

DESCRIPTION OF THE COURSE OF STUDY

Course code	0719-2ID-C32-PSN	
Name of the course in	Polish	Podstawy sieci neuronowych
	English	Basics of neural networks

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	Rafal 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

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. R. Tadeusiewicz, Sieci neuronowe, Akademicka Oficyna Wydawnicza RM, Warszawa, 1993 2. R.A. Kosiński, Sieci neuronowe. Dynamika nieliniowa i chaos, PWN, Warszawa, 2018 3. Z. Michalewicz, D.B. Fogel, Jak to rozwiązać, czyli nowoczesna heurystyka, WNT, Warszawa, 2006
	Further reading	1. Ł. Wordliczek, Wykorzystanie sztucznych sieci neuronowych, PWN, Warszawa, 2021 2. S. Osowski, Sieci neuronowe do przetwarzania informacji, wyd. 5, Wydawnictwo Politechniki Warszawskiej, 2025

4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED LEARNING OUTCOMES

4.1. Course objectives (including form of classes)

Lecture:

C1. Understanding the principles and operation of neural networks.

Course and project:

C1. Acquiring the ability to develop and apply neural networks using a computer.

4.2. Detailed syllabus (including form of classes)

Lectures:

Neuron model, sigmoid, perceptron, neural network, biological analogy. Associative and heteroassociative memory. Supervised learning, backpropagation, unsupervised learning. Examples of applications in data processing. Hopfield and Kohonen networks.

Course and project:

Computer modeling of simple neural networks 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)* (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.

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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