

Faculty of Information and Communication Technology

**SUBJECT CARD****Name in Polish: Hurtownie Danych****Name in English: Data Warehouses****Main field of study (if applicable): Applied Computer Science****Specialization (if applicable):****Level and form of studies: 1st level, full-time****Kind of subject: obligatory****Subject code: W04IST-SI4013W, W04IST-SI4013L****Group of courses: NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		30		
Number of hours of total student workload (CNPS)	60		60		
Form of crediting	Examination	Examination / crediting with grade*	crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark final course with (X)					
Number of ECTS points	2		2		
including number of ECTS points for practical (P) classes			2		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	1,2		1,2		

\*delete as applicable

**PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1. Basic knowledge of database system, with a particular focus on the relational model.
2. At least basic knowledge of SQL query language

**SUBJECT OBJECTIVES**

- C1. Has basic knowledge and skills of using SQL grouping operators, and SQL aggregation and grouping functions.
- C2. Has basic knowledge and skills in the area of transaction oriented processing (OLTP) and analytic oriented processing (OLAP).
- C3. Has basic knowledge and skills of using data warehouses.
- C4. Has basic knowledge and skills in data integration, reporting and visualization.

### SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEU\_W01 has basic knowledge on data warehouse usage and data warehouse organization – logical and physical

PEU\_W02 has basic knowledge on ETL process, reporting and data analysis

relating to skills:

PEU\_U01 can use SQL grouping operators and SQL grouping and aggregating functions

PEU\_U02 can design and implement a ETL process

PEU\_U03 can design and implement a simple data warehouse and use it to generate basic reports, using different data visualization methods

PEU\_U04 can use basic MDX queries

### PROGRAMME CONTENT

Lecture		Number of hours
Lec 1	Course details. Introduction to Data Warehouses and Business Intelligence.	2
Lec 2	SQL grouping operators. SQL aggregating and grouping functions.	2
Lec 3	Transaction vs analytic needs, processes and data sources	2
Lec 4	Multidimensional data model – conceptual organization	2
Lec 5	Multidimensional data model – logical organization	4
Lec 6	Multidimensional data model – physical organization	2
Lec 7	ETL proces	4
Lec 8	Data warehouses – architecture	2
Lec 9	MDX queries	4
Lec 10	Reporting	2
Lec 11	Data visualisation. Web dashboards	4
	Total hours	30

### Laboratory

Laboratory		Number of hours
Lab 1	Course details (Health and Safety Training, Course requirements). Pivot tables and pivot graphs	2
Lab 2	SQL aggregation and SQL grouping functions. SQL grouping operators	4
Lab 3	Data cleansing	4
Lab 4	Data integration	4
Lab 5	Multidimensional model	4
Lab 6	Data Warehouses design and implementation	4
Lab 7	MDX queries	4

Lab 8	Reporting	2
Lab 9	Data visualisation	2
	Total hours	30

### TEACHING TOOLS USED

- N1. Lecture – traditional method with multimedia content  
 N2. Consultations  
 N3. To get to know with basic items and expanded literature by the student  
 N4. Project exercises in the computer laboratory  
 N5. Student's own work - preparation for laboratory classes  
 N6. Develop reports of project

### EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end))	Educational effect number	Way of evaluating educational effect achievement
F- laboratory	PEU_U01 – PEU_U03	Student assessment – individual discussion including result presentation, conclusions, etc.
P - lecture	PEU_W01 PEU_W02	Exam
P - laboratory	PEU_U01 – PEU_U03	Average note from part notes

### PRIMARY AND SECONDARY LITERATURE

#### PRIMARY LITERATURE:

- [1] Kimball R., Ross M., The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling. Wiley Publishing, 2013.
- [2] Kimball R., Caserta J., The Data Warehouse ETL Toolkit: Practical Techniques for Extracting, Cleaning, Conforming, and Delivering Data. Wiley Publishing, 2004.
- [3] Inmon W., Building the Data Warehouse, John Wiley & Sons, New York 2005.
- [4] Jensen C.S., Pedersen T.B., Thomsen C., Multidimensional Databases and Data Warehousing, Morgan & Claypool Publishers series Synthesis Lectures On Data Management, 2010.
- [5] Rainardi V., Building a Data Warehouse With Examples in SQL Server, Apress, 2014.

[6] Harinath S., Pihlgren R., Lee D.G.-Y., Sirmon J., Bruckner R.M., Professional Microsoft® SQL Server® 2016 Analysis Services With MDX And DAX, John Wiley & Sons, Inc., 2016.

**SECONDARY LITERATURE:**

- [1] Bhatia P., Data Mining and Data Warehousing. Principles and Practical Techniques. Cambridge University Press, 2019.
- [2] Imhoff C., Galemno N., Geiger J. G., Mastering Data Warehouse Design, Wiley Publishing, Inc., 2003.
- [3] Dela J., Implementing Business Intelligence with SQL Server 2019. Packt Publishing, 2019.

**SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)**

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