

HONG KONG BAPTIST UNIVERSITY

COURSE OUTLINE

1. COURSE TITLE

Database Systems & Administration

2. COURSE CODE

COMP7640

3. NO. OF UNITS

3 Units

4. OFFERING DEPARTMENT

MSc in Information Technology Management

5. PREREQUISITES

Nil

6. MEDIUM OF INSTRUCTION

English

7. AIMS & OBJECTIVES

To give students a solid background in relational DBMS. To learn general DBMS designs and internals, including relational data modeling, relational database design, data storage, index structures, query evaluation, transaction processing, concurrency control, and crash recovery. To discuss advanced topics such as distributed databases and data warehouses.

8. COURSE CONTENT

I. The Entity-Relationship Data Model

- A. Elements of the ER model
- B. Conceptual design with the ER model
- C. Modeling of constraints

II. The Relational Data Model and Database Language

- A. Relational model concepts
- B. Relational database schemas
- C. Relational algebra

D. SQL

III. Relational Database Design

- A. Functional dependencies
- B. Normal forms and normalization

IV. Disk and Memory Management

- A. Disk space management
- B. Buffer management
- C. File organization

V. Access Methods and Indexing

- A. Dynamic Tree-Structured indexing
- B. Hashing indexing

VI. Query Evaluation and Optimization

- A. Query operator evaluation
- B. Query optimization
- C. External sorting

VII. Concurrency Control and Crash Recovery

- A. Transactions
- B. Locking-based concurrency control
- C. Concurrency control without locking
- D. Crash recovery

VIII. Advanced/Current Topics

9. COURSE INTENDED LEARNING OUTCOMES (CILOs)

CILO	By the end of the course, students should be able to:
CILO 1	Explain the basic concepts of RDBMS design, including entity-relationship model, relational data model and data normalization
CILO 2	Explain database languages: relational algebra and SQL
CILO 3	Explain underlying disk-based data storage, organization and access methods in RDBMS
CILO 4	Explain query evaluation, query optimization, concurrency control and crash recovery techniques
CILO 5	Analyze the tradeoffs of alternative database designs and implementation mechanisms
CILO 6	Develop team spirit and professional attitude towards database management and administration

10. TEACHING & LEARNING ACTIVITIES (TLAs)

CILO alignment	Type of TLA
1-4	Students will learn the database management concepts and methods via lectures, tutorials, and assignments.
5	Students will investigate alternative database designs and implementation techniques.
1-6	Students will work on a project to gain hands-on experience.

11. ASSESSMENT METHODS (AMs)

Type of Assessment Methods	Weighting	CILOs to be addressed	Description of Assessment Tasks
Continuous Assessment	40 %	1-6	It may include written assignments and project reports. The course instructors can design the most appropriate forms of assessment to complement their teaching and learning strategies and determine their weighting.
Examination	60 %	1-5	Final Examination questions are designed to evaluate how far students have achieved their intended learning outcomes. Questions will primarily be analysis and skills based to assess the students' ability in design and management of database systems.

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