

## **Relational Databases**

- 1. Course number and name:** 020BDRES2 Relational Databases
- 2. Credits and contact hours:** 4 ECTS credits, 2x1:15 contact hours
- 3. Name(s) of instructor(s) or course coordinator(s):** Ibrahim Kiwan
- 4. Instructional materials:** Slides; course handouts in-class problems

### **References:**

- <http://www.mysql.com/>
- <https://www.microsoft.com/en-us/sql-server/>
- <http://www.oracle.com/>
- Fundamentals of Database Systems, El Masri, sixth edition
- Modern Database management, Hoffer Prescott, ninth edition

### **5. Specific course information**

#### **a. Catalog description:**

Introduction to Databases - The Relational Model - Relational Algebra - Functional Dependencies - Normal Forms - Theory of Constructing a Relational Database - Data Dictionary, SQL (DDL, DML), PL/SQL, Stored Procedures and Functions, Views, Triggers - Transactions, Concurrency, Optimistic Locking, and Two-Phase Commit Validation - Introduction to Non-Relational Databases

#### **b. Prerequisites:** None

#### **c. Required** for CCE students

### **6. Educational objectives for the course**

#### **a. Specific outcomes of instruction:**

- Understand the logical models of databases.
- Resolve an algebraic query and optimize it accordingly.
- Design database structures through functional dependencies.
- Normalize a database.
- Implement a database.
- Manipulate, update, and extract data.
- Handle views in a Database Management System (BDR).
- Manage triggers in a BDR.
- Respond to informal logical computer queries by translating them into SQL language.
- Establish a programmatic PL/SQL solution when necessary.
- Manage transactions, handle concurrency, and address failures and recoveries.
- Apply the lifecycle of a Database Management System (BDR), including design, implementation, and utilization of MySQL, Oracle, SQL Server.
- Introduction to NoSQL database management systems.

**b. PI addressed by the course:**

| <b>PI</b>       | 1.1 | 1.2 | 1.3 | 6.3 | 6.4 |
|-----------------|-----|-----|-----|-----|-----|
| <b>Covered</b>  | x   | x   | x   | x   | x   |
| <b>Assessed</b> |     | x   | x   | x   | x   |

**7. Topics and approximate lecture hours**

- Introduction to Databases (2 lectures)
- Logical Models of Databases (2 lectures)
- Algebraic Query Resolution and Optimization (2 lectures)
- Functional Dependencies and Database Design (3 lectures)
- Database Implementation (2 lectures)
- Data Manipulation, Update, and Extraction (3 lectures)
- Views in a Database Management System (2 lectures)
- Triggers in a Database Management System (2 lectures)
- Translating Informal Queries to SQL (2 lectures)
- PL/SQL Solutions (2 lectures)
- Transaction Management and Concurrency (2 lectures)
- Failures and Recoveries in Database Management (1 lecture)
- Lifecycle of a Database Management System (3 lectures)
- Introduction to NoSQL Databases (1 lecture)