University of Shanghai for Science and Technology

Course Syllabus

Course Title: Advanced Database Management System
Course Number: 2760
Semester: Summer 2024

Total Contact Hours: 56 Hours

Credits: 4

Class Schedule: TBA

Instructor: TBA

Email: TBA

Office Location: TBA

Course Prerequisite(s): 2758 Database Management System

Course Description: The purpose of this course is to present advanced topics in database systems and delve into research in these areas. The topics include distributed systems, distributed databases, as well as advanced application domains that influence database research such as Big Data, cloud computing, Web services, semantic Web, information security & privacy, and electronic commerce.

Required Textbook:
R. Ramakrishnan, J. Gehrke, ***Database Management Systems***, McGraw Hill, 2004
S. A. Silberschatz, H. Korth, S. Sudarshan, ***Database System Concepts***, 5/e, McGraw Hill, 2008.

Learning Outcomes: *After completing this course, students will able to*

- Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions;
- Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline;
- Apply computer science theory and software development fundamentals to produce computing-based solutions;
- Communicate effectively in a variety of professional contexts.

Homework Assignments:

- The assignments will be posted on the course web page at least one week before the due date.

- The due dates of the assignments will be also indicated by the instructor.
- Late homework is not accepted.

Grading Evaluation:

EXAMS	PERCENT	GRADE	PERCENTAGE
2 Assignments	20%	A+	96-100
2 Quizzes	20%	A	90-95
Midterm Exam	25%	A-	85-89
Final Exam	35%	B+	82-84
Total	100%	B	78-81
		B-	75-77
		C+	71-74
		C	66-70
		C-	62-65
		D	60-61
		F	< 60

Course Outline:

Class Number	Topics
1	Introduction and overview
2	Foundations of relational systems
3	Conformity and integrity
4	Mapping design approaches to relational systems **Assignment 1**
5	Using SQL in querying and manipulating data and data objects
6	Query transformations
7	Creation and use of a variety of index types
8	The ACID principle **Quiz 1**
9	Two-phase locking and deadlocks
10	Maximizing storage and memory usage

11	Memory components and caching techniques
12	***Midterm Exam***
13	Data replication: i. Synchronous ii. Asynchronous
14	The Two-Phase Commit protocol and its weaknesses
15	Object oriented database management systems
16	Deductive/Spatial/Temporal/Constraint database management systems **Assignment 2**
17	New database applications and architectures
18	Use of SQL and standards in the industry
19	Limitations of standardization
20	Data encryption **Quiz 2**
21	Redaction and masking techniques
22	Authentication and authorization
23	Database auditing
24	***Final Exam***

Attending Policy： Regular and prompt attendance is required. Under ordinary circumstances, you may miss two times without penalty. Each absence over this number will lower your course grade by a third of a letter and missing more than five classes may lead to a failing grade in the course. Arriving late and/or leaving before the end of the class period are equivalent to absences.

Policy on "Late Withdrawals"： In accordance with university policy, appeals for late withdrawal will be approved ONLY in case of medical emergency and similar crises.

Academic Honesty： University of Shanghai for Science and Technology expects all students to do their own work. Instructors will fail assignments that show evidence of plagiarism or other forms of cheating, and will also report the student's name to the University administration. A student reported to the University for cheating is placed on disciplinary probation; a student reported twice is suspended or expelled.

General Expectations: Students are expected to

- Attend all classes and be responsible for all materials covered in class and otherwise

assigned;

- Complete the day's required reading and assignments before class;
- Review the previous day's notes before class and make notes about questions you have about the previous class or the day's reading;
- Participate in class discussions and complete required written work on time;
- Refrain from texting, phoning or engaging in computer activities unrelated to class during the class period;
- While class participation is welcome, even required, you are expected to refrain from private conversations during the class period.

Special Needs or Assistance： Please contact the Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material. Our goal is to help you learn, not to penalize you for issues which mask your learning.