



Subject card

Subject name and code	Optimizing database, PG_00070477						
Field of study	Technical Physics						
Date of commencement of studies	February 2027	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	1	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Institute of Physics and Applied Computer Science -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Bartosz Reichel				
	Teachers		dr inż. Bartosz Reichel				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	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	60		6.0		34.0	100
Subject objectives	Familiarization with advanced relational database structures such as the extension of procedural languages.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W04] possesses advanced knowledge of mathematical, numerical and simulation methods used in the description and modelling of physical phenomena.						
	[K7_U02] demonstrates advanced programming skills in a selected language and the ability to use specialised software packages.						
	[K7_K01] demonstrates readiness for continuous professional development, including updating and critically evaluating knowledge in physics and related fields, and recognising its importance in solving practical and theoretical problems.						

Subject contents	<p>Course content – lecture</p> <p>1.Introduction 2h The history of the development of Oracle databases, Oracle Installation, connection to the database, the configuration of the package. What are relational databases. The basic assumptions of the structural query language SQL (Structured Query Language). Basic concepts: tables, columns, rows.</p> <p>2.Structure of Oracle database 2h Components of the Oracle database: data files, settings files, log files, backup files. 3. Struktura 4h Data types (character, numeric types representing date). BLOB data. Conversion types, combining the comparison. NULL in the Oracle database and other SQL databases (variations, traps). Tables, Indexes, Prospects. 4.Basics of SQL 4h Basic SQL query (SELECT, INSERT, DELETE, UPDATE, CREATE TABLE ...), allowing the testing of the database and obtain configuration information. Breakdown of queries on the DML (Data Manipulation Language), DDL (Data Definition Language), DCL (Data Control Language), TCL (Transactional Control Language). 5.Modeling of database, design of database 6g Tools to help database design from both the Oracle and beyond what. Analyze Query and software (Query Analyzer). The concept of their primary keys, foreign keys and their relationship. Normal forms. The process of normalization of data. How and when to normalize the data. What are data warehouses. 6. Basics of database administration 6h Tools for database management and user accounts and privileges from Oracle and external. Security and limiting access to an Oracle database. Special roles: SDB, SYSDBA, SYSOPER. Space system tables: XFS, TEMP, TOOLS, USERS. Matching the size of tablespaces. System Global Area - what it is and its use. Monitoring of the database and log interpretation....</p> <p>Course content – laboratory</p> <p>... The process of recovering lost data. Fragmentation and the reorganization of the data. 7. Working with Oracle database 2h Access to the Oracle database with the Java platform. NET (C #). Setting up development environments, libraries joining (Oracle C++ Call Interface - OCCI). 8. Migration to Oracle database from other relational databases 4h Migration to the Oracle database and differences in relation to Oracle"s most well-known relational databases such as PostgreSQL, MySQL, FireBird, SQLite, DB2, MSSQL</p> <p>The lab task consists of tasks that generate reports. Report 1 - Data structure and generation (preparation of data sets for optimization) Report 2 - Queries (complex), finding bottlenecks Report 3 - Optimization</p>											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="453 882 794 909">Subject passing criteria</th> <th data-bbox="799 882 1141 909">Passing threshold</th> <th data-bbox="1145 882 1492 909">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="453 916 794 943">Written exam</td> <td data-bbox="799 916 1141 943">50.0%</td> <td data-bbox="1145 916 1492 943">50.0%</td> </tr> <tr> <td data-bbox="453 949 794 976">Projekt</td> <td data-bbox="799 949 1141 976">50.0%</td> <td data-bbox="1145 949 1492 976">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Written exam	50.0%	50.0%	Projekt	50.0%	50.0%
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Example issues/ example questions/ tasks being completed	- describe database syntax from DML, DDL, DCL											
Practical activities within the subject	Not applicable											

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