GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00052288
Field of study	Mathematics

Date of commencement of studies	October 2023	Academic year of realisation of subject	2024/2025
Education level	second-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	2	Language of instruction	Polish
Semester of study	3	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment

Conducting unit	Divison of Nonlinear Analysis -> Institute of Applied Mathematics -> Faculty of Applied Physics and Mathematics

Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marcin Styborski				
	Teachers	dr inż. Marcin Styborski				

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	45.0	0.0	0.0	60
	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	60	5.0	35.0	100

Subject objectives	The aim of the course is to familiarize students with the methods used in the daily practice of the LPP Data Sience team and practical training.

Learning outcomes		Course outcome	Subject outcome	Method of verification
		[K7_U09] Is able, at an advanced level and covering modern mathematics, to apply and present in speech and in writing the methods of at least one selected branch of mathematics: mathematical and functional analysis, theory of differential equations and dynamical systems, algebra and number theory, geometry and topology, calculus probability and statistics, discrete mathematics and graph theory, logic and set theory.	The student knows what machine learning is. He knows its types and the process of creating. The student works with data warehouses and uses them for mathematical modeling.	[SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
		[K7_K01] Knows the limitations of one's own knowledge and understands the need for further education, can independently search for information in literature, also in foreign languages.	The student uses SQL and Python in practice to solve specific problems in business The student performs a specific project task in a group, which ends with its explanation and visualization. As a result, he learns teamwork, regularity and responsibility for the entrusted component task.	[SK1] Assessment of group work skills [SK2] Assessment of progress of work [SK5] Assessment of ability to solve problems that arise in practice
		[K7_W03] Knows the most important theorems and hypotheses of main branches of mathematics.	The student performs tasks related to machine learning. The student is able to work with data warehouses.	[SW3] Assessment of knowledge contained in written work and projects
		[K7_U06] Has the ability to recognize topological structures in mathematical objects occurring, for example, in geometry or mathematical analysis; is able to use the basic topological properties of sets, functions and transformations, uses the language and methods of functional analysis in the problems of mathematical analysis and its applications, in particular uses the properties of classical Banach and Hilbert spaces.	The student knows what machine learning is. He knows its types and the process of creating. The student works with data warehouses and uses them for mathematical modeling.	[SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task

Subject contents	
	LPP business • Business processes and supply chain • Data Science in the organization • Roles in the Data Science team **Business Intelligence and Cubes** • Data warehouses • Data modeling • OLAP and tabular cubes **SQL** • Introduction to SQL • Tables, partitions, clustered and non-clustered indexes, or how the database holds the data • Data reading and performance **Data Science in practice** • Machine learning in business • Types of machine learning models and the development process • Basic metrics used in machine learning models • Interpreting the results of machine learning models **SCRUM** • Explanation of the Scrum framework • Roles, artifacts, events • Scrum Tale simulation game
Prerequisites and co-requisites	Basic knowledge of Python and SQL. Basic knowledge of probability and statistics.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Class attendance and active participation in lectures (5 weeks * 4 points)	50.5%	20.0%
Project execution in classes (10 weeks * 5 points)	50.5%	50.0%
Project implementation (30 points)	50.5%	30.0%

Recommended reading

Basic literature	1. The Elements of Statistical Learning: Data Mining, Inference, and Prediction, Second Edition (Springer Series in Statistics) 2nd Edition Trevor Hastie, Robert Tibshirani, Jerome Friedman 2. Probabilistic Machine Learning: An Introduction Kevin Patrick Murphy. MIT Press, 2021. 3. Python. Machine learning i deep learning. Biblioteki scikit-learn i TensorFlow 2. Wydanie III, Sebastian Raschka, Vahid Mirjalili, Helion 2021 4. Zapytania w SQL. Przyjazny przewodnik. Wydanie IV, John L. Viescas, Helion 2021
Supplementary literature	1. Python w analizie danych. Przetwarzanie danych za pomocą pakietów pandas i numpy oraz środowiska ipython. Wydanie II, Wes McKinney, Wydawnictwo Helion 2. Uczenie maszynowe z użyciem Scikit-Learn. Aurelion Geron, Wydawnictwo Helion 3. Hurtownie danych. Od przetwarzania analitycznego do raportowania. Wydanie II, Adam Pelikant, Helion 2021
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	Work in the design laboratory billed in weekly incremental cycles in accordance with the Scrum framework. Timely delivery of weekly gains from project implementation in accordance with the developed Road Map. Verification will take place during review at each classes. Finally, a team presentation of the results obtained.
Work placement	Not applicable

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