



Subject card

Subject name and code	Data warehouses, PG_00045309						
Field of study	Data Engineering						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2022/2023		
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			blended-learning		
Year of study	2	Language of instruction			English		
Semester of study	4	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Software Engineering -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Teresa Zawadzka					
	Teachers	dr inż. Teresa Zawadzka dr inż. Grzegorz Gołaszewski dr inż. Aleksandra Nabożny					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	0.0	45
	E-learning hours included: 13.0						
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	8.0		47.0		100
Subject objectives	The aim of the course is introduction the student to data warehouse concepts, to applications and design of data warehouses, as well as to methods of querying a data warehouse. The student also gets knowledge how to use business <i>intelligence tools</i> .						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W16] Knows the quality attributes of data in information systems and the principles of data management and usage that ensure the level of data quality required for specific applications	Student knows data quality problems occurring in the data integration processes			[SW1] Assessment of factual knowledge		
	[K6_W08] Knows the models and structure of the data mining process and their multidimensional analysis and can assess the results of such analyses	The student knows and can use data models used in data warehousing and knows how to build data warehouses that comply with these models.			[SW1] Assessment of factual knowledge		
[K6_U06] Independently solves complex engineering tasks using literature, materials and devices, prepares extensive documentation of the developed solution using appropriate description techniques.	Student can use basic business intelligence tools, in particular those included in standard commercial software packages for data warehousing.			[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools			

Subject contents	<ol style="list-style-type: none"> 1. Basic concepts of data warehousing 2. Multi-dimensional data model in data warehouses. Categorical and hierarchical dimensions. 3. The star schema and the snowflake schema. Mixed schemes. 4. Basic operations on OLAP cubes. 5. Memory models in data warehouses 6. The logical and physical architecture of a data warehouse 7. The rules for creating a data warehouse. 8. Applications of data warehouse - Examples. 9. Review of available commercial OLAP servers 10. MDX language– an review 11. MDX simple queries 12. MDX advanced queries 13. Extensions of SQL - operations on OLAP cubes 14. ETL (Extract, Transform, Load) processes 15. Planning for a data warehouse in an enterprise 		
Prerequisites and co-requisites	Basic database course completed		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	lab	50.0%	50.0%
	exam	50.0%	50.0%
Recommended reading	Basic literature	<p>W.H. Inmon: Building the Data Warehouse. J. Wiley&Sons,</p> <p>R. Kimball: Data Warehouse Toolkit. J. Wiley&Sons,</p> <p>P. Ponniah: Data Warehousing. J. Wiley&Sons, .</p> <p>K. Goczyła. T. Zawadzka. "Data Warehousing". Lecture materials.</p> <p>V. Poe, P. Klauer, S. Brebst: Tworzenie hurtowni danych, WNT</p>	
	Supplementary literature	None	
	eResources addresses	<p>Adresy na platformie eNauczanie:</p> <p>Data Warehouses DE 2022/2023 - Moodle ID: 28971</p> <p>https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28971</p>	

Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none">1. Design a data warehouse according to guidelines specified2. Develop a data warehouse and test its functioning3. Explain the differences between OLAP and OLTP processing4. Specify the most important features of a data warehouse5. What is the difference from the star schema and the snowflake schema?6. Explain extensions of SQL for OLAP processing.7. What is the ETL process?
Work placement	Not applicable

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