LO4	can notice presence and a role of notions of discrete mathematics i applications, mainly in computer science, can demonstrate examples of a practical use of these notions	K_U01

Symbol of learning outcome	**Methods of assessing the learning outcomes**	**Type of tuition during which the outcome is assessed**
LO1	written examination, tests of solving problems	L
LO2	written examination, test of solving problems	L, Sw
LO3	test of solving problems	Sw
LO4	test of solving problems	Sw

Student workload (in hours)	**No. of hours**
Calculation	
1 - Attendance at lectures -	30
2 - Preparation for classes -	15
3 - Attendance at classes -	30
4 - Participation in student-teacher sessions -	20
5 - Preparation for the exam -	25
6 - Presence during the exam -	2
7 - Preparation for tests -	28
TOTAL:	**150**

Quantitative indicators	**HOURS**	**No. of ECTS credits**
Student workload – activities that require direct teacher participation	82 (4)+(1)+(3)+(6)	3.3
Student workload – practical activities	73 (7)+(2)+(3)	2.9

Basic references	1. K.H., Rosen, Discrete mathematics and its applications, 1999. 2. K.H., Handbook of discrete and combinatorial mathematics, 2000.
Supplementary references	1. W.L. Kocay, D.L. Kreher, Graphs, algorithms, and optimization, 2017.
Organisational unit conducting the course	Department of Theoretical Computer Science — **Date of issuing the programme**
Author of the programme	dr Joanna Karbowska-Chilińska — Feb. 17, 2022

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW – field work,S – seminar