



### MIS-302 Database Management Systems

<b>Course Code</b> MIS-302	<b>Course Title</b> Database Management Systems	<b>Credits / ECTS</b> 3 / 6
<b>Department</b> Computer Science	<b>Semester</b> Fall, Spring	<b>Prerequisites</b> MIS-201, Junior standing
<b>Type of Course</b> Compulsory	<b>Field</b> MIS	<b>Language of Instruction</b> English
<b>Level of Course</b> 1 <sup>st</sup> cycle	<b>Year of Study</b> 3 <sup>rd</sup>	<b>Lecturer</b> Vasso Stylianou
<b>Mode of Delivery</b> Face-to-face	<b>Work Placement</b> N/A	<b>Co-requisites</b> None

#### Objectives of the Course:

The main objectives of the course are:

- Examine databases, database management systems and their role in the organization.
- Follow historically the development of database management systems until present time.
- Analyze data models and data modeling techniques.
- Cover relational database design by converting a conceptual data model to a database schema.
- Explain normalization and use it to design normalized relational databases.
- Cover Structured Query Language's (SQL), data definition (DDL), data manipulation (DML), and data control (DCL) components.
- Introduce data and database administration functions.
- Introduce on-line transaction processing (OLTP) and its role in the business environment.
- Introduce business intelligence to include on-line analytic processing (OLAP), data warehousing, data mining.

#### Learning Outcomes:

Students will be able to:

- Explain the role of databases and database management systems in managing organizational data and information.
- Follow the historical development of database management systems and logical data models.
- See the role of information requirements specification processes in the broader systems analysis and design context.
- Distinguish between the basic approaches to data modeling techniques (i.e. object-oriented data modeling, semantic data modeling, etc.)
- Use at least one conceptual data modeling technique (such as entity-relationship modeling) to capture the information requirements for an enterprise domain.
- Design high-quality relational databases.
- Explain the purpose and principles of normalizing a relational database structure and design a normalized relational database.
- Implement a relational database design using an industrial database management system, including the principles of data type selection and indexing.
- Use the data definition, data manipulation, and data control language components of SQL in the context of one widely use implementation of the language.
- Perform simple database administration tasks.
- Understand the concept of database transaction and apply it appropriately to an application context.
- Understand the role of databases and database management systems in the context of enterprise

systems.

- Understand the difference between on-line transaction processing (OLTP) and on-line analytic processing (OLAP), and the relationship between these concepts and business intelligence, data warehousing and data mining.

### Course Contents:

- 1) Basic File Processing Concepts
- 2) Database Approach
- 3) Types of Database Management Systems
- 4) Conceptual Data Model
  - a) Entity-relationship model
  - b) Object-oriented data model
  - c) Specific modeling grammars
  - d) Semantic data modeling
- 5) Logical Data Model
  - a) Hierarchical data model
  - b) Network data model
  - c) Relational data model
    - Relations and relational structures
    - Relational database design
      - Mapping conceptual schema to a relational schema
      - Normalization
      - Anomalies
- 6) Physical Data Model
  - a) Indexing
  - b) Data types
- 7) Structured Query Language (SQL): DDL, DML, and DCL
- 8) Data and Database Administration
- 9) Data Views
  - a) Virtual views (i.e. declaring views, query views, etc.)
  - b) Modifying views (i.e. Triggers)
- 10) Transaction Processing
- 11) Business intelligence
  - a) On-line analytic processing
  - b) Data warehousing
  - c) Data mining

### Teaching Methods:

Lectures, Lab Sessions, CASE tools demonstrations, Exercises

### Assessment Methods:

Final Exam, Midterm Exam, Coursework

### Required Textbooks:

Authors	Title	Publisher	Year	ISBN
D. M. Kroenke, D. J. Auer	Database Processing; Fundamentals, Design, and Implementation, 11/e	Prentice Hall	2010	978-0-13-157945-3

### Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
V. Stylianou	InterLearning On-Line Teaching and Learning Material	Student Intranet	2010	

R. Elmasri, S. Navathe	Fundamentals of Database Systems, 5/e	Addison-Wesley	2007	978-0-321-36957-4
A. Silberschatz, H. F. Korth, S. Sudarshan	Database System Concepts, 5/e	McGraw-Hill	2006	0-07-295886-3