

SYLLABUS OF A MODULE

Polish name of a module	Bazy danych
English name of a module	Databases
ISCED classification - Code	0612
ISCED classification - Field of study	<i>Database and network design and administration</i>
Languages of instruction	<i>English</i>
Level of qualification:	1 – BSc (EQF 6)
Number of ECTS credit points	6
Examination:	EW – exam written
Available in semester:	A – autumn only

Number of hours per semester:

Lecture	Exercises	Laboratory	Seminar	E-learning	Project
30		30			15

MODULE DESCRIPTION

MODULE OBJECTIVES

- O1. Acquiring knowledge about models, stages of database design, maintaining data consistency and ensuring data security.
- O2. Learning the SQL language and optimization methods.
- O3. Students acquire practical skills in data analysis, database design, operation of database management systems, searching, updating data and creating data structures.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

- 1. Knowledge of logic, algebra and basic programming.
- 2. The ability to build logical conditions, recognizing relationships between data.

3. Ability to use various sources of information, including manuals and technical documentation.

LEARNING OUTCOMES

LO 1 – Student has basic theoretical knowledge of databases, data models and database management systems that the models use.

LO 2 – Student knows the SQL language (including its DML parts – for query handling, DDL – for implementing data structures and TCL – for transaction management).

LO 3 – Student can design and implement a relational database, taking into account normalization, integrity constraints, optimization (finding sources of redundancy and anomalies).

MODULE CONTENT

Type of classes – lecture	Numb er of hours
Lec 1 - Introduction to databases	2
Lec 2 - Relational data model	2
Lec 3 - Relational data integrity	2
Lec 4 - Introduction to SQL	2
Lec 5 - DML – queries and data modification	2
Lec 6 - Stages of database design - normalization	2
Lec 7 – Normal forms	2
Lec 8 - Entity relationship model	2
Lec 9 - Logical modeling	2
Lec 10 - Transactions in databases	2
Lec 11 - Physical design	2
Lec 12- DDL - defining, modifying and deleting data structures	2
Lec 13 - Indexation	2
Lec 14 - Query optimization	2
Lec 15 - Contemporary trends in databases	2
Sum	30

Type of classes– laboratory.	Number of hours
Lab 1 - Introduction to the SQL tools, basic query syntax in SQL	2
Lab 2 - Projection and selection in queries, support for aliases and NULL values	2
Lab 3 - String support in SQL, row functions – text and math	2
Lab 4 - Date-based functions and conversion functions	2
Lab 5 - Grouping data and using aggregation functions	2
Lab 6 - Using relation joins, collective operators for relations	2
Lab 7 - Subqueries	2
Lab 8 - Colloquium	2
Lab 9 - Modification of entered data	2
Lab 10 - Transaction handling	2
Lab 11 - Creating table structures taking into account integrity constraints	2
Lab 12 - Modification of existing structures	2
Lab 13 - Creating sequences, indexes, perspectives	2
Lab 14 - Query optimization	2
Lab 15 - Colloquium	2
Sum	30
Type of classes– project.	Number of hours
P 1 – Determining project topics, dividing into groups, establishing rules.	1
P 2,3 – Creating an entity-relationship model for the selected topic – report submission.	2
P 4 – Evaluation of work progress – report defense.	1
P 5 - 8 – Transition to the logical-relational model, constraint analysis, selection of optimal data types. Choosing the best solutions for converting relationships, hierarchies, and subtypes into relations.	4
P 9 – Evaluation of work progress – report defense.	1

P 10 - 11 – Implementation of tables and integrity constraints.	2
P 12 – Implementation of objects optimizing database performance.	1
P 13 – Data entry and query testing.	1
P 14 – User and privilege management planning.	1
P 15 – Evaluation of work progress – report defense.	1
Sum	15

TEACHING TOOLS

1. – multimedial presentations for lectures, possibility to work in e-learning mode
2. – instructions for laboratories and projects, possibility to work in e-learning mode
3. – workplaces for students equipped with workstations

WAYS OF ASSESSMENT (F – FORMATIVE, S – SUMMATIVE

F1. - Assessment of participation during classes.
P2. - Assessment verifying problem-solving skills – First Colloquium.
P3. - Assessment verifying problem-solving skills – Second Colloquium.
P4. - Assessment verifying problem-solving skills – Project report evaluation.
S1. - assessment of the ability to solve the problems posed and the manner of presentation obtained results - pass mark *
S2. - assessment of mastery of the teaching material being the subject of the lecture - exam

*)In order to receive a credit for the module, the student is obliged to attain a passing grade in colloquia, the project, and the exam.

STUDENT'S WORKLOAD

L. p.	Forms of activity	Average number of hours required for realization of activity
1. Contact hours with teacher		
1.1	Lectures	30
1.2	Tutorials	
1.3	Laboratory	30
1.4	Seminar	

1.5	Project	15
1.6	Examination	2
Total number of contact hours with teacher:		77
2. Student's individual work		
2.1	Preparation for tutorials and tests	10
2.2	Preparation for laboratory exercises, writing reports on laboratories	15
2.3	Preparation of project	20
2.4	Preparation for final lecture assessment	0
2.5	Preparation for examination	15
2.6	Individual study of literature	13
Total number of hours of student's individual work:		73
Overall student's workload:		150
Overall number of ECTS credits for the module		6 ECTS
Number of ECTS points that student receives in classes requiring teacher's supervision:		3.1 ECTS
Number of ECTS credits acquired during practical classes including laboratory exercises and projects:		2.8 ECTS

BASIC AND SUPPLEMENTARY RESOURCE MATERIALS

1. C. J. Date, An Introduction to Database Systems (last edition)
2. C. J. Date, SQL and Relational Theory. How to Write Accurate SQL Code. 3rd Edition, O'Reilly Media, 2015
3. C. J. Date, Type Inheritance and Relational Theory, O'Reilly Media, 2016
4. J. D. Ullman, Database Systems: The Complete Book (last edition)
5. J. D. Ullman, J. Widom, A First Course in Database Systems
6. Stephens, Plew, Database design
7. D. Tow, SQL tuning
8. M. J. Hernandez, Database Design for Mere Mortals: A Hands-On Guide to Relational Database Design
9. <https://docs.oracle.com/en/database/oracle/oracle-database/19/books.html>

MODULE COORDINATOR (NAME, SURNAME, E-MAIL ADDRESS)

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