SYLLABUS

Name: ***Biologically Inspired Artificial Intelligence (InfAAu>SI6BIAI19)***
Name in Polish:
Name in English: ***Biologically Inspired Artificial Intelligence***

Information on course:

Course offered by department: Faculty of Automatic Control, Electronics and Computer Science
Course for department: Silesian University of Technology

Default type of course examination report:

ZAL

Language:

English

Course homepage:

https://platforma2.polsl.pl/rau2/course/view.php?id=1108

Short description:

Introduction to artificial neural networks and evolutionary algorithms,
Fundamentals of artificial neural networks, structure of neuron, feedforward networks, Rosenblatt's perceptron, multilayer perceptron, methods of learning, backpropagation algorithm, evolutionary learning, RBF networks, self-organizing networks, Kohonen map, Hopfield network, Technologies of ANNs, AI libraries, Deep learning: Convolutional Neural Networks, Large Language Models

Description:

Pre-requisite qualifications: Computer Programming, Mathematical Analysis, Linear Algebra, Statistical Methods

Course objectives:
The goal of the course is to present methods of artificial intelligence which fundamentals are derived from biological systems. The methods of computational intelligence like Artificial Neural Networks and Evolutionary Algorithms will be presented. Biologically inspired methods are examples of nonclassical methods of data processing in parallel connectionist systems like Artificial Neural Networks or evolutionary and genetic algorithms. Students can expand their knowledge about IT from simple computer science to general information processing science.

Lectures:
The course focuses on the following: Introduction to artificial neural networks ans evolutionary algorithms, fundamentals of artificial neural networks, structure of neuron, feedforward networks, Rosenblatt's perceptron, multilayer perceptron, methods of learning, backpropagation algorithm, evolutionary learning, RBF networks, self-organizing networks, Kohonen map, Hopfield network, Technologies of ANNs, AI libraries, Deep learning: Convolutional Neural Networks, Large Language Models

Project:
The project will be based on one of above mentioned topics, selected by students and approved by project supervisor.

ECTS: 4
Total workload: 100 (60 contact hours / 40 student's own work hours)
Lecture: 30
Project: 30
Student's own work:
Preparing presentations, Literature studying

Bibliography:

1. Fiesler, Baele, Handbook of Neural Computation, Oxford University Press,
2. Back, Fogel, Michalewicz, Handbook of Evolutionary Computation, Oxford University Press,
3. C. Looney, Pattern recognition using neural networks, Oxford University Press

Learning outcomes:

Knowledge
Student knows and understands:
problems of artificial intelligence (K1A_W09);
fundamental methods, techniques, and tools for artificial intelligence (K1A_W15).

Skills
Student is able to:
prepare well documented report regarding implementation of engineering task on AI problems (K1A_U03);
prepare oral presentation regarding specific AI problem (K1A_U04);
plan and conduct experiments with AI, interpret results, and draw conclusions (K1A_U10).

Assessment methods and assessment criteria:

The assesment is done based on the quality of software projects written by students and documented in their reports.

The syllabus is valid from academic year 2024/2025 and its content cannot be changed during the semester.

Course credits in various terms:

Informatics, full-time first degree engineering studies 7 sem. (InfAAu-SI7)

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	4	2020/2021-L	