Course Unit Descriptor

Study Programme: Information Technology; Information technology – Software Engineering

Course Unit Title: Databases II

Course Unit Code: OAS004

Name of Lecturer(s): Professor Biljana Radulovic, PhD

Type and Level of Studies: Bachelor Academic Degree

Course Status (compulsory/elective): Compulsory

Semester (winter/summer): Summer

Language of instruction: English

Mode of course unit delivery (face-to-face/distance learning): Face-to-face

Number of ECTS Allocated: 5

Prerequisites: None

Course Aims:

The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively – information from a DBMS.

Learning Outcomes:

Upon successful completion of this course, students should be able to: • Describe the fundamental elements of relational database management systems • Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL. • Design ER-models to represent simple database application scenarios • Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data. • Improve the database design by normalization. • Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing.

Syllabus:

Theory

Database System- concepts and architecture: Data modelling using the Entity Relationship (ER) modelling and Enhanced Entity Relationship (EER) modelling, Specialization and Generalization. The Relational Model: Relational database design using ER to relational mapping, Relational algebra and relational calculus, Tuple Relational Calculus, Domain Relational Calculus, SQL. Database design theory and methodology: Functional dependencies and normalization of relations, Normal Forms, Properties of relational decomposition, Algorithms for relational database schema design. Transaction processing concepts: Schedules and serializability, Concurrency control, Two Phase Locking Techniques, Optimistic Concurrency Control, Database recovery concepts and techniques.

Practice

Student Learning Outcomes(as measured by exam and lab project results) Install, configure, and interact with a relational database management system; Describe, define and apply the major components of the relational database model to database design; Learn and apply SQL) for database definition and manipulation.

Required Reading:

1. Hector Garcia-Molina, Jeff Ullman, and Jennifer Widom: Database Systems: The Complete Book (DS:CB), Addison-Wesley + Prentice-Hall, 2008

Weekly Contact Hours: 4	**Lectures:** 2	**Practical work:**2

Teaching Methods:

Lectures and students group work			
Knowledge Assessment (maximum of 100 points): 100			
Pre-exam obligations	Points	**Final exam**	points
Active class participation	10	oral exam	30
Test I and Test II	40		
Seminar(s)	20		