GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Transfer, collection and data security, PG_00044137		
Field of study	Mathematics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
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 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

eNauczanie source address: https://enauczanie.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

Course content – lecture
- 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

Course content – laboratory
- 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

Course content – project
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".

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

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.

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.

Shannon Bradshaw Eoin Brazil, Chodorow, Kristina.
MongoDB: Powerful and Scalable Data Storage OReilly, 2019.

Churchhouse, R. F. Codes and Ciphers: Julius Caesar, the Enigma, and the Internet / R.F. Churchhouse. Cambridge University Press, 2002.

Supplementary literature

Hu, Fei. Big Data: Storage, Sharing, and Security / Edited by Fei Hu. CRC Press, 2016.

https://learn.mongodb.com/

https://docs.snowflake.com/en/learn-tutorials

https://www.edps.europa.eu/data-protection-day-programme_en

eResources addresses

Example issues/ example questions/ tasks being completed

How to keep your data safe on the Internet?
The differences between the HTTP and HTTPS protocols.
Differences between relational and graph databases.

Practical activites within the subject

Not applicable

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