

**Course title: Natural language processing**

**Course code: 63555**

**ECTS: 6**

**Professor: Marko Robnik Šikonja**

**Master's program**

**Prerequisite knowledge :**

- programming skills in Python
- basic knowledge of machine learning
- basic knowledge of statistics

**Short course description:**

- Introduction to deep learning
- Historical perspective
- Applications of deep learning. Training deep neural networks
- Feedforward neural networks
- Stochastic Gradient Descent
- Backpropagation
- Activation and loss functions
- Regularization, initialization, normalization
- Parameter updates
- Convolutional Neural Networks
- Convolution layer
- Pooling layer
- CNN architectures
- Image classification
- Image segmentation
- Visualizing and interpreting CNNs
- Recurrent Neural Networks
- Backpropagation through time
- RNN
- Long Short-Term Memory
- Gated Recurrent Units
- Language model and sequence generation
- Image captioning
- Beyond supervised learning
- Autoencoders
- Variational Autoencoders
- Generative Adversarial Networks
- Deep Reinforcement Learning
- Applications of deep learning

- Computer vision
- Speech recognition
- Natural language processing

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