COURSE DESCRIPTION CARD - SYLLABUS

Course name
Databases

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 studies

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
30

Laboratory classes
15

Other (e.g. online)

Tutorials
15

Projects/seminars

Number of credit points

4

Lecturers

Responsible for the course/lecturer:
dr hab. inż. Mariusz Żal,
mariusz.zal@put.poznan.pl

Responsible for the course/lecturer:

Prerequisites

The student has a basic knowledge of computer networks and a basic knowledge of C# and/or programming, algebra of sets and relation algebra. Student is able to find information in literature, as well as other reference sources; is able to integrate and interpret obtained information, draws conclusions and justifies. Student understands a necessity to acquire a new knowledge and skills stemming from a 75chosen field of studies.

Course objective

To provide students with database models and architectures, bases SQL, extensions of SQL programming languages, database creation, and available database tools and developer software. To prepare students to database optimization and programming database applications.

Course-related learning outcomes

Knowledge

1. Has a systematic knowledge, together with necessary mathematical background, on algebra of sets and relation algebra.
2. Has a systematic knowledge, with the necessary theoretical background, of optimization methods

used in solving engineering problems.
3. Students got knowledge of entity relationship diagrams and database models.
4. Students got knowledge of database tuning.

Skills

1. Students are able to prepare database structure and implement it using SQL and PL SQL.
2. Students are able to prepare database application in at least popular database management system.
3. Students are able to prepare in C# or Java application that communicate with database management systems.

Social competences

1. Knows limitations of his/her knowledge, understands the necessity of further self-studying.
2. A student is aware of the impact of network application on the information society.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes are verified with a written or oral test. Test in written form consists 7-10 question (multichoice and open), which are scored in different ways (there are three or four groups of scores). Test in oral form contains 50-60 open questions divided into three or four score groups. Students draw one question from each group. In the oral form, for each question teacher can ask one additional question. Both, main and additional questions are scored, taking into account content range and understanding the issue. Minimum number of scores to pass the exam is equal to 50%.

Knowledge and skills gathered during tutorials and laboratories are assessed by project realized on the last classes. The project contains 5 – 6 tasks which are scored in different ways. Each task can be realized independently. Minimum number of scores to pass the exam is equal to 50%.

The assessment levels (lecture and tutorials) are the following:

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

Lectures:

1. Basic definitions: inforamtion, data, data processing
2. Database models
3. Codd's rules
4. Mathematical definition of relational databases
5. Entity relationship diagrams

6. SQL bacis, embeded functions (text manipulation, arthmetic functions, date/time processing)
7. Keys in databases: primary key, foreing key, candidate key, artifical and natural keys
8. PL SQL programming language
9. Views, sequnces, triggers, indexes
10. Procedures and functions
11. Database users, privileges, roles
12. Database management systems - review
13. Database application basic elements
14. Database optymalization, Normal Forms
15. Database physical layer, parameters optimalization
16. Database replications and backups
17. Database and programming lanuages (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. Database and programming lanuages (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	4,0
Classes requiring direct contact with the teacher	75	3,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	25	1,0

[1] delete or add other activities as appropriate