

DESCRIPTION OF THE COURSE OF STUDY

Course code	0719-2ID-F44-AE	
Name of the course in	Polish	Algorytmy ewolucyjne
	English	Evolutionary 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	stationary
1.3. Level of study	I-degree, bachelor
1.4. Profile of study*	general academic
1.5. Person/s preparing the course description	Rafał Porowski
1.6. Contact	rafal.porowski@ujk.edu.pl

2. GENERAL CHARACTERISTICS OF THE course of study

2.1. Language of instruction	English
2.2. Prerequisites*	Mathematics 1, Mathematics 2, Discrete Mathematics

3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY

3.1. Form of classes	lecture, course, project	
3.2. Place of classes	stationary	
3.3. Form of assessment	lecture: exam, lab and project: assessment	
3.4. Teaching methods	Lecture, computer lab	
3.5. Bibliography	Required reading	1. J. Arabas, Wykłady z algorytmów ewolucyjnych, WNT, Warszawa, 2004 2. D. E. Goldberg, Algorytmy genetyczne i ich zastosowania. WNT, Warszawa, 1998 3. Z. Michalewicz, D.B. Fogel, Jak to rozwiązać, czyli nowoczesna heurystyka, WNT, Warszawa, 2006
	Further reading	1. A.Q.H. Badar, Evolutionary optimization algorithms, CRC Press, 2022 2. L.A. Scardua, Applied evolutionary algorithms for engineers using python, CRC Press, 2021

4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED LEARNING OUTCOMES

4.1. Course objectives (including form of classes) Lecture: C1. Understanding the principles and operation of evolutionary algorithms. Course and project: C1. Acquiring the ability to develop and apply evolutionary algorithms using a computer.
4.2. Detailed syllabus (including form of classes) Lectures: Heuristic algorithms for solving problems of high computational complexity. The concept of evolutionary algorithms based on mechanisms found in nature. Genetic, ant colony, and bee algorithms and their application to example optimization problems (traveling salesman, knapsack, routing, and scheduling). Evolutionary strategies. Course and project: Computer modeling of simple evolutionary algorithms from scratch and understanding how they work.

4.3 Intended learning outcomes

Code	A student, who passed the course	Relation to learning outcomes
within the scope of KNOWLEDGE:		
W01	knows and understands how evolutionary algorithms work	ID1A_W06 ID1A_W07
within the scope of ABILITIES:		

U01	can solve an example optimization problem using a computer-based evolutionary algorithm	ID1A_U07
within the scope of SOCIAL COMPETENCE:		
K01	is aware of the engineer's role in communicating accurate, expert information on evolutionary algorithms to the public	ID1A_K03

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	P	L	C	P	L	C	P	L	C	P	L	C	P	L	C	P	L	C	P
W01	+																				
U01					+				+		+	+		+	+			+			
K01	+																				

*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	Achievement of [50-60)% of the requirements used in the assessment methods.
	3,5	Achievement of [60-70)% of the requirements used in the assessment methods.
	4	Achievement of [70-80)% of the requirements used in the assessment methods.
	4,5	Achievement of [80-90)% of the requirements used in the assessment methods.
	5	Achievement of [90-100)% of the requirements used in the assessment methods.
classes (C)* (including e-learning)	3	Achievement of [50-60)% of the requirements used in the assessment methods.
	3,5	Achievement of [60-70)% of the requirements used in the assessment methods.
	4	Achievement of [70-80)% of the requirements used in the assessment methods.
	4,5	Achievement of [80-90)% of the requirements used in the assessment methods.
	5	Achievement of [90-100)% of the requirements used in the assessment methods.
Project (P)*	3	Achievement of [50-60)% of the requirements used in the assessment methods.
	3,5	Achievement of [60-70)% of the requirements used in the assessment methods.
	4	Achievement of [70-80)% of the requirements used in the assessment methods.
	4,5	Achievement of [80-90)% of the requirements used in the assessment methods.
	5	Achievement of [90-100)% of the requirements used in the assessment methods.

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/	75	
Participation in lectures	30	
Participation in classes, laboratories	30	
Project	15	
INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/	50	
Preparation for the lecture*	10	
Preparation for the classes, seminars, laboratories	25	
Preparation for the exam/test*	15	
TOTAL NUMBER OF HOURS	125	
ECTS credits for the course of study	5	

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

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