



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Databases [S2EiT1-SKiTI>BD]

Course

Field of study

Electronics and Telecommunications

Year/Semester

1/2

Area of study (specialization)

Computer Networks and Internet Technologies

Profile of study

general academic

Level of study

second-cycle

Course offered in

Polish

Form of study

full-time

Requirements

elective

Number of hours

Lecture

30

Laboratory classes

15

Other

0

Tutorials

15

Projects/seminars

0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

The student possesses a basic knowledge of computer networks, C# programming (and/or programming in general), algebra of sets, and relation algebra. The student demonstrates the ability to search for information in literature and other reference sources, integrate and interpret obtained information, draw conclusions, and provide justifications. Furthermore, the student recognizes the importance of acquiring new knowledge and skills relevant to their chosen field of studies.

Course objective

To provide students with knowledge of database models and architectures, fundamental SQL concepts, extensions of SQL programming languages, database creation, and available database tools and developer software. The goal is to prepare students for database optimization and programming database applications.

Course-related learning outcomes

Knowledge:

1. Possesses extensive and in-depth knowledge of set algebra and relational algebra.
2. Demonstrates a thorough understanding of the assumptions underlying the relational data model.

3. Has knowledge of the design principles of relational databases, including the entity-relationship model and optimization and normalization principles.

4. Understands the construction of the physical layer of databases.

Skills:

1. Capable of designing and implementing databases; proficient in creating a database application using one of the popular database management systems.

2. Able to modify data in the database and retrieve the required information using SQL language.

3. Proficient in programming in PL/SQL language.

4. Skilled in developing C# / Java applications that interact with databases.

Social competencies:

1. Recognizes the limitations of their own knowledge and skills and acknowledges the importance of further training and education.

2. Understands the significance of the information society for the country's development.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes are verified through written or oral tests. The written test consists of 7-10 questions (multiple choice and open-ended) and is scored using different criteria (divided into three or four score groups). The oral test consists of 50-60 open-ended questions divided into three or four score groups. Students randomly select one question from each group. During the oral test, the teacher may ask an additional question for each main question. Both the main and additional questions are scored based on the content range and the understanding of the topic. The minimum passing score for the exam is 50%.

The knowledge and skills acquired during tutorials and laboratory classes are assessed through a project completed during the final classes. The project consists of 5-6 tasks, each scored using different criteria. Each task can be completed independently. The minimum passing score for the exam is 50%.

The assessment levels for lectures and tutorials are as follows:

Number of scores mark

<=50 % 2,0

51% - 60% 3,0

61% - 70% 3,5

71% - 80% 4,0

81% - 90% 4,5

91% - 100% 5,0

Programme content

The program includes basic information about databases. It discusses relational databases in detail. It presents basic SQL commands and also introduces popular database tools and development software.

Course topics

Lectures:

1. Basic definitions: information, data, data processing.

2. Database models.

3. Codd's rules.

4. Mathematical definition of relational databases.

5. Entity relationship diagrams.

6. SQL basics, embedded functions (text manipulation, arithmetic functions, date/time processing).

7. Keys in databases: primary key, foreign key, candidate key, artificial and natural keys.

8. PL/SQL programming language.

9. Views, sequences, triggers, indexes.

10. Procedures and functions.

11. Database users, privileges, roles.

12. Database management systems - review.

13. Database application basic elements.

14. Database optimization, Normal Forms.

15. Database physical layer, parameter optimization.
16. Database replication and backups.
17. Databases and programming languages (Java, C#).

Laboratories:

1. SQL basics.
2. DQL and DML.
3. Advanced SQL queries.
4. PL/SQL procedures.
5. Triggers.
6. Simple database applications.
7. Databases and programming languages (Java, C#).

Tutorials:

1. Relational algebra.
2. Database definition in ERD.
3. Database tuning - Normal Forms.
4. Advanced SQL queries.

Teaching methods

1. Lectures:
 - a) multimedia presentations illustrated with examples presented on the board.
 - b) practical case study of selected events in database management systems or programming languages runtime environment.
2. Laboratory classes : solving problems given by the teacher (practical case study with database management systems and programming languages runtime environment) complemented with multimedia presentations.
3. Tutorials: solving problems given by the teacher (practical case study) complemented with multimedia presentations.

Bibliography

Basic

1. Wieczerzycki W., Bazy danych, Wydaw.FPWSNT, 1994.
2. Beynon-Davies P., Systemy baz danych (tł. Lech Banachowski, Marcin Banachowski), Wydawnictwo Naukowo-Techniczne, 1998.
3. Reese G.. Java : aplikacje bazodanowe : najlepsze rozwiązania, Helion 2003.

Additional

1. Hernandez, Michael J., Database design for mere mortals: a hands-on guide to relational database design, Addison-Wesley 2005
2. PL/SQL User's Guide and Reference, Release 2 (9.2) Part No. A96624-01

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	75	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	25	1,00