COURSE DESCRIPTION CARD - SYLLABUS

Course name
Databases and database applications [S1Cybez1>BDiAB]

Course

Field of study
Cybersecurity

Year/Semester
2/4

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
16

Laboratory classes
16

Other
0

Tutorials
0

Projects/seminars
12

Number of credit points

3,00

Coordinators

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Lecturers

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 chosen field of studies.

Course objective

To provide students with database models, SQL and PL SQL languages, query formats, embeded functions and extensions 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. [K1_W01]
2. Has a systematic knowledge, with the necessary theoretical background, of optimization methods used in solving engineering problems. [K1_W05]

3. Has knowledge in developing database applications [K1_W06]

Skills:
1. Students are able to use bibliography in English (books, scientific and technical journals, application notes, catalogs, instructions, recommendations etc.). [K1_U01]
2. Students are able to prepare database structure and implement it using SQL and PL SQL. [K1_U02]
3. Students can use optimization methods to reduce database complexity. [K1_U02]

Social competences:
1. He is aware of the importance of his own work and the need to comply with the principles of professional ethics, is ready to comply with the rules of teamwork and bear responsibility for jointly implemented tasks, as well as care for the achievements and traditions of the profession. [K1_K05]
2. Knows the limitations of their own knowledge and skills, he understands the need for further education. [K1_K01]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Knowledge gained in the lecture is verified by a written or oral credit. In the written exam, students must answer 7-10 questions (a combination of multiple-choice and open-ended), each carrying different point values. There are three or four separate scoring groups. In the case of the oral exam, a student draws one question from each scoring group. During the oral exam, for each drawn question, the student may be asked an additional follow-up question related to the one drawn. The grade for each question (including both the main and the follow-up question) reflects the scope of the answer and the depth of understanding of the topic. A set of 50-60 questions is prepared for each exam. To pass, a student must earn at least 50% of the total possible points.
Projects: Skills acquired through project work are assessed based on the projects presented. The evaluation considers the student's engagement in project preparation, the tools used, and the additional knowledge the students had to acquire. Projects can be done individually or in pairs. The grading scale ranges from 2.0 to 5.0.
Laboratories: Skills gained in laboratory classes are assessed on an ongoing basis. In each lab session, the
correctness of the completed exercises is graded on a scale of 0 to 10 points. To pass the lab component, a student must earn at least 50% of the total possible points.
Percentage of Points Grade
<=50% 2,0
51% - 60% 3,0
61% - 70% 3,5
71% - 80% 4,0
81% - 90% 4,5
91% - 100% 5,0
The course completion rules and the exact passing thresholds will be communicated to students at the beginning of the semester through the university's electronic systems and during the first class meeting (in each form of classes).

Programme content

• Database Model
• Database Structure
• Database Query Languages
• Database Optimization Principles
• Development of a Database Application

Course topics

Lectures:
1. SQL basis, views, sequences
2. Embedded SQL functions
3. Extendend SQL queries
4. PL SQL, T-SQL

5. Triggers, indexes
6. Database users, access to databases.
7. Elements of database applications.
8. non-SQL databases
Laboratory classes:
1. Database definitions
2. Simple SQL queries
3. Database modifications
4. Extended SQL queries
5. PL SQL procedures
6. PL SQL Triggers
Projects in line with the topics of the classes

Teaching methods

Lectures:
a) multimedia presentation with addtional examples presented and expalined on a board,
b) case study based on the presentation with usage of SQL tools
Laboratory classes and projects:
a) practical programming exercies with computers and SQL tools,
b) short multimedia presentations

Bibliography

Basic:
1. Li Yan, Zongmin Ma, Advanced database query systems : techniques, applications and technologies, Hershey : Information Science Reference, 2011.
2. Oracle, Database SQL Language Reference, online: https://docs.oracle.com/database/121/SQLRF/toc.htm.

Additional:
1. Jason Price, Oracle Database 11gSQL, McGrawHill 2008
2. PL/SQL Users Guide and Reference, Release 2 (9.2) Part No. A96624-01
3. Joe Celko, The Guru's Guide to Transact-SQL, Addison-Wesley Professional; 1st edition (March 4, 2000)

Breakdown of average student's workload

	Hours	ECTS
Total workload	89	3,00
Classes requiring direct contact with the teacher	44	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	45	1,50