Course Unit Descriptor

Study Programme: Information Technologies	
Course Unit Title: Databases 2	
Course Unit Code: IT204	
Name of Lecturer(s): Miloš Racković	
Type and Level of Studies: Bachelor Academic Degree	
Course Status (compulsory/elective): Compulsory	
Semester (winter/summer): Summer	
Language of instruction: Serbian (primary), English (secondary)	
Mode of course unit delivery (face-to-face/distance learning): Face-to-face	
Number of ECTS Allocated: 7	
Prerequisites: None	

Course Aims:

Introducing principles of development of client-server applications that use database. Understanding of methodologies for connecting applications that use database and principles that functioning of classical and distributed DBMSs are based on.

Learning Outcomes:

Minimum: After successful completion of this course students are able to create object-oriented application which communicates with a database.

Desirable: After successful completion of this course students are able to understand principles of the JDBC interface and ORM specification for an object-oriented application which communicate with a database. Students are also able to deeply understand principles of classic and distributed DBMSs.

Syllabus:

Theory

Client-server architecture. Multilayer architecture. Principles of binding applications and databases. Object-relational mapping (ORM). Normalization of relational data model. Physical organization of databases. Transaction management in DBMSs. Distributed DBMSs. Security of databases.

Practice

In practical part of this course students create two-layer application that uses JDBC to communicate with relational database. They also create two-layer application that uses ORM (Hibernate) to communicate with relational database.

Required Reading:

1. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom, Database Systems, The Complete Book, Prentice Hall, Pearsons Education International, 2002.
2. C.J. Date, An Introduction to Database Systems, Pearson, Addison Wesley, 2004.
3. Mike Keith, Merrick Schincariol, Pro JPA 2 (Expert's voice in Java), Apress; 2nd ed. edition, 2013.

Weekly Contact Hours: 5	**Lectures:** 3	**Practical work:** 2

Teaching Methods:

Classical teaching methods using projector are applied during theoretical instruction. Principles of creating applications that use database are described. The object-relational mapping is introduced, too. Classical teaching methods are used on exercises where relational data model normalization examples are described.

Practical instruction is performed in computer laboratory where students are introduced with development tools through practical work. Through practical examples and labs, they illustrate a small application that communicate with a database

using JDBC driver. After that, students learn to apply ORM (Hibernate) and create two-layer application with CRUD functionalities (obligatory practical assignment).

On the final exam student has to perform knowledge of relational data model normalization, principles of physical data structures, as well as functioning of classical and distributed DBMSs.

Knowledge Assessment (maximum of 100 points): 100

Pre-exam obligations	points	Final exam	points
Test (theory)	20	oral exam	40
Practical test	10		
Obligatory practical assignment	30		