SYLLABUS

Name: ***Data Science - Applications in Network Technologies (InfAAu>SM2DSANT19z)***
Name in Polish:
Name in English: ***Data Science - Applications in Network Technologies***

Information on course:

Course offered by department: Faculty of Automatic Control, Electronics and Computer Science
Course for department: Silesian University of Technology

Default type of course examination report:

ZAL

Language:

English

Course homepage:

https://platforma.polsl.pl/rau2/course/view.php?id=1749

Short description:

The aim of the course is to present the basic of the Data Science and its applications using the example of data analysis related to network technologies. During the course, students will be presented with exemplary tools used in Data Science and will acquire basic skills in general data analysis as well as specific types of data related to the network environment, e.g., data streams or social networks.

Description:

Number of ECTS credits: 4
Total number of hours: 100 (contact hours 60h / independent study 40h)
Lecture: 30h
Laboratory: 30h

Own work: preparation for passing the final test from the lecture, preparation for laboratory classes.

Course content:

Lecture:
1. Introduction to Data Science
2. Assessment of data quality and preparation for analysis (preprocessing) of data from Internet
3. Classification and evaluation of classifiers' quality
4. Learning on data streams
5. Adaptive learning on data streams
6. Methods for social network analysis
7. Deep learning networks

Laboratory classes:
1. Introduction to the Altair AI Studio tool, methods of data preprocessing
2. Learning on data streams
3. Deep learning networks

Bibliography:

1. Han J., Kamber M., Pei J.: Data Mining: Concepts and Techniques. Morgan Kaufmann Publishers, 2017
2. Witten I. H., Frank E., Hail M.A: Data Mining. Practical Machine Learning Tools and Techniques. Fourth Edition. Theory and its applications, Morgan Kaufmann /Elsevier 2017.
3. Bifet A., Gavaldà R., Holmes G. and Pfahringer B. Machine Learning for Data Streams with Practical Examples in MOA, MIT Press, 2018
4. De Nooy W., Mrvar A. and Batagelj V. Exploratory social network analysis with Pajek: Revised and expanded edition for updated software. Cambridge University Press, 2018
5. Hastie T., Tibishirani R., Freidman J., The Elements of Statistical Learning. Data mining, Inference and Prediction. Springer, 2009
6. McKinney W: Python for Data Analysis. O'Reilly, 2022.
7. Bengio, Y.: Deep Learning. MIT Press, 2016.

Learning outcomes:

Course-specific learning outcomes: at the completion of the course, student:
1. Knows data mining methods and their application to data from the Internet (test, final test) K2A_W02; K2A_W06
2. Knows the characteristics of social networks and methods of analyzing them (test, final test) K2A_W02; K2A_W06
3. Can select appropriate methods and tools and apply them to the task of data mining and social network analysis (laboratory report) KA_U06;
4. Can evaluate the quality and effectiveness of methods and tools used for data mining and social network analysis (laboratory report) KA_U06;

Assessment methods and assessment criteria:

The DSAiNT course consists of lectures and laboratory classes. In accordance with the Study Regulations, attendance at lectures is not obligatory (although recommended), while laboratory classes are obligatory.

Lecture:
Written assessment in the form of a test containing open-ended or multiple-choice questions.
The criterion for passing: minimum 50% of correct answers.

Laboratory
Positive assessment of all laboratory reports

Conditions for passing the course:
The final grade is the grade obtained from the final test.

Making up missed laboratory work is possible on dates agreed upon with the teacher.

The syllabus is valid from academic year 2024/25 and its content cannot be changed during the semester.

Course credits in various terms:

<without a specific program>

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	4	2024/2025-Z	