

Subject card

Subject name and code	Databases II, PG_00168382						
Field of study	Informatics						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study Optional subject group		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		2.0		
Learning profile	practical		Assessment form		credit		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		mgr Mateusz Miotk				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	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	30		0.0		0.0	30
Subject objectives	The aim of the course is to introduce students to methods of designing and implementing the data layer in backend applications. The course covers the use of relational and non-relational databases, data model design, query handling, versioning of database structure changes, indexing, and integration of different data sources within a single application.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[INFL3_W05] has ordered knowledge of the design and use of databases		The student knows the basic principles of designing, using, and maintaining relational and non-relational databases.		[SW4] test/exam - oral or written [SW2] presentation/project/paper/report		
	[INFL3_U07] has the ability to select the type of database depending on the needs, create an adequate model and use it		The student is able to select an appropriate type of database according to the needs of an application, design a data model, and use it in a backend application.		[SU2] presentation/project/paper/report [SU4] test/exam - oral or written		

Subject contents	Layered architecture of backend applications. 2. Design of relational and non-relational data models. 3. Data operations in backend applications. 4. Secure query execution and transaction handling. 5. Versioning of changes in the database structure. 6. Use of tools supporting data access. 7. Modelling of documents and nested data. 8. Indexing and basics of query optimization. 9. Data aggregation and analysis. 10. Integration of different types of databases in a single application.		
Prerequisites and co-requisites	Basic knowledge of backend programming and the ability to create simple network services are required. Basic knowledge of a database query language is recommended.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project	51.0%	40.0%
	Test/Exam	51.0%	60.0%
Recommended reading	Basic literature	• M. Casciaro, L. Mammino, Node.js Design Patterns, 3rd edition, Packt Publishing, 2020. • L. Ferrari, F. Ribaud, Learn PostgreSQL, 2nd edition, Packt Publishing, 2023. • PostgreSQL Global Development Group, PostgreSQL Documentation. • Knex.js Contributors, Knex.js Documentation. • Sequelize Contributors, Sequelize Documentation. • Prisma, Prisma Documentation. • MongoDB Inc., MongoDB Documentation. • Mongoose Contributors, Mongoose Documentation.	
	Supplementary literature	• M. Fowler, Patterns of Enterprise Application Architecture, Addison-Wesley, 2002. • M. Winand, SQL Performance Explained, Markus Winand, 2012. • OWASP Foundation, OWASP Top 10. • Heroku / CNCF, The Twelve-Factor App.	
	eResources addresses	Basic https://www.postgresql.org/docs/ - PostgreSQL Documentation https://knexjs.org/ - Knex.js Documentation https://sequelize.org/docs/ - Sequelize Documentation https://www.prisma.io/docs - Prisma Documentation https://www.mongodb.com/docs/ - MongoDB Documentation https://mongoosejs.com/docs/ - Mongoose Documentation Supplementary https://owasp.org/www-project-top-ten/ - OWASP Top 10 https://12factor.net/ - The Twelve-Factor App	

Example issues/ example questions/ tasks being completed	Selection of a database type according to application requirements. 2. Design of a data model for a backend application. 3. Implementation of basic data operations. 4. Versioning of changes in the database structure. 5. Comparison of different methods of data access. 6. Creating indexes and analysing their impact on queries. 7. Integration of different data sources in a single application.
Work placement	Not applicable

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