

Code	V.6.
Course Title (English)	Artificial Intelligence
Course Title (Polish)	Inżynierskie zastosowanie sztucznej inteligencji
Credits	3 ECTS

Language of instruction **English**

Programme Computer Modelling and Simulation, Intelligent Energy, Biotechnology for Environmental Protection, Business and Technology

Type of studies BSc studies

Unit running the programme Institute of Computational Intelligence

Course coordinator and academic teachers **Prof. Leszek Rutkowski, Dr Rafał Scherer**

Form of classes and number of hours

Semester	Lec.	Tut.	Lab.	Proj.	Sem.	Credit points
5	30	-	-	-	-	3

Learning outcomes Knowledge of mathematical foundations of artificial intelligence and of the basic algorithms of intelligent computational systems. Students will be able to prepare data for artificial intelligent systems and to implement algorithms of artificial intelligence.

Prerequisites Basic knowledge of computer science, calculus and algebra.

Course description

LECTURE

Introduction to Artificial Intelligence and Computational Intelligence. Turing test. Cognitive modelling. Intelligent agents.

Neural Networks. Introduction. Neurons. Feedforward neural networks. Learning algorithms. Recurrent neural networks. Self-organizing neural networks. Radial basis functions. Applications.

Evolutionary algorithms. Introduction. Types of evolutionary algorithms. Coding and selection methods. Types of mutation and crossover. Evolutionary algorithms in designing intelligent systems.

Fuzzy logic and fuzzy systems. Introduction. Operations on fuzzy sets. Extension principle. Fuzzy numbers. Triangular norms. Fuzzy relations. Fuzzy reasoning. Building knowledge base. Neuro-fuzzy systems. Applications.

Data clustering. Distance measures. Fuzzy and possibilistic algorithms. Clustering

validity measures.

Pattern recognition. Feature extraction. Classification. Post processing. Bayesian decision theory. Parametric and nonparametric techniques. Nonmetric methods (decision trees, CART). Ensembles of classifiers. Estimating and comparing classifiers. Component analysis.

Perception. Image formation. Extracting 3D information. Speech recognition. Biometrics. Natural language processing.

TUTORIALS:

Not applicable

LABORATORY

Not applicable

PROJECT

Not applicable

SEMINAR

Not applicable

Form of assessment Written test.

Basic reference materials 1. L. Rutkowski: "Computational Intelligence: Methods and Techniques", Springer 2008
2. R.O. Duda, P.E. Hart, D. G. Stork: "Pattern Classification", Wiley-Interscience 2000
3. C.M. Bishop: "Pattern Recognition and Machine Learning", Springer 2007
4. D.J. Hand, H. Mannila, P. Smyth: "Principles of Data Mining", The MIT Press 2001
5. S.J. Russell, P. Norvig: "Artificial Intelligence: Modern Approach", Prentice Hall 1995

Other reference materials None.

e-mail of the course coordinator and academic teachers	leszek.rutkowski@iisi.pcz.pl rafal.scherer@iisi.pcz.pl
Average student workload (teaching hours + individ.)	2 hours of teaching hours + 2 hours of individual work per week
Remarks:	
<i>Updated on:28.01.2015</i>	