

DESCRIPTION OF THE COURSE OF STUDY

Course code	0719-2ID-C22-WdA	
Name of the course in	Polish	Wprowadzenie do algorytmów
	English	Introduction to algorithms

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
1.3. Level of study	FIRST-CYCLE DEGREE, ENGINEERING
1.4. Profile of study*	GENERAL ACADEMIC
1.5. Person/s preparing the course description	Dr hab. Grzegorz Stefanek
1.6. Contact	Grzegorz.stefanek@ujk.edu.pl

2. GENERAL CHARACTERISTICS OF THE course of study

2.1. Language of instruction	english
2.2. Prerequisites*	Basics of Mathematics, Introduction to Programming

3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY

3.1. Form of classes	Lectures, classes	
3.2. Place of classes	Didactic rooms UJK	
3.3. Form of assessment	Lecture – egzam, Classes – pass with grade.	
3.4. Teaching methods	Lecture, Classes-laboratory	
3.5. Bibliography	Required reading	Niclaus Wirth "Algorithms+data structures = programs", Prentice-Hall, 1976 Donald E.Knuth "The art of Computer Programming", Addison-Wesley R.Neapolitan, K.Naimpour, "Foundation of Algorithms using C++", Jones and Bartlett Publishers, 2003
	Further reading	R.Sedgewick, Algorithms in C (III edition), Pearson, 1997

4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED LEARNING OUTCOMES

4.1. Course objectives (including form of classes) Lecture: C1. Learning basic algorithmic methods, along with examples of their calculations and the most commonly used data structures. C2. Determining the complexity of an algorithm and its class Classes:. C1. Constructing basic algorithms in the form of block diagrams and networks of activities and using data structures in them. C2. Writing down the algorithm for executing a class of tasks in the form of iterative or recursive pseudocode and checking its correctness.	4.2. Detailed syllabus (including form of classes) Lectures, classes. Fundamental concepts of algorithmics: algorithm, flowchart, activity network, iteration, recursion, data structures. Basic iterative and recursive algorithms: finding the minimum value, calculating factorial, Horner's scheme. Divide and conquer method: Min-Max algorithm, binary search algorithm, Strassen's algorithm. Searching and sorting methods: linear, binary, and interpolation search; bubble sort, selection sort, merge sort, and quicksort. Data structures: array, record, single- and double-linked lists (linear and circular), stacks, graphs, and trees. Dynamic programming: computing Fibonacci numbers, Floyd's algorithm. Greedy algorithms and optimization problems: knapsack problem, minimum spanning tree. Backtracking algorithms: N-queens problem, maze solving. Algorithm analysis: input size, dominant operations, time and memory complexity, sensitivity, and algorithm class.
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4.3 Intended learning outcomes

Code	A student, who passed the course	Relation to learning outcomes
within the scope of KNOWLEDGE:		
W01	Knows basic concepts and algorithmic methods.	ID1A_W01 ID1A_W09
W02	Knows basic examples illustrating the use of algorithmic methods and data structures.	ID1A_W01 ID1A_W09
W03	Understands the operation of the algorithm and knows the methods for determining its effectiveness.	ID1A_W01 ID1A_W09
within the scope of ABILITIES:		
U01	Constructs from scratch a solution scheme for a given class of tasks	ID1A_U01 ID1A_U05 ID1A_U06
U02	Analyses the operation of the algorithm in detail.	ID1A_U01 ID1A_U05 ID1A_U06
within the scope of SOCIAL COMPETENCE:		
K01	Demonstrates creativity in solving assigned algorithmic problems and understands the need to search for the optimal solution.	ID1A_K01 ID1A_K04
K02	Demonstrates responsibility for the solutions to problems he or she proposes and understands their significance for an individual as well as their social aspect.	ID1A_K03 ID1A_K04

4.4. Methods of assessment of the intended learning outcomes																					
Teaching outcomes (code)	Method of assessment (+/-)																				
	Exam oral/written*			Test*			Project*			Effort in class*			Self-study*			Group work*			Others* e.g. standardized test used in e-learning		
	Form of classes			Form of classes			Form of classes			Form of classes			Form of classes			Form of classes			Form of classes		
	L	C	...	L	C	...	L	C	...	L	C	...	L	C	...	L	C	...	L	C	...
W01	+				+																
W02	+				+																
W03	+				+																
U01					+					+				+							
U02					+					+				+							
K01										+				+							
K02										+				+							

*delete as appropriate

4.5. Criteria of assessment of the intended learning outcomes		
Form of classes	Grade	Criterion of assessment
lecture (L) (including e-learning)	3	Osiągnięcie <50 - 60) % wymogów stosowanych w metodach oceny
	3,5	Osiągnięcie <60 - 70) % wymogów stosowanych w metodach oceny
	4	Osiągnięcie <70 - 80) % wymogów stosowanych w metodach oceny
	4,5	Osiągnięcie <80 - 90) % wymogów stosowanych w metodach oceny
	5	Osiągnięcie <90 - 100) % wymogów stosowanych w metodach oceny
classes (C)* (including e-learning)	3	Osiągnięcie <50 - 60) % wymogów stosowanych w metodach oceny
	3,5	Osiągnięcie <60 - 70) % wymogów stosowanych w metodach oceny
	4	Osiągnięcie <70 - 80) % wymogów stosowanych w metodach oceny
	4,5	Osiągnięcie <80 - 90) % wymogów stosowanych w metodach oceny
	5	Osiągnięcie <90 - 100) % wymogów stosowanych w metodach oceny

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, seminars, laboratories*	30	
INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/	40	
Preparation for the lecture*	10	
Preparation for the classes, seminars, laboratories*	20	
Preparation for the exam/test*	10	
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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