GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Autonomous Systems of Expertise and Data Mining, PG_00047703		
Field of study	Automatic Control, Cybernetics and Robotics		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2023/2024
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	3	Language of instruction	Polish
Semester of study	6	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Decision Systems and Robotics -> Faculty of Electronics, Telecommunications and Informatics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Jakub Wszołek	
	Teachers	dr inż. Jakub Wszołek	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	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	2.0	18.0	50

Subject objectives

The aim of the course is to understand the construction and operation of autonomous systems and data mining expertise. In the lecture part of the course, students learn the different components of solutions based on modern systems analysis of large volumes of data. Theoretical considerations are enriched practical knowledge acquired from the laboratory classes.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W04] Knows and understands, to an advanced extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, and organisation of systems using computers or such devices	Student has basic information on the operation of the relational databases. Student knows the basics of SQL. Student has knowledge how to create the optimal database structures.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
[K6_W03] Knows and understands, to an advanced extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum	Student has a basic knowledge of high level programming languages. Student is able to define ptroblem and implement appropiate procedures.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
[K6_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study	Student can write software that interacts with the database data. Student is able to apply mechanism of analyzation of large data sets based on data mining methods	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools

Subject contents

1. Introduction
2. Expert System
a. Definition and characteristics of an expert system
b. The construction of expert systems
3. Knowledge Representation (OAV, semantic networks)
4. The facts, rules
5. Database - part of the expert system
a. The definition of the database
b. The models architectures databases (relational, hierarchical, semantic network, distributed)
c. Solutions NO-SQL (documentary, column, key-value, BigTable)
d. Methods for the use of databases for storing knowledge
6. Evaluation of the quality of the expert system
7. Algorithm Quinlan - help in acquiring knowledge
8. RETE Algorithm
9. The inference algorithm to the front, back, mixed
10. Introduction to the Drools rule-based language
11. Data Mining Systems
a. History
b. The definition and structure of the system
c. The practical use of
12. tables, decision trees
13. Classification
a. The Bayesian probabilistic model
b. The Naive Bayes classifier
c. Uses
14. Cluster analysis
a. The hierarchical methods
b. A group of k-means methods
c. Uses
15. Practical implementations

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
lab	50.0%	40.0%
lecture	50.0%	60.0%

Recommended reading	Basic literature	Kowalczuk, Z., Diagnosis of Processes and Systems. PWNT, Gdan´sk (2009) Jared Dean, Big Data, Data Mining and Machine Learning BCS Learning & Development Limited, Big Data: Opportunities and Challenges Keith R Holdaway, Think Bigger: Developing a Successful Big Data Strategy for Your BusinessHarness Oil and Gas Big Data with Analytics: Mark Van Rijmenam, Exploration and Production with Data Driven Models
	Supplementary literature	Edward Capriolo, Dean Wampler, Jason Rutherglen, Hive programming
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	