Bialystok University of Technology									
Field of study	**Computer Science**							**Degree level and programme type**	**Engineer's degree full-time programme**
Specialization/ diploma path	**---**							**Study profile**	academic
Course name	**Advanced Database Systems and Data Warehouses**							**Course code**	**FCS-00028**
								Course type	obligatory
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	**Semester**	2
	15				30			**No. of ECTS credits**	**6**
Entry requirements									
Course objectives	The aim is this course is to familiarize students with the subject of advanced database objects, procedural SQL, data warehouse, query optimization, NoSQL databases, and data analysis based on Bayesian networks. Most of these issues will also be carried out as part of classes from a specialist studio. Prerequisites: Knowledge of relational databases and the SQL language. Ability to design relational databases and programming in SQL.								
Course content	Lecture: 1. Procedural SQL. 2. Advanced database objects: functions, packages, triggers. 3. Optimizing queries in practice. 4. Data models in data warehouses. 5. Data warehouse architecture. 6. Advanced SQL: Grouping. 7. Advanced SQL: Analytical functions. 8. Data integration. 9. NoSQL databases. 11. Data analysis with Bayesian network models. Specialistic workshop: 1. Procedural SQL. 2. Advanced database objects: functions, packages, triggers. 3. Data models in data warehouses. 4. Advanced SQL: Grouping. 5. Advanced SQL: Analytical functions. 6. Data integration. 7. NoSQL databases. 8. Data analysis with Bayesian network models.								
Teaching methods	lecture problem, programming,								
Assessment method	Homework assignments, advanced SQL test, quizzes, project								

Symbol of learning outcome	**Learning outcomes**	**Reference to the learning outcomes for the field of study**
LO1	knows the rules of implementing advanced SQL queries based on analytical functions; can create this kind of query	K_W07
LO2	can use the NoSQL database and formulate commands for selecting data and modifying them	K_U07
LO3	a student knows how to design data warehouse model	K_U07
LO4	a student knows how to integrate the data coming from different sources	K_U07
LO5	a student knows how to analyze data with Bayesian network models	K_U07

Symbol of learning outcome	**Methods of assessing the learning outcomes**	**Type of tuition during which the outcome is assessed**
LO1	Advanced SQL test	L
LO2	solving class assignments	Sw
LO3	report describing designed data warehouse model	Sw
LO4	Class assignment report	Sw
LO5	Class assignment report	

Student workload (in hours)	**No. of hours**
1 - Lecture participation - 2x15h	30
2 - Specialistic workshop participation - 2x15h	30
3 - Preparation for specialistic workshop -	25
4 - Participation in office hours -	5
5 - Implementing project -	20
6 - Preparation for advanced SQL test -	20
7 - Doing homework and preparing report -	20
TOTAL:	**150**

Quantitative indicators	**HOURS**	**No. of ECTS credits**
Student workload – activities that require direct teacher participation	65 (2)+(4)+(1)	2.6
Student workload – practical activities	45 (5)+(3)	1.8

Basic references	1. R. Kimball, J. Caserta, The Data Warehouse ETL Toolkit (2nd edition). New York: Wiley, 2008. 2. B. Inmon, D. Strauss, G. Neushloss, DW 2.0 – Architecture for the Next Generation of Data Warehousing, Elsevier Press, 2008. 3. F. Silvers, Building and Maintaining a Data Warehouse, Auerbach Publications, 2008.
Supplementary references	1. P.J. Sadalage, M. Fowler, NoSQL Distilled, 2015.

Organisational unit conducting the course	Software Department	**Date of issuing the programme**
Author of the programme	dr hab. inż. Agnieszka Drużdżel	Feb. 17, 2022

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW – field work,S – seminar