



Subject card

Subject name and code	Internet of Things and operational technologies, PG_00062730						
Field of study	Technologies for Industry 5.0						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2025/2026		
Education level	first-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	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			1.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Division of Electrochemistry and Surface Physical Chemistry -> Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jacek Ryl					
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	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	15	1.0		9.0		25
Subject objectives	The aim of the course is to familiarize students with the physical and systemic aspects of industry 4.0 and 5.0 technologies, allowing them to choose their diploma specialization in a more informed way. The course will be taught by many lecturers from the FTIMS and ETI faculties - specialists in the above-mentioned issues.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W06] demonstrates knowledge related to data analysis and engineering, machine learning, knows the principles of integrating data with management systems to analyze complex engineering and technological problems	The student has knowledge of the development trends of Industry 5.0 technologies, in particular data engineering tools, machine learning, analysis of complex engineering problems			[SW1] Assessment of factual knowledge		
	[K6_U06] performs analysis, exploration and cleaning of data sets, can use statistical models and machine learning models, integrate various analytical, management and data storage tools	The student is able to identify the tools needed to analyze and explore a data set, propose models for solving analytical problems, and knows the development trends in data engineering.			[SU3] Assessment of ability to use knowledge gained from the subject		

Subject contents	<p>The Importance of Intelligent Process Technologies</p> <p>Internet of Things (IoT)</p> <p>Industrial Internet of Things (IIoT)</p> <p>Data Processing and Analysis</p> <p>Sensors and Actuators in IoT</p> <p>Communication in IoT</p> <p>Platforms and Systems</p> <p>Security and Privacy</p> <p>Intelligent Energy Management Systems</p> <p>A Review of Applications in Various Industries - Examples and Case Studies</p>								
Prerequisites and co-requisites									
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 1025 798 1059">Subject passing criteria</th> <th data-bbox="802 1025 1142 1059">Passing threshold</th> <th data-bbox="1147 1025 1487 1059">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 1066 798 1093">exam</td> <td data-bbox="802 1066 1142 1093">50.0%</td> <td data-bbox="1147 1066 1487 1093">100.0%</td> </tr> </tbody> </table>	Subject passing criteria	Passing threshold	Percentage of the final grade	exam	50.0%	100.0%		
Subject passing criteria	Passing threshold	Percentage of the final grade							
exam	50.0%	100.0%							
Recommended reading	Basic literature	literature recommended by individual lecturers							
	Supplementary literature	nie dotyczy							
	eResources addresses	Adresy na platformie eNauczanie:							
Example issues/ example questions/ tasks being completed									
Work placement	Not applicable								

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