UNIVERSITY of DEBRECEN

PEKÁR IMRE
DOCTORAL SCHOOL OF MECHANICAL ENGINEERING
H-4002 Debrecen, Ótemető str. 2-4.
e-mail: doktori@eng.unideb.hu
website: engphd.unideb.hu

Name of the course:	**Problem solving with intelligent computing**
Course type:	Optional
Responsible lecturer:	Dr. Kocsis Imre
Content:	Fundamentals of soft computing, applications in engineering. Fuzzy systems, fuzzy sets, operations. Fuzzy rules and implications. Fuzzy rule interpolation. Hierarchical fuzzy control. Evolutionary algorithms. Genetic algorithms, fitness function, selection, cross-over, mutation, migration. Genetic programming, bacterial evolutionary algorithms. Artificial neural networks, multilayer perceptron, radial basis function networks, B-spline networks, backpropagation method, Levenberg-Marquardt algorithms, spiking neural networks. Deep learning, classification and regression problems. Pre-processing. Convolutional neural networks, machine vision.
Literature:	• A.E. Eiben, J.E. Smith Introduction to Evolutionary Computing, Springer-Verlag, 2015. • Goodfellow, Y. Bengio, A. Courville, Deep Learning, MIT Press, 2016. • Engelbrecht: Computational Intelligence: An Introduction, Wiley & Sons, 2007. • R. Kruse, C. Borgelt, C. Borgelt, M. Steinbrecher: Computational Intelligence: A Methodological Introduction, Springer, 2016 • N. Siddique, H. Adeli: Computational Intelligence: Synergies of Fuzzy Logic, Neural Networks and Evolutionary Computing. John Wiley & Sons, 2013. • L. Rutkowski: Computational Intelligence: Methods and Techniques. Springer, 2008. • M. Negnevitsky: Artificial Intelligence: a guide to intelligent systems, Addision Wesley, 2002. • D. Poole, A. Mackworth, R. Goebel: Computational Intelligence: A Logical Approach, Oxford University Press, 1998. • J.-S. R. Jang, C.-T. Sun, E. Mizutani: Neuro-Fuzzy and Soft Computing, Prentice Hall, 1997.