

SYLLABUS

BIL553 – DATABASE MANAGEMENT SYSTEMS THEORY

2024 Spring

Course Description

The main objective of this course is to provide students with an in-depth understanding of the design and implementation of database systems. Topics include data models (relational, document, key/value), relational database design, schema refinement, indexing (order preserving trees, hash tables), transaction processing (ACID, concurrency control), recovery (logging, checkpoints), query processing (joins, sorting, aggregation), and emerging database technologies, such as NoSQL and big data models.

Upon successful completion of this course, students will have advanced theoretical and hands-on skills to effectively develop, implement and manage database management systems.

Contact	Schedule	Grading
Name: Assoc. Prof. Mustafa SERT Office: A205/A407 Phone: +90-312-246-6666 Ext.4144/4009 E-mail: msert@baskent.edu.tr Web: www.baskent.edu.tr/~msert/	Class Hours: Mon., 18:00–20:50 Location: E402 Office Hours: By appointment or e-mail	Class Activities: 30% Midterm Exam: 30% Final Exam: 40%

Textbook and Reference(s):

1. A. Silberschatz, H.F. Korth, and S. Sudarshan, “Database System Concepts,” McGraw-Hill, (2020).
2. C. Coronel and S. Morris, “Database Systems: Design, Implementation, Management,” Cengage.
3. H. Garcia-Molina, *et al.*, “Database Systems: The Complete Book”, Prentice Hall, (2009).
4. R. Ramakrishnan and J. Gehrke, “Database Management Systems”, McGraw-Hill, (2002).
5. R. Elmasri and S.B. Navethe, “Fundamentals of Database Systems”, Prentice Hall, (2011).

Table 1: Weekly Course Schedule

Week	Topics
1–3	Database Modeling Data models, relational DB design, relational algebra Deadline for paper presentation topics and articles by March 4, 2024, 9 AM
4–5	Design Theory for Relational DBs Functional dependency, schema refinement and normalization
6–8	Database Storage & Indexing Files, pages, buffer pool, hash&tree indexing.
9	Query Processing Query execution I
10	Query execution II Midterm Exam – Subject to change according to the Institute regulations
11	Concurrency Control Transaction processing
12	Logging protocols and schemes
13–15	Recent topics in database systems (Student paper presentations and discussions)

REMARKS

Class Activities: Class activities include homework assignments and paper presentations. Each student will present a paper in the database field. Paper topic will be proposed by the student and needs instructors’ approval. You will get points from both your own presentation and your critiques / questions to others.

Late day policy: Each student will have total of 3 free late (calendar) days to be able to use for assignments (not valid for paper presentations). Once these late days are exhausted, any assignments turned in late will not be accepted in any case.

Attendance: A minimum of **70%** attendance to the lecture hours is compulsory. Violation of this rule will result in an **F2** grade.

*The instructor can change the content of this syllabus plus other information anytime without any prior notice.