SYLLABUS

Name: Artificial intelligence methods in engineering applications
Name in Polish: Metody sztucznej inteligencji w zastosowaniach inżynierskich
Name in English: Artificial intelligence methods in engineering applications

Information on course:

Course offered by department:	Faculty of Organisation and Management
Course for department:	Silesian University of Technology
Study level and form:	Bachelor's degree, Full-time
Term:	winter semester 2020/2021
Coordinator of course edition:	Magdalena Palacz, Ph.D., D.Sc.

Default type of course examination report:

credit

Language:

English

Course homepage:

[link]

ECTS

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Short description:

The course objectives include:
1.   The organized knowledge of theoretical and practical aspects in the field of artificial intelligence.
2.   Fundamental principles necessary to operate with artificial intelligence.
3.   Knowledge of the construction and functioning of a simple AI system.

Description:

1) lectures:
Basic definitions of intelligence, artificial intelligence with examples and potential applications; basic tools used for AI; artificial intelligence history and foundations; AI Agents; Problem-solving characterisation; Machine Learning; Methods for communicating used in AI – neural networks, genetic algorithms; Most spectacular applications of AI; benefits and dangers of AI implementation.
2) project:
In an essay, the student should describe the improvement of AI-based systems in the area of one's hobby with careful attention paid to potential benefits and dangers.
3) laboratory:
Students will be working with a simple robotic system (lego Mindstorm) to program it for a simple production line application.

Number of hours of classes with direct participation of academic teachers or other persons teaching courses and students
Contact hours:
Lecture: 15 h
Project: 15 h
Laboratory: 15 h
Lecture credit: 1 h
Project credit: 1 h
Laboratory credit: 1 h
Student's own work
Preparation for lecture credit: 5h
Project preparation: 7h
Total workload: 60
Number of ECTS credits: 2
including the number of ECTS credits covered by the study programme to be earned as part of the courses taught with the direct participation of academic teachers or other persons teaching courses and students: 1,5

Bibliography:

Heaton Jeff: Artificial Intelligence for Humans, vol. 1 – Fundamental Algorithms
Russell Stuart and Norvig Peter: Artificial Intelligence – a Modern Approach
Carter Matt: Minds and Computers – An Introduction to the Philosophy of Artificial Intelligence
Heaton Jeff: Introduction to the Math of Neural Networks

Learning outcomes:

The student knows and understands:
K1A_W01 - subjects on elements of logic, elements of algebra and linear algebra, analytical geometry in R2 and R3.
K1A_W20 - the fundamental dilemmas of modern civilisation
The student can:
K1A_U01 use rules of precise, logical thinking in the analysis of physical and technical processes

K1A_U13 use analytical, simulation and experimental methods in the identification and formulation of specifications of engineering tasks and their solution:
- use analytical, simulation and experimental methods,
- recognize their system and non-technical aspects, including ethical aspects
- make a preliminary economic assessment of the proposed solutions and engineering actions taken
The student is able to:
K1A_K02 recognise the importance of knowledge in solving cognitive and practical problems and consults experts when having difficulty solving problems independently

Assessment methods and assessment criteria:

Lecture: Written test with multiple choice questions. Passing criteria: minimum 50% of correct answers.
Project: Documented project work. Passing criteria: providing and presenting the project work in accordance with the specified requirements of the project task.
Laboratory: written reports being the description of the prepared model of a production line.
Students solve a final test covering the subjects explained during the lectures.

Practical placement:

Not applicable