THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY | HKUST Summer School

COMP 3311 – Database Management Systems

School:	**School of Engineering**
Subject Area:	**Computer Science and Engineering**
Course Credit:	**3**
Instructor:	**LOCHOVSKY Frederick Horst**
Pre-requisite/co-requisite:	**Details Here**

Notes:

- The syllabi provided here is for reference only and may be subject to changes and adjustments as determined by the course instructors.

The Hong Kong University of Science and Technology

UG Course Syllabus Template

Database Management Systems

COMP3311

3-credit

COMP 2011 OR COMP 2012 OR COMP 2012H

Name: Prof Frederick H. LOCHOVSKY

Email: fred@cse.ust.hk

Office Hours: Friday 2-3 p.m. via Zoom and by appointment in Room 3558

Course Description

A database management system (DBMS) is primarily concerned with *efficiently and effectively* managing very large amounts of data. This course introduces the topic through lectures, which present database technology theories and concepts, and through tutorials and labs which provide practise and experience in designing, implementing and querying databases using commercial database management systems. Topics covered include analysis and representation of data requirements (entity-relationship (E-R) model, relational model, JavaScript Object Notation (JSON)); querying data using database query languages (relational and non-relational); storing, managing and processing data; safeguarding data in a multi-user environment. Experience in designing, implementing and querying databases using both relational and non-relational database technologies will be provided.

OBJECTIVES

The course provides both a theoretical and a practical foundation for understanding the capabilities and use of database management systems for managing data. The theoretical part covers the major concepts and techniques used by database management systems to manage data. The practical part provides hands-on experience in using commercial database management systems to design, implement and query databases.

TOPICS	CHAPTERS (6th ed.)	(7th ed.)	LECTURES (estimated)
Database Management Systems	1	1	1
Database Design	7	2	2
Relational Database Design	2	2, 6, 7	3
Relational Algebra (RA)	6	2	1
Structured Query Language (SQL)	3, 4, 5	3, 4, 5	4
NoSQL DBMSs		10	1
MongoDB DBMS			3
Storage and File Structure	10	12, 13	1
Indexing	11	14	2
Query Processing	12, 13	15, 16	3
Transaction Management	14, 15, 16	17, 18, 19	3

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

1. Explain important database management system concepts including: database system architecture; data models; logical and physical database design; query languages and query processing; database services including storage management, transaction management, data integrity and database recovery; differences between relational and non-relational database systems.

2. Apply database theories and concepts to practical database applications.

3. Analyze the data requirements for an application, design a database for the application and implement appropriate queries for the application using commercial database management systems

Assessment and Grading

This course will be assessed using criterion-referencing and grades will not be assigned using a curve. Detailed rubrics for each assignment will be provided outlining the criteria used for evaluation.

Assessments:

Assessment Task	Contribution to Overall Course grade (%)	Due date
Lecture, Tutorial and Lab Exercises	10%	1 day after each leacture, tutorial and lab
Assignments	25%	28/06/2025 * 12/07/2025 * 26/07/2025 *
Midterm test	25%	10/07/2025 *
Final examination	40%	07/08/2025

* Assessment marks for individual assessed tasks will be released within two weeks of the due date.

Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanation
Lecture, Tutorial and Lab Exercises	ILO2	This task assesses students' ability to apply concepts and techniques discussed in lectures and to obtain timely feedback on their understanding of these concepts and techniques.
Assignments	ILO2, ILO3	This task assesses students' ability to apply concepts and techniques discussed in lectures to a realistic real-workd problem.
Midterm Test	ILO1, ILO2, ILO3	This task assesses students' ability to apply concepts and techniques discussed in lectures without reference to outside sources.
Final Exam	ILO1, ILO2, ILO3	This task assesses students' ability to apply concepts and techniques discussed in lectures without reference to outside sources.

Grading Rubrics

Detailed rubrics for each assignment will be provided. These rubrics will clearly outline the criteria used for evaluation. Students can refer to these rubrics to understand how their work was assessed.

Final Grade Descriptors:

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	Demonstrates a comprehensive grasp of subject matter, expertise in problem-solving, and significant creativity in thinking. Exhibits a high capacity for scholarship and collaboration, going beyond core requirements to achieve learning goals.
B	Good Performance	hows good knowledge and understanding of the main subject matter, competence in problem-solving, and the ability to analyze and evaluate issues. Displays high motivation to learn and the ability to work effectively with others.
C	Satisfactory Performance	Possesses adequate knowledge of core subject matter, competence in dealing with familiar problems, and some capacity for analysis and critical thinking. Shows persistence and effort to achieve broadly defined learning goals.
D	Marginal Pass	Has threshold knowledge of core subject matter, potential to achieve key professional skills, and the ability to make basic judgments. Benefits from the course and has the potential to develop in the discipline.
F	Fail	Demonstrates insufficient understanding of the subject matter and lacks the necessary problem-solving skills. Shows limited ability to think critically or analytically and exhibits minimal effort towards achieving learning goals. Does not meet the threshold requirements for professional practice or development in the discipline.

Course AI Policy

Students are not allowed to use generative Ai tools.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Feedback on assignments will include specific areas of deviation from expected results. Students who have further questions about the feedback including marks should consult the instructor within five working days after the feedback is received.

Resubmission Policy

No resubmission is allowed.

Required Texts and Materials

TEXTBOOK

Database System Concepts, 7th Edition, A. Silberschatz, H.F. Korth and S. Sudarshan, McGraw-Hill, 2020.

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Academic Integrity | HKUST – Academic Registry for the University's definition of plagiarism and ways to avoid cheating and plagiarism.

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