GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Advanced data mining, PG_00067415		
Field of study	Data Engineering		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2028/2029
Education level	first-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	4	Language of instruction	English
Semester of study	7	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Software Engineering -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Aleksandra Karpus	
	Teachers	dr inż. Aleksandra Karpus	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	30.0	0.0	0.0	30

E-learning hours included: 0.0

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	30	3.0	42.0	75

Subject objectives

The aim of the course is to introduce students to the subject of exploration and visualization of data-sets using Python programming language.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U04] formulates logical solutions to complex or unstructured problems	The student is able to select the appropriate machine learning method to solve data mining problems.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
[K6_U06] acquires new knowledge, planning its own development in aiming at achieving defined goals	The student is able to draw knowledge from various sources, including knowledge from other fields of science, in order to solve complex problems of analyzing real data.	[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject
[K6_K03] demonstrates the ability to think critically and analytically and integrates knowledge from many disciplines in order to make effective decisions	The student is able to draw meaningful conclusions from analyzed data. He is able to apply knowledge from various fields in order to enrich the analysis performed.	[SK5] Assessment of ability to solve problems that arise in practice

Subject contents

Course content – laboratory
1. Introduction to Python

2. Data Preparation

3. Data Visualization

4. Basic Predictive Models

5. Decision Tree Model

6. Tuning of hyper-parameters

7. Anomaly Detection (K-means Clustering)

Prerequisites and co-requisites

Basic knowledge of programming and statistics.

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>practical exercieses</td><td>60.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. Valentina Porcu, Python for Data Mining Quick Syntax Reference, Berkeley, CA : Apress : Imprint: Apress, 2018
2. Megan Squire, Mastering Data Mining with Python Find patterns hidden in your data, Packt Pub, 2016
3. Robert Layton, Learning data mining with Python: harness the power of Python to analyze data and create insightful predictive models, Packt Pub, 2015</td></tr>
<tr><td>Supplementary literature</td><td>Greeneltch Nathan, Python Data Mining Quick Start Guide, Packt Pub

S.Ryza, U.Laserson, S.Owen & J.Wills, Advanced Analytics with Spark (Spark. Zaawansowana analiza danych), ORelly (Helion)

Karau, H., Konwinski, A., Wendell, P., Zaharia, M.: Learning Spark: Lightning-Fast Big Data Analysis. OReilly, 2015</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">During the course, the student will select the optimal hyperparameters of the predictive model.</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="2">Not applicable</td></tr>
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