

Subject card

Subject name and code	Advanced Databases and Data Engineering, PG_00203631						
Field of study	Informatics						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2026/2027		
Education level	Master's 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		5.0		
Learning profile	academic		Assessment form		credit		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Anna Nenca				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	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		0.0		65.0	125
Subject objectives	The aim of the course is to familiarize students with advanced database models (relational and non-relational), modern data-processing technologies, and methods of data engineering and data mining — extraction, conversion, profiling, cleaning, exploratory data analysis (EDA) and data preparation for further analysis.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[INFMU2_W05] has in-depth knowledge of artificial intelligence algorithms and techniques, their properties and importance in practical applications		Knows data engineering methods and the possibilities of using artificial intelligence and machine learning algorithms in data analysis and exploration.		[SW4] test/exam - oral or written		
	[INFMU2_U06] can formulate and test hypotheses related to simple research problems using artificial intelligence algorithms and tools		Is able to design and implement solutions using advanced databases and formulate and verify research hypotheses based on data analysis.		[SU5] implementation of a problem task [SU6] demonstration of practical skills		
	[INFMU2_W09] knows and understands formal models of data representation and structures (e.g. graphs, relational and non-relational models), knows the applications of mathematical models and data structures in solving practical problems, understands the connections between theory (e.g. graphs) and practical data processing systems (e.g. databases, Big Data systems)		Familiar with advanced data representation models, including relational, document, graph, and columnar models, and understands their application in database systems and large data processing.		[SW4] test/exam - oral or written		

Subject contents	Modern database management systems. Advanced data modeling. NoSQL databases (document, key-value, columnar, graph). Graph models and graph databases. Data stream processing. Query languages for relational and non-relational databases. Fundamentals of data mining.		
Prerequisites and co-requisites	knowledge of SQL		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	test	51.0%	50.0%
	laboratory assignments	51.0%	50.0%
Recommended reading	Basic literature	- Sadalage P.J., Fowler M., <i>NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence</i>, Addison-Wesley, Upper Saddle River 2012. - Kleppmann M., <i>Designing Data-Intensive Applications</i>, O'Reilly, Sebastopol 2017. - Robinson I., Webber J., Eifrem E., <i>Graph Databases</i>, 2nd ed., O'Reilly, Sebastopol 2015.	
	Supplementary literature	- Bradshaw S., Brazil E., Chodorow K., <i>MongoDB: The Definitive Guide</i>, 3rd ed., O'Reilly, Sebastopol 2019. - Carpenter J., Hewitt E., <i>Cassandra: The Definitive Guide</i>, 3rd ed., O'Reilly, Sebastopol 2020. - McKinney W., <i>Python for Data Analysis</i>, 3rd ed., O'Reilly, Sebastopol 2022.	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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