

ECTS Code			
Title	Artificial Intelligence (2)		
Instructor	L. State		
Type (Compulsory, Elective, Optional)	Compulsory		
Structure	The number of weeks		
	Lectures	2	hours/week
	Seminars	0	hours/week
	Laboratory	2	hours/week
Period (semester 1-6)	6		
ECTS Credits	6		

Content:

- Feedforward neural networks; Perceptron and Multi-layer perceptron models; Linear Associative Memory; Optimal Linear Associative Memory; Back-propagation;
- Recurrent neural networks; Stability analysis of Cohen-Grossberg / Kohonen neural networks with Hebb / anti-Hebb / differential Hebb learning rules; Continuous additive bi-directional associative memory (CABAM);
- Karhunen-Loeve compression / decompression; Principal Component Analysis with Neural Networks and PCA learning algorithms: Hebb, Oja, Foldiak, Rubner, Generalized Hebbian Algorithm (GHA, Sanger's rule), Adaptive Principal Component Extractor (APEX);
- Stochastic neural networks: Boltzmann / Cauchy Models;
- Competitive neural networks; Kohonen neural networks; Kohonen's Self-Organizing Map (SOM), Adaptive Resonance Theory (ART), Fuzzy ART;

References:

1. Haykin, S. *Neural Networks; A Comprehensive Foundation*, Prentice Hall, Inc., 1999
2. Du, K.L., Swamy, M.N.S., *Neural Networks in Softcomputing Framework*, Springer Verlag, 2006.
3. J.Principe, N.Euliano, C. Lefebvre, *Neural and Adaptive Systems: Fundamentals Through Simulations*, Wiley, 2000.
4. Hassoun, M.H., *Fundamentals of Artificial Neural Networks*, MIT Press, 1995.
5. L.Fausett, *Fundamentals of Neural Networks: Architectures, Algorithms and Applications*, Prentice Hall, 1994.
6. L.R.Medsker, L.C. Jain, *Recurrent Neural Networks: Design and Applications* CRC Press LLC, 2000.