



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Big data analysis

Course

Field of study

Computing

Area of study (specialization)

IT Microsystems

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

15

Tutorials

0

Laboratory classes

0

Projects/seminars

15

Other (e.g. online)

0

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

dr inż. Jędrzej Potoniec

Responsible for the course/lecturer:

Prerequisites

A student starting this course should have basic knowledge of probability and statistics, linear algebra, mathematical analysis and artificial intelligence. They should also have the ability to obtain information from the indicated sources and be ready to cooperate as part of the team.

Course objective

Introduction to data analysis and machine learning with regard to big data. Learning about selected problems of data analysis and methods of solving them:



1. Providing students with basic knowledge about data analysis, in particular regarding supervised learning.
2. Developing students' skills to select appropriate methods of solving data analysis problems.
3. Introducing the students to the methodology of practical solving of data analysis problems and the stages of a data analysis project.

Course-related learning outcomes

Knowledge

1. Has knowledge of preliminary data analysis and processing for machine learning experiments.
2. Has knowledge of supervised machine learning algorithms.
3. Has knowledge of contemporary neural networks.

Skills

1. Can perform an initial data analysis and processing as preparation of a machine learning experiment in one of the popular tools.
2. Can use libraries implementing machine learning algorithms to carry out an experiment.
3. Can use libraries implementing components of neural networks to construct a neural network and conduct an experiment.

Social competences

1. Understands that knowledge related to data analysis and machine learning is becoming obsolete very quickly.
2. Understands the importance of using the latest knowledge in the field of computing in solving research and practical problems

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified on the basis of answers to questions about the material discussed in the lecture (e.g. entrance tests, online quizzes).

The skills acquired under the project are verified by the project defense.

Programme content

Lecture: preliminary data analysis and processing, supervised learning (selected regression and classification algorithms), model evaluation, regularization. Selected problems of gradient optimization, fully connected, convolutional and recursive neural networks.

As part of the project, students implement and present their own solution to the problem of data analysis, consisting of the following parts: preliminary data analysis and visualization, data



preprocessing, selecting and training the machine learning model, refining the model, presenting the solution.

Teaching methods

Lecture: multimedia presentation, illustrated with examples presented on the blackboard; discussion.

Project: problem method, discussion.

Bibliography

Basic

Aurélien Géron, *Uczenie maszynowe z użyciem Scikit-Learn i TensorFlow*, Helion, 2018

Additional

Ian Goodfellow and Yoshua Bengio and Aaron Courville, *Deep Learning*, MIT Press 2016

on-line: <https://www.deeplearningbook.org/>

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2
Classes requiring direct contact with the teacher	30	1
Student's own work (literature studies, project preparation) ¹	20	1

¹ delete or add other activities as appropriate