Subject card

Subject name and code	Artificial intelligence in production engineering, PG_00064716
Field of study	Management and Production Engineering

Date of commencement of studies	February 2025	Academic year of realisation of subject	2024/2025
Education level	second-cycle studies	Subject group	Obligatory subject group in the field of study
			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	1	Language of instruction	Polish
Semester of study	1	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	exam

Conducting unit	Zakład Technologii Maszyn i Automatyzacji Produkcji -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology

Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Aleksander Mroziński
	Teachers	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	15.0	0.0	45
	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	45	7.0	23.0	75

Subject objectives	Acquiring the ability to use algorithms based on artificial intelligence to conduct data analysis and exploration (Data Mining), preprocessing real data. In addition, acquiring the ability to independently search for information on the latest solutions used in production management systems and assess the development of artificial intelligence methods. Acquiring the ability to analyze and verify the obtained results in order to draw reliable conclusions.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U15] evaluates the feasibility of advanced methods and tools for solving complex engineering tasks of a practical nature, characteristic of the field of study, and selects and applies appropriate methods and tools for this purpose	expanding one's knowledge of artificial intelligence methods and the possibilities of its application; developing the ability to work independently; using AI algorithms, e.g. data mining	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
	[K7_U03] identifies and formulates the specification of tasks in the field of designing stationary and part-time production and technological systems/processes, including tasks taking into account non-technical aspects of business activity	expanding your knowledge about artificial intelligence methods and the possibilities of its application	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
	[K7_W04] demonstrates knowledge covering selected issues in the field of advanced detailed knowledge, in particular in the field of methods, techniques, tools and algorithms used in production management and control processes as well as in the design of technological processes	expanding knowledge about the latest solutions used in production management systems,	[SW3] Assessment of knowledge contained in written work and projects
	[K7_K11] is aware of importance of professional acting, the need for critical verification of acquired knowledge and consulting experts opinion in case of facing difficulties with individual problem solving	developing the ability to work independently and evaluate the development of artificial intelligence methods	[SK5] Assessment of ability to solve problems that arise in practice [SK3] Assessment of ability to organize work

Subject contents	
	C++ and Python Programming Basics
	Introduction to Data Mining
	Preprocessing Real Data
	Exploratory Data Analysis
	Statistical Approaches to Estimation and Prediction
	K-Means Algorithm
	Hierarchical Clustering and K-Means
	Association Rules
	Documentation Creation
	Real Data Analysis
	Creating a Model of Evaluation Determinants
	A Priori Algorithm

Prerequisites and co-requisites	

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		50.0%	40.0%
		50.0%	20.0%
		50.0%	40.0%

Recommended reading	Basic literature	Trocki M.: Project Management. Warsaw. Polish Economic Publishing House. 2009.Pawlak M.: Project Management. Warsaw. PWN Scientific Publishing House. 2006.Dudka A., Microsoft Business Solutions Navision Management Information Systems, UE Publishing House in Wrocław, Wrocław 2011,
	Supplementary literature	EXPLORATION OF INTERNET RESOURCES Analysis of the structure, content and use of the WWW.Author:Zdravko Markov, Daniel T. Larose Publisher:Wydawnictwo Naukowe PWN
	eResources addresses	Uzupełniające Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	List the types and definitions of the most popular neural networks used by artificial intelligence.
	Principle of operation of the k-means algorithm.
	Assessment of the quality and correctness of classification models using the example of the so-called Confusin Matrix.
	Comparison of the advantages and disadvantages of clustering methods using the example of hierarchical clustering and the k-means method.
Work placement	Not applicable

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