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| **Course unit title:** | Database Management Systems |
| **Course unit code:** | CSC331 |
| **Type of course unit:** **(Compulsory/optional)** | Compulsory |
| **Level of course unit:** **(First, second or third cycle)** | Bachelor (1st cycle) |
| **Year of study:** | 3 |
| **Semester when the unit is delivered:** | 5 |
| **Number of ECTS credits allocated:** | 6 |
| **Name of lecturer(s):** | TBA |

**Learning outcomes of the course unit:**

Upon succesful completion of this course students should be able to:

- Distinguish between the various Database Management Systems models
- List the various steps that are implemented in designing Relational Database Systems
- Create, organize and manipulate databases using correct procedures such as Entity-Relationship diagrams, functional dependencies and table normalization
- Describe database techniques such as security, system recovery, transaction processing and concurrency control
- Build queries using the Structured Query Language, relational algebra and relational calculus
- Use Microsoft SQL Server in a real project for implementing a database
- Manipulate data in Microsoft SQL Server
- Understand data storage in Microsoft SQL Server
- Manage and administer Microsoft SQL Server

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| **Mode of delivery:** | Face- to- face |
| **Prerequisites and co-requisites:** | CSC205 or CSW205 |
| **Recommended optional program components:** | None |

**Course Contents:**

**Objective:**

To provide information on database management; hierarchical, relational, and network models for logical design. An emphasis to the Relational database systems is given. Database administration including reliability, security and integrity.

**Description:**

An introduction to database management systems from the users point of view. Define what a database system is, explain operational data of a DBS, data independence, discuss the architecture for a database system and distributed databases.

Data Modelling using the Entity-Relationship (ER) Model and Enhanced-ER (EER) Model Concepts, Inheritance, Super/Sub Classes.

Data structures and corresponding operators. An introduction to the three different approaches; object-relational approach; Usage of the higher level operators with selected examples.

Relational Data model; A more in-depth analysis of the relational data structure including definition of the modelling concepts and notation of the relational model, identification of integrity constraints, update operations and their effects on integrity constraints.

Structured Query Language (SQL); Introduction to a comprehensive database language. Statements for data definition, query, and update.

Relational algebra; An introduction to the relational algebra using the traditional set operations, attribute names for derived relations and special relational operations.

Relational Calculus; Tuple and Domain relational calculus.

Query By Example (QBE); Overview of another relational language.

Functional Dependencies and Normalization for Relational Databases; Designing guidelines for Relation Schemes, Functional dependencies, General Definitions of First, Second and Third Normal Forms, Boyce-Codd Normal Form (BCNF).

Security and Authorization, System Recovery, Transaction Processing, Concurrency Control.

Microsoft SQL Server:
Microsoft SQL, Transact-SQL, Administering, securing, backing-up MS SQL Server. Permissions in MS SQL Server, data dictionary, built-in functions, database roles, database views, MS SQL Server database storage and indexing

Recent developments and contemporary issues pertaining to the subject-matter of the course.

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| **Recommended or required reading:** | Elmarsi & Navathe, FUNDAMENTALS OF DATABASE SYSTEMS, Benjamin/Cummings<br><br>Database Administration Fundamentals, Microsoft Official Academic Course in Database Fundamentals, Exam 98-364<br><br>Koch & Loney, ORACLE - THE COMPLETE REFERENCE Osborne, McGraw-Hill |

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| | Silber Schatz, Korth et all, DATABASE SYSTEMS CONCEPTS, McGraw Hill<br>Harve D.R., DATA ANALYSIS FOR DATABASE DESIGN Edward Arnold<br><br>Christopher Date, DATABASE, Addison-Wesley<br><br>Date, C.J., RELATIONAL DATABASE SELECTED WRITINGS, Addison-Wesley<br><br>Date, C.J., INTRODUCTION TO DATABASE SYSTEMS Addison-Wesley<br><br>Frank, DATABASE THEORY AND PRACTICE, Adison-Wesley<br><br>Kerschberg, L., EXPERT DATABASE SYSTEMS, Addison Wesley<br><br>Post, Gerarld, DATABASE MANAGEMENT SYSTEMS McGraw Hill<br><br>Atzemi & Geri et all, DATABASE SYSTEMS, McGraw Hill<br><br>Eagle Stone & Redley, WEB DATABASE SYSTEMS, McGraw Hill |
| **Planned learning activities and teaching methods:** | Class Instruction 42 Hours<br>Consultation/Computer Lab 30 Hours |
| **Assessment methods and criteria:** | Examinations 80%<br>Assignments/Project 20%<br>100% |
| **Language of instruction:** | English |
| **Work placement(s):** | No |
| **Place of Teaching:** | Theoretical Part: Regular Classroom<br>European University Cyprus, Nicosia<br><br>Practical Part: Computer Laboratory<br>European University Cyprus, Nicosia |