GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Business Intelligence and Data Science Aspects in Practice , PG_00074000		
Field of study	Economic Analytics		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
Education level	first-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	Part-time studies (on-line)	Mode of delivery	at the university
Year of study	3	Language of instruction	English
Semester of study	6	ECTS credits	6.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Informatics In Management -> Faculty of Management and Economics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Anna Trzaskowska	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	16.0	16.0	0.0	0.0	0.0	32

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	32	6.0	112.0	150

Subject objectives

To prepare students for designing and implementing Business Intelligence and Data Warehouse systems, as well as applying Data Science methods to generate business knowledge for strategic and tactical management, based on advanced knowledge of BI/DW system architectures and data analytics, while fostering responsible and critical attitudes toward data use in organizational decision-making contexts.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_K03] Critically evaluates their own knowledge necessary to solve cognitive and practical problems, supplementing gaps with input from external experts.	is ready to critically evaluate their own knowledge in the field of Business Intelligence and Data Warehouse system design and implementation, as well as Data Science applications, necessary for solving analytical and decisionmaking problems in organizations, in particular by identifying limitations of their analyses and confronting them with external expert opinions and best practices in BI/DW and data-driven decision making	[SK5] Assessment of ability to solve problems that arise in practice
[K6_W04] Possesses advanced knowledge of the principles of creative and entrepreneurial action, including identifying and implementing innovative ideas while considering copyright protection requirements.	knows and understands advanced principles of creative and entrepreneurial action in the field of designing and implementing Business Intelligence, Data Warehouse, and Data Science solutions, including the identification of innovative datadriven concepts and analytical business models, with due consideration of copyright protection requirements, software licensing, and data source regulations	[SW1] Assessment of factual knowledge

Subject contents

Course content – lecture

Course content – lecture
• Business Intelligence and Data Warehouse in Organizations and Business
• Characteristics, Tasks, and Application Domains of BI and DW Systems
• BI and DW Architectures Reference Models and Components
• Strategic System Analysis as a Foundation for DW and BI Design
• Planning and Methodology of Data Warehouse and Business Intelligence Development
• Database Schema Design for Data Warehouses (Dimensional Modeling)
• Enterprise Data Warehouses and Data Marts Data Integration and Management
• ETL Process Extraction, Transformation, and Loading in DW Systems
• Physical Structures and Performance Optimization in DW Systems (DBMS Mechanisms)
• Aggregated Data and Analytical Optimization in Data Warehouses
• Decision Support Systems (DSS) Concepts, Architecture, and Applications
• OLAP and Advanced SQL Analytical Functions in Data Analysis
• Business Reporting and Analytical Tools in BI Environments
• Data Science, Data Engineering, and Big Data in Data-Driven Decision Making
• Data Science Processes and Methods CRISP-DM Model and Integration with BI

Course content – exercises

Course content – exercises
• Business requirements analysis and BI/DW project specification development
• Business process modeling and data source identification
• Star schema and snowflake schema design for a Data Warehouse
• Implementation of a Data Warehouse schema in a selected DBMS
• ETL process design and implementation data extraction
• Data transformation, cleansing, and integration rule implementation
• Data loading and refresh process implementation in a Data Warehouse
• Design and use of aggregated data, fact and dimension tables
• Query performance optimization in DW environments (indexing, partitioning)
• Implementation of analytical SQL queries (window functions, aggregations, rankings)
• OLAP analysis design and implementation (cubes, hierarchies, drill-down, roll-up)
• Development of business reports and dashboards using BI tools
• Data analysis using selected Data Mining methods
• Implementation of a Data Science process according to the CRISP-DM model
• Preparation of a final BI/DW project report with managerial recommendations

Prerequisites and co-requisites

Students are expected to have basic knowledge in computer science and informatics topics, including basic programming techniques. Basic knowledge in databases and database management systems (DBMSs) is welcomed. Students are to be ready to learn techniques of usage of selected BI and DW tools in support of database schema implementation, ETL process, as well as reporting and analytics frameworks, independently.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
knowledge test	60.0%	30.0%
final project	60.0%	70.0%

Recommended reading

Basic literature

1. Golfarelli Matteo, Rizzi Stefano: Data Warehouse Design: Modern Principles and Methodologies, SEPS, 2009, ISBN: 978-0-07-161039-1.
2. Inmon H. William: Building The Data Warehouse: 4th Edition, Wiley Publishing, Inc., 2005, ISBN: 978-0-7645-9944-6.
3. Kimball, R., & Ross, M.: The Data Warehouse Toolkit: The Complete Guide to Dimensional Modeling. Third Edition. John Wiley & Sons. 2013.
4. Provost Foster, Fawcett Tom: Data Science for Business: What You Need to Know About Data Mining and Data-Analytic Thinking, O'Reilly, 2013, ISBN: 978-1-449-36132-7.

	Supplementary literature	1. Ramakrishnan, R., & Gehrke, J.: Database Management Systems. Third Edition. McGraw-Hill. 2003. 2. Hubbard W. Douglas: How To Measure Anything: Finding the Value of Intangibles in Business, 2nd Edition, 2010, ISBN: 978-0-470-53939-2. 3. Ladley John: Making Enterprise Information Management (EIM) Work for Business: A Guide to Understanding Information as an Asset, 1st Edition, 2010, ISBN: 978-0123756954.
	eResources addresses	
Example issues/ example questions/ tasks being completed	• Development of business reports and dashboards using BI tools • Data analysis using selected Data Mining methods	
Practical activites within the subject	Not applicable	

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