



## COURSE PRESENTATION FORM – ACADEMIC YEAR 2010/2011

<b>COURSE NAME</b>	<b>Database Management Systems</b>
<b>COURSE CODE</b>	70098
<b>LECTURER</b>	<a href="#">Johann Gamper</a>
<b>TEACHING ASSISTANT</b>	
<b>TEACHING LANGUAGE</b>	English
<b>CREDIT POINTS</b>	4
<b>LECTURE HOURS</b>	24
<b>EXERCISE HOURS</b>	12
<b>TIME SPAN</b>	21.02.2011 - 11.06.2011
<b>TIME TABLE</b>	See <a href="#">Timetable Page</a>
<b>OFFICE HOURS LECTURER</b>	During the lecture time span:by appointment
<b>OFFICE HOURS TEACHING ASSISTANT</b>	
<b>PREREQUISITES</b>	Students should be familiar with basic concepts in databases (including relational databases, SQL, and relational algebra) and algorithms and have decent programming skills. This material is taught in the following courses: Introduction to Databases, Data Structures and Algorithms, Introduction to Programming.
<b>OBJECTIVES</b>	Based on the concepts gained in the introductory database course, students will develop a deeper understanding of database technology. Advanced concepts and techniques of database management systems are introduced. Specifically, we will focus on data storage, indexing, data querying, and transaction management.
<b>SYLLABUS</b>	<ul style="list-style-type: none"><li>• Storage and file structure</li><li>• Indexing: basic concepts, ordered indexes, B+-tree index and file organization, hash index, bitmap index, grid index</li><li>• Query processing: general concepts, selection evaluation, sort-merge, join evaluation, materialization</li><li>• Query optimization: rule-based and cost-based optimization, materialized views and nested subqueries</li><li>• Transactions: ACID properties, serializability, isolation</li><li>• Concurrency control: lock-based protocols, timestamp-based</li></ul>



protocols, graph-based protocol, multi-version protocol, deadlock handling

- Recovery system: log-based recovery, checkpoints, shadow paging

**TEACHING FORMAT**

Frontal classroom lecture plus exercises

**ASSESSMENT**

Written exam at the end (100%)

**READING LIST**

Textbook:

Silberschatz, Korth, Sudarshan: *Database System Concepts*, 4<sup>th</sup> edition, McGraw Hill, 2002

Further Reading:

Garcia-Molina, Ullman, Widom: *Database Systems: The Complete Book*, Prentice-Hall 2002

**SOFTWARE USED**

--

**LEARNING OUTCOME**

Students completing this course should:

understand how files of records and relations are stored on disk;  
understand how different allocation methods affect the access methods;  
understand the basic concepts of database indexing and different indexing techniques, including B+-tree and hashing;  
be able to compare the index effectiveness in order to speed-up the retrieval of records in response to particular search conditions;  
understand the techniques used for processing and optimizing SQL queries, including cost estimation, evaluation plan and transformation rules;  
be able to compare the effectiveness of different query compilation strategies with respect to the execution query time;  
be able to compare different implementation of selected operations, e.g. different implementations of joins;  
understand the basic concepts of transaction management;  
understand concurrency control in environments with concurrent transaction;  
understand the various failures that may occur during transaction execution;  
know the techniques to recover from system failures.

**COURSE PAGE**

<http://www.inf.unibz.it/dis/teaching/DMS/>