

# Global Learning Semesters

## Course Syllabus

Course: COMP-617 Advanced Database Concepts

Department: Computer Science

Host Institution: University of Nicosia, Nicosia, Cyprus



Course Summary		
Course Code	Course Title	Recommended Credit Hours
COMP-617	Advanced Database Concepts	4
Semester Offered	Contact Hours	Prerequisites
Please contact us	42-45	Students are expected to have undergraduate-level knowledge of database systems, Internet technology and object-oriented programming.
Department	Level of Course	Language of Instruction
Computer Science	Upper Division	English

### Course Description

This course is designed for graduate students pursuing a Master's degree in Computer Science. The aim of this course is to provide a critical study of theory and research related to advanced topic areas of Databases. Topic areas include object-oriented databases and the ODMG model, object-relational databases, SQL3, database administration (security, recovery, optimization), web databases and XML, data mining and data warehousing and current research in database systems (temporal databases, spatial databases, multimedia databases, graphical query languages, etc).

### Prerequisites

Students are expected to have undergraduate-level knowledge of database systems, Internet technology and object-oriented programming.

### Topic Areas

1. Object-Oriented Databases and the ODMG Model. Concepts, Standards and Systems. Data Definition and Data Manipulation Languages. The OQL Language. Object-Relational Databases. Concepts and Systems. The SQL3 Language.
2. Database Administration. Advanced concepts in security, recovery and optimization. Distributed Database Systems. Client Server Architectures.
3. Web Technology and Database Systems. Internet and the WEB. Integrating Databases into the Web Environment (scripting languages, CGI, Microsoft and Oracle Internet Platforms). Web-DBMS Architecture. Web-DBMS Design and Development. Semi-structured Data and XML.
4. Data Warehousing. Concepts, Benefits and Problems. Data Warehouse Architecture, Data Flows, Tools and Technologies. Data Warehousing Design. On-Line Analytical Processing (OLAP) and Data Mining.
5. Active Databases. Deductive Databases. Temporal Databases. Spatial and Multimedia Databases. Mobile Databases. Geographic Information Systems. Digital Libraries. Graphical Query Languages.

Course Assessment

Students will be assessed through semester projects and presentations, a midterm and a final examination. The percentages contributing to the final grade are as follows:

Semester Project and Presentation:	30%
Midterm Exam:	30%
Final Exam:	40%

Description of course assessment:

Project work: This will be a major project with a deadline the end of the semester; students will be expected to do a presentation in front of the class and explain their work.

Example 1.

The project consists of three major parts:

1. Research Work - State-of-the arts Database Management Systems (DBMS) and Temporal Database Features. A report on how DBMSs (Oracle, Access, etc.) support these features.
2. Implementation of a temporal database application in a DBMS (e.g. Oracle). Design and development of queries.
3. Design and development of temporal data structures and supporting functions using a programming language (preferably an object-oriented language). Design and development of functions to implement the queries in 2.

Database Application Example that can be used: A database application that stores time-related values for the use of rooms in houses.

Example 2.

Design and Development of a Web-based database application. Data Modeling Design. Database Development. Database Administration settings (authorization, security, performance, etc.). Database Interface Design and Development. Reports and Queries. Embedded SQL programming. Web interface. Students are expected to use a methodology implementing the life-cycle of software development and document accordingly their work.

Midterm exam: It will contain the material covered up to the time of the midterm.

Final Examination: This examination will be comprehensive and it will include all the material covered throughout the semester.

## Readings and Resources

### Required Textbook

1. Connolly, T.M. and Begg, C.E. Database Systems - A Practical Approach to Design Implementation and Management, 4<sup>th</sup> Edition, Addison Wesley, 2004, ISBN: 0-321-29401-7.
2. Elmasri, R. and Navathe, S.B. Fundamentals of Database Systems, 4<sup>th</sup> Edition, Addison Wesley, 2004, ISBN 0-321-12226-7.
3. Date, C.J. An Introduction to Database Systems, 8<sup>th</sup> Edition, Addison Wesley, 2004, ISBN: 0-321-19784-4
4. Riccardi G. Database Management with Web-Site Development Applications, Addison Wesley, 2003, ISBN: 0-201-74387-6
5. Eaglestone E. and Ridley M. Web Database Systems, McGraw Hill, 2001, ISBN:0-07-709600-2
6. Research Papers from Conference Proceedings and Journals on Database Systems.