ADVANCED DATABASE SYSTEMS AND DATA WAREHOUSES

Faculty of Computer Science				
Study programme:	**Computer Science**		Degree level:	**Engineer's degree full-time programme**
Specialization	**---**		Diploma path:	**2026/2027W - 2026/2027S**
Module name:	**Advanced Database Systems and Data Warehouses** (Zaawansowane bazy danych i hurtownie danych)			
Module type:	**obligatory**	**Semester: 2**	ECTS:**4**	Module ID:**FCS-00028**
No. of hrs in semester:	Lecture (L) - **30** Classes(C) - **0** Specialization workshop (SW) - **30** Project (P) - **0** Laboratory classes (LC) - **0** Seminar (S) - **0**			
Prerequisites	-			

Aims and 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.		
Forms of teching activities::	lecture, specialization workshop,	Assessment:	Evaluation must be relevant to the intended learning outcomes: Homework assignments, advanced SQL test, quizzes, project
Module 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:	programming, lecture problem,		

Learning outcomes

Symbol	Specify min. 4, max. 8 learning outcomes in the following order: knowledge – skills – competence. Each learning outcome must be verifiable	Reference to the programme learning outcomes of education
LO1	knows the rules of implementing advanced SQL queries based on analytical functions; can create this kind of query	
LO2	can use the NoSQL database and formulate commands for selecting data and modifying them	
LO3	a student knows how to design data warehouse model	
LO4	a student knows how to integrate the data coming from different sources	
LO5	a student knows how to analyze data with Bayesian network models	

No. of learning outcome	Methods of assessing the learning outcome	Type of teaching activities (if more than one) 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's workload (in hours)	**1** - Lecture participation	None	30
	2 - Specialistic workshop participation	None	30
	3 - Implementing project	None	20
	4 - Preparation for advanced SQL test	None	10
	5 - Doing homework and preparing report	None	10
		TOTAL:	**100**

Quantitative indicators	Student's workload - activities that require direct teacher participation: (1)+(2)	60	**ECTS**
			2.4
	Student's workload connected with practical classes (3)	20	0.8
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.		
Further reading	1. P.J. Sadalage, M. Fowler, NoSQL Distilled, 2015.		

Unit:	Software Department	Lecturer/ instructor	
Date of issuing the programme:	31st March 2026	Author of the programme:	dr hab. inż. Agnieszka Drużdżel

L - lecture, C - classes, LC - laboratory classes, P-project, SW - specialization workshop, S - seminar