

DESCRIPTION OF THE COURSE OF STUDY

Course code	0719-2ID-C23-MD	
Name of the course in	Polish	Matematyka dyskretna
	English	Discrete mathematics

1. LOCATION OF THE COURSE OF STUDY within the system of studies

1.1. Field of study	Data engineering
1.2. Mode of study	Full-time studies
1.3. Level of study	First-cycle (Bachelor's), Engineering degree
1.4. Profile of study*	General academic
1.5. Person/s preparing the course description	dr Joanna Garbulińska-Węgrzyn
1.6. Contact	jgarbulinska@ujk.edu.pl

2. GENERAL CHARACTERISTICS OF THE course of study

2.1. Language of instruction	english
2.2. Prerequisites*	Basics of mathematics

3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY

3.1. Form of classes	lectures, classes	
3.2. Place of classes	classes in UJK teaching rooms	
3.3. Form of assessment	lecture – exam, classes – graded credit	
3.4. Teaching methods	lecture: informative lecture, talk, seminar lecture, problem-based lecture classes: discussion, subject exercises	
3.5. Bibliography	Required reading	K. A. Ross, C. R. B. Wright, Discrete mathematics, Pearson, 1999
	Further reading	R. L. Graham, D. E. Knuth, O. Patashnik, Concrete Mathematics, Addison-Wesley Publishing Company, 1990

4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED LEARNING OUTCOMES

4.1. Course objectives (including form of classes) Lectures: C1. Knowledge - familiarization with basic concepts, theorems, and problems of discrete mathematics. C2. Skills - acquisition of skills in applying recurrence theory, counting, and graphs to solve computer science problems. Classes: C1. Knowledge – familiarization with the basic concepts and methods of discrete mathematics. C2. Skills – acquisition of the ability to interpret concepts from the field of computer science in terms of discrete mathematics.
4.2. Detailed syllabus (including form of classes) Lectures: 1. Recursion: recursive sequence; Fibonacci sequence; examples of recursive problems: the Tower of Hanoi problem, dominoes, gambler's ruin; methods of solving recursion using characteristic equations and generating functions; divide and conquer recursion, universal recursion theorem. 2. Counting: sets; subsets and multisets; divisions of sets and numbers; unorders; counting combinatorial objects; Dirichlet's pigeonhole principle; inclusion-exclusion principle. 3. Graphs: adjacency and incidence matrices; incidence lists; graphs: Eulerian, Hamiltonian, connected, bipartite, planar; Kuratowski's theorem on planar graphs; graph search; weighted graphs; algorithms on graphs: finding the minimum spanning tree, finding the shortest path; vertex and edge coloring of graphs; graph coloring algorithms; labeled trees; networks; flows in networks; theorem on minimum cut and maximum flow. Classes: 1. Recursion: recursive sequence; Fibonacci sequence; examples of recursive problems; methods of solving recursion. 2. Counting: sets; subsets and multisets; counting combinatorial objects; Dirichlet's pigeonhole principle; inclusion-exclusion principle. 3. Graphs: basic concepts of graph theory; graphs: Eulerian, Hamiltonian, connected, bipartite, planar; graph search; weighted graphs; vertex and edge coloring of graphs; graph algorithms; networks.

4.3 Intended learning outcomes

Code	A student, who passed the course	Relation to learning outcomes
within the scope of KNOWLEDGE:		
W01	defines concepts related to recursion, counting techniques, and graphs	ID1A_W01
W02	explains selected recursive algorithms and graph algorithms	ID1A_W08
within the scope of ABILITIES:		
U01	applies basic discrete mathematics theorems to solve recursive problems and counting problems	ID1A_U01
U02	uses recursive algorithms and graph algorithms in problem solving	ID1A_U07
within the scope of SOCIAL COMPETENCE:		
K01	effectively plans their work and is willing to continuously expand their knowledge	ID1A_K01

4.4. Methods of assessment of the intended learning outcomes

Teaching outcomes (code)	Method of assessment (+/-)											
	Exam written*			Test*			Effort in class*			Self-study*		
	Form of classes			Form of classes			Form of classes			Form of classes		
	L	C	...	L	C	...	L	C	...	L	C	...
W01	+				+			+			+	
W02	+				+			+			+	
U01	+				+			+			+	
U02	+				+			+			+	
K01								+			+	

4.5. Criteria of assessment of the intended learning outcomes

Form of classes	Grade	Criterion of assessment
lecture (L)	3	at least 50% and no more than 60% of the total number of points possible
	3,5	more than 60% and no more than 70% of the total number of points possible
	4	more than 70% and no more than 80% of the total number of points possible
	4,5	more than 80% and no more than 90% of the total number of points possible
	5	more than 90% of the total number of points possible
classes (C)*	3	at least 50% and no more than 60% of the total number of points possible
	3,5	more than 60% and no more than 70% of the total number of points possible
	4	more than 70% and no more than 80% of the total number of points possible
	4,5	more than 80% and no more than 90% of the total number of points possible
	5	more than 90% of the total number of points possible

5. BALANCE OF ECTS CREDITS - STUDENT'S WORK INPUT

Category	Student's workload	
	Full-time studies	Extramural studies
NUMBER OF HOURS WITH THE DIRECT PARTICIPATION OF THE TEACHER / CONTACT HOURS/	60	
Participation in lectures	30	
Participation in classes	30	
INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/	40	
Preparation for the lecture	5	
Preparation for the classes	15	
Preparation for the exam/test	20	
TOTAL NUMBER OF HOURS	100	
ECTS credits for the course of study	4	

****delete as appropriate***

Accepted for execution (date and legible signatures of the teachers running the course in the given academic year)

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