



Subject card

Subject name and code	Transfer, collection and data security, PG_00044137						
Field of study	Mathematics						
Date of commencement of studies	October 2025	Academic year of realisation of subject			2025/2026		
Education level	second-cycle studies	Subject group			Specialty subject group 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	2	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Institute of Applied Mathematics -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Magdalena Chmara					
	Teachers	dr hab. Paweł Pilarczyk dr inż. Magdalena Chmara					
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	15.0	0.0	60
	E-learning hours included: 0.0						
	eNauczenie source address: https://enauczenie.pg.edu.pl/moodle/course/view.php?id=46761 Moodle ID: 46761 Przesyłanie, gromadzenie i bezpieczeństwo danych 2025/2026 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=46761						
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		5.0		35.0	100
Subject objectives	The purpose of the course is to familiarize you with the formats and tools for secure data storage, analysis and transmission						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W06] analyzes the mathematical foundations of information theory, the theory of algorithms and cryptography and their practical applications, i.a. in programming and computer science.	- knowledge of the mathematical basics of cryptography theory - ability to ensure the security of stored data - knowledge of the principles of secure transmission of stored data	[SW1] Assessment of factual knowledge
	[K7_U09] constructs mathematical models used in specific advanced applications of mathematics, can use stochastic processes as a tool for modeling phenomena and analyzing their evolution, constructs mathematical models used in specific advanced applications of mathematics, uses stochastic processes as a tool for modeling phenomena and analyzing their evolution, recognizes mathematical structures in physical theories	- ability to design database structures. - collecting data in various ways, ability to choose the appropriate method - ability to analyze collected data	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
[K7_K01] acknowledges the limitations of one's own knowledge and understands the need for further education, independently searches for information in literature, also in foreign languages	- awareness and understanding of the risks associated with data transmission and storage - use of technical documentation and online resources in English, ability to critically evaluate the information found	[SK5] Assessment of ability to solve problems that arise in practice [SK3] Assessment of ability to organize work [SK2] Assessment of progress of work	
Subject contents	<p>Course content – lecture</p> <ul style="list-style-type: none"> - overview of different types of databases - creation of database applications - data transmission on the internet - OSI model - Security of databases - RODO - elements of cryptography - threats to data security <p>Course content – laboratory</p> <ul style="list-style-type: none"> - a repetition of SQL and relational database issues (e.g. normal characters), followed by the independent creation of a simple database using only the console - attempting to use MySQL (and on occasion SQLite) directly from Python using the SQLite and SQLAlchemy modules - learning the basics of creating dynamic web pages using PHP, including interaction with MySQL - introduction to ORM (Object Relational Mapping) technology, which bridges the gap between objectoriented programs and relational databases - additional exercises and issues directly related to the lecture <p>Course content – project</p> <p>creation of a module using databases using one of the tried and tested solutions (or otherwise) in the group projects prepared in the subject "Software Engineering".</p>		
Prerequisites and co-requisites	databases and programming		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture	60.0%	40.0%
	Lab	60.0%	30.0%
	Project	60.0%	30.0%

Recommended reading	Basic literature	<p>Uhlig, Ulrike, et al. How the Internet Really Works: An Illustrated Guide to Protocols, Privacy, Censorship, and Governance / Article 19; Contributors: Ulrike Uhlig, Mallory Knodel, Niels Ten Oever, Corinne Cath-Speth. No Starch Press, 2020.</p> <p>Deshpande, Prachi S., et al. Security and Data Storage Aspect in Cloud Computing by Prachi S. Deshpande, Subhash C. Sharma, Sateesh K. Peddoju. Springer Singapore, 2019.</p> <p>Shannon Bradshaw Eoin Brazil, Chodorow, Kristina. MongoDB: Powerful and Scalable Data Storage O'Reilly, 2019.</p> <p>Churchhouse, R. F. Codes and Ciphers: Julius Caesar, the Enigma, and the Internet / R.F. Churchhouse. Cambridge University Press, 2002.</p>
	Supplementary literature	<p>Hu, Fei. Big Data: Storage, Sharing, and Security / Edited by Fei Hu. CRC Press, 2016.</p> <p>https://learn.mongodb.com/</p> <p>https://docs.snowflake.com/en/learn-tutorials</p> <p>https://www.edps.europa.eu/data-protection-day-programme_en</p>
	eResources addresses	
Example issues/ example questions/ tasks being completed	<p>How to keep your data safe on the Internet? The differences between the HTTP and HTTPS protocols. Differences between relational and graph databases.</p>	
Practical activities within the subject	Not applicable	

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