



## Subject card

Subject name and code	Data warehouses, PG_00045309						
Field of study	Data Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2023/2024		
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				
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_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.			[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment	
	[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_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	

Subject contents	<ol style="list-style-type: none"> <li>1. Basic concepts of data warehousing</li> <li>2. Multi-dimensional data model in data warehouses. Categorical and hierarchical dimensions.</li> <li>3. The star schema and the snowflake schema. Mixed schemes.</li> <li>4. Basic operations on OLAP cubes.</li> <li>5. Memory models in data warehouses</li> <li>6. The logical and physical architecture of a data warehouse</li> <li>7. The rules for creating a data warehouse.</li> <li>8. Applications of data warehouse - Examples.</li> <li>9. Review of available commercial OLAP servers</li> <li>10. MDX language– an review</li> <li>11. MDX simple queries</li> <li>12. MDX advanced queries</li> <li>13. Extensions of SQL - operations on OLAP cubes</li> <li>14. ETL (Extract, Transform, Load) processes</li> <li>15. Planning for a data warehouse in an enterprise</li> </ol>		
Prerequisites and co-requisites	Basic database course completed		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	exam	50.0%	50.0%
	lab	50.0%	50.0%
Recommended reading	Basic literature		<p>W.H. Inmon: Building the Data Warehouse. J. Wiley&amp;Sons,</p> <p>R. Kimball: Data Warehouse Toolkit. J. Wiley&amp;Sons,</p> <p>P. Ponniah: Data Warehousing. J. Wiley&amp;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		

Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"><li>1. Design a data warehouse according to guidelines specified</li><li>2. Develop a data warehouse and test its functioning</li><li>3. Explain the differences between OLAP and OLTP processing</li><li>4. Specify the most important features of a data warehouse</li><li>5. What is the difference from the star schema and the snowflake schema?</li><li>6. Explain extensions of SQL for OLAP processing.</li><li>7. What is the ETL process?</li></ol>
Work placement	Not applicable