D – Description of Course

Course	Neural Networks and their Application			
Type			**Recommended year/term**	4/S
Time extent	2+0	**credits** 2	**Completion**	examination
Form			**Code**	
Teacher	Ing. F. Hakl, CSc., doc. Ing. RNDr. M. Holeňa, Csc.			

Goals

Acquired knowledge: Basic concepts, features and models of neural networks.
Acquired skills: Orientation in the art, the ability to use models of artificial neural networks for solving practical problems in the field of approximation of functions, separation of sets and time series prediction.

Outline

Models of artificial neural networks are broadly aplicable in many nowadays computational techniques in the area of data processing and evaluation. Target of the course is providing basic knowledge in this field and the ability to use such knowledge for solving real-world problems.

1. Basic concepts of artificial neural networks.
2. Most common kinds artificial neural networks.
3. Basic numerical methods for neural networks learning.
4. Network design and architecture optimization techniques.
5. Overview of basic types of problems solved by neural networks.
6. Working with artificial neural networks in the Matlab and ROOT.

Keywords

Neural networks, data separation, functional approximation, supervised learning

Extent of individual work

Literature and auxiliary tools

Compulsory literature:

[1] R. Rojas. Neural Networks - A Systematic Introduction. Springer. 1991
[2] I. Goodfelow, Y. Bengion, A. Courville. Deep learning, The MIT Press, Cambridge, MA, USA, 2016.
[3] C.C. Agarwaal. Neural Networks and Deep Learning: A Textbook. Springer Publishing, 2018.

Optional literature:

[4] B.D. Ripley. Pattern Recognition and Neural Networks. Cambridge University Press. 1996