



## Subject card

Subject name and code	Databases, PG_00047832						
Field of study	Informatics						
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	Part-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish		
Semester of study	4	ECTS credits			6.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Geoinformatics -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Zbigniew Łubniewski					
	Teachers	dr hab. inż. Zbigniew Łubniewski dr inż. Marek Kulawiak mgr inż. Tomasz Idzi					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	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	6.0		99.0	150	
Subject objectives	To familiarize students with creating and management of relational databases .						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U07] can apply methods of process and function support, specific to the field of study	Student is able to adequately design a secure database system, depending on the specific needs of the user.	[SU2] Assessment of ability to analyse information
	[K6_W43] Knows and understands, to an advanced extent, standards and methods of IT systems administration, monitoring of processes occurring in them and immunising them to undesirable phenomena and activities	Student knows the principles of designing, creating and managing a database.	[SW1] Assessment of factual knowledge
	[K6_W41] Knows and understands, to an advanced extent, the operation and evaluation criteria of data processing, storage and transfer methods, including computational algorithms, artificial intelligence and data mining	Student knows the methods of administering and managing the database.	[SW1] Assessment of factual knowledge
	[K6_U42] can apply tools and methods of designing, optimization, monitoring, management, increasing reliability and protection from safety hazards in local and distributed information systems and applications	Student is able to design and implement data security mechanisms, including user authorization and authentication.	[SU4] Assessment of ability to use methods and tools
	[K6_W03] Knows and understands, to an advanced extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum	Student knows the principles of construction and operation of computer systems.	[SW1] Assessment of factual knowledge

## Subject contents

1. Database system architecture
2. Functions of a Database Management System (DBMS)
3. Entity sets, entity attributes, entity keys, relationships
4. Entity relationship diagrams (ERDs) - general concepts
5. Creating entity relationships diagrams 6. Relational database - definitions
7. Integrity rules: entity integrity, referential integrity
8. From an entity relationship diagram to a relational database schema
9. Relational algebra: set-theoretic operators
10. Relational algebra: relational operators
11. SQL - an overview, origins, standards
12. Creating tables
13. Populating tables with data
14. Simple queries
15. SQL expressions - simple and conditional
16. Queries with aggregate functions
17. Queries with grouping
18. Queries with joins
19. Queries with outer joins
20. Nested queries
21. Queries for UPDATES, deletes and bulk inserts
22. Views, operations on views, updatable views
23. Cursors, sequential processing of query results
24. Normalization of relational databases: 2nd and 3rd normal form
25. Boyce-Codd normal form
26. Normalization of relational databases: 4th and 5th normal form

	<p>27. Transactional processing in databases - basics</p> <p>28. Isolation levels in transactions</p> <p>29. Transactional processing and SQL standards</p> <p>30. Rules for development of correct database applications in concurrent environments</p> <p>31. Identification, authentication and authorization in databases</p> <p>32. Authorization of SQL operations on data: views, GRANT and REVOKE statements</p>												
Prerequisites and co-requisites	No requirements												
Assessment methods and criteria	<table border="1"> <thead> <tr> <th>Subject passing criteria</th> <th>Passing threshold</th> <th>Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Presence</td> <td>0.0%</td> <td>10.0%</td> </tr> <tr> <td>Written test</td> <td>50.0%</td> <td>50.0%</td> </tr> <tr> <td>Practical exercise</td> <td>50.0%</td> <td>40.0%</td> </tr> </tbody> </table>	Subject passing criteria	Passing threshold	Percentage of the final grade	Presence	0.0%	10.0%	Written test	50.0%	50.0%	Practical exercise	50.0%	40.0%
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Example issues/ example questions/ tasks being completed	<p>Creating a relational database schema based on the entity relationship diagram.</p> <p>Verification normal form of the database.</p> <p>Developing SQL commands for creating and modifying objects in a relational database.</p> <p>Developing SQL commands to obtain data from a relational database.</p>												
Work placement	Not applicable												