

dr hab. inż. Wojciech Jędruch

Przedmiot „Machine Learning and Soft Computing” dla doktorantów realizowany jest w dwóch grupach. Do grupy pierwszej wchodzi doktoranci, którzy nie mieli przedmiotu Sztuczna inteligencja lub mieli go w niewielkim lub niestandardowym zakresie. Do grupy drugiej wchodzi studenci po regularnym kursie Sztucznej inteligencji w ilości około 60 godz.

### Grupa I

W grupie pierwszej zajęcia składają się z 15 godzin wykładów i 15 godzin laboratorium.

Wykład:

#### List of Topics - Lecture

No	Topic <sup>(c)</sup>	Level of <sup>(d)</sup>					No of hours <sup>(e)</sup>
		knowledge			skills		
		A	B	C	D	E	
1.	Definitions of AI, overview of methods and applications		X				1
2.	FOL language and reasoning		X				3
3.	Fuzzy reasoning		X				1
4.	Bayesian networks		X				1
5.	Introduction to machine learning		X				1
6.	Gradient, evolutionary, simulated annealing, particle swarm algorithms		X				3
7.	Artificial neural networks		X				1
8.	Neuro-fuzzy systems		X				1
9.	Decision trees		X				1
10.	Selforganization and clusters computing		X				1
11.	Generalization problems		X				1
<b>Total <sup>(f)</sup></b>							<b><u>15</u></b>

#### List of Topics - Lab

No	Topic <sup>(c)</sup>	Level of <sup>(d)</sup>					No of hours <sup>(e)</sup>
		knowledge			skills		
		A	B	C	D	E	
1.	Prolog language						8
2.	Fuzzy systems				X		2
3.	Adaptive neural-fuzzy systems				X		2
4.	Neural networks				X		3
<b>Total <sup>(f)</sup></b>							<b><u>15</u></b>

Grupa II

Tematy seminariów

**List of Topics - Seminar**

No	Topic <sup>(c)</sup>	Level of <sup>(d)</sup>					No of hours <sup>(e)</sup>
		knowledge			skills		
		A	B	C	D	E	
1.	Project CYC						1
2.	Probability learning in Bayesian Networks						1
3.	Elemens of LISP language						1
4.	Methods of human face recognition						1
5.	Overview of the book: Bar-Cohen Y, Hanson D., Marom A.: „The coming robot revolution”, Springer, 2009						1
6.	Overview of the book: Searle J.R.: The mystery of consciousness”						1
7.	Selected applications of genetic programming methods based on the books: Koza J., Genetic Programming						1
8.	Overview of the book: Mitchell M. „Complexity a guided tour”, Oxford University Press, 2009						1
9.	Description logic						1
10.	Hidden Markov Models and their applications						1
11.	Filogenetics using Bayes methods						1
12.	Support Vector Machines methods and its application to information retrieval based on Maszczyk T., Duch W. "Support Feature Machines: Support Vectors are not enough", Manning C.D., Raghavan P., Schütze H.: An Introduction to Information Retrieval, Cambridge University Press, 2009						1
13.	Use of Self-Organizing Maps for Information Retrieval						1
14.	Kernel and spectral Clustering, based on: Luxburg U. "A Tutorial on Spectral Clustering", Filippone M., Camastra F., Masulli F., Rovetta S. "A survey of kernel and spectral methods for clustering", Camastra F., Verri A. "A novel kernel method for clustering" , Rui Xu. Wunsch D.C., II "Clustering"- chapter on spectral methods						1
15.	Paradigms, history and future of SI and AL – based on the book: Johnston J.; The Allure of Machinic Life – Cybernetics, Artificial Life, and the New AI, The MIT Press, 2008 and papers of Brooks						1
16.	Multiagent Systems based on the book: Wooldridge M., Multiagent Systems, Wiley, 2009. Topic for two person for two seminar						1
17.	Cognitive Dynamic Systems: <a href="http://soma.mcmaster.ca/lectures.php">http://soma.mcmaster.ca/lectures.php</a>						1
18.	Cognitive Decision-Making based on the book: Benoit Hardy-Vallée (ed.), Cognitive Decision-Making, Cambridge Scholars Publishing, 2007						1
19.	Collaborative Sensing based on the paper: Collaborative Sensing by Unmanned Aerial Vehicles, W. T. L. Teacy, J. Nie, S. McClean and G. Parr, and other papers						1
20.	Roger Penrose's theory of mind						1