

# SYLLABUS

## BIL553 – DATABASE MANAGEMENT SYSTEMS THEORY

### 2026 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
<b>Name:</b> Mustafa SERT	<b>Class Hours:</b>	Assignments: 10%
<b>Office:</b> A407	Mon 18:00–20:50	Paper Presentation: 20%
<b>Phone:</b> 312-246-6666 Ext.6658/4009	<b>Location:</b> TBD	Midterm Exam: 30%
<b>E-mail:</b> msert@baskent.edu.tr	<b>Office Hours:</b>	Final Exam: 40%
<b>Web:</b> www.baskent.edu.tr/~msert/	By appointment or e-mail	

#### 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
	<b>Database Modeling</b>
1–3	Data models, relational DB design, relational algebra <b>Paper presentation topics and articles are due by the end of the Week 3 lecture</b>
	<b>Design Theory for Relational DBs</b>
4–5	Functional dependency, schema refinement and normalization
	<b>Database Storage &amp; Indexing</b>
6–8	Files, pages, buffer pool, hash&tree indexing.
	<b>Query Processing</b>
9	<b>Midterm Exam – Subject to change according to the Institute regulations</b>
10	Query execution I
11	Query execution II
	<b>Concurrency Control</b>
12	Transaction processing
13	Logging protocols and schemes
14–16	<b>Recent topics in database systems (Student paper presentations and discussion)</b>

**REMARKS**  
**Paper Presentations:** Each student will present a paper in the database field, with the topic proposed by the student and approved by the instructor. Assessment is based on both the student’s presentation and their critiques and questions during other presentations.

**Late Submission Policy:** No deadline extensions for paper presentations. For other assignments, each student will have a total of 3 free late (calendar) days that can be used for assignments. Once these late days are exhausted, any assignments turned in late will not be accepted under any circumstances.

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

**Moodle (OYS) page of the course:** Check regularly the Moodle page of the course for lecture notes, homework assignments, and announcements.

*The instructor reserves the right to modify this syllabus at any time without prior notice.*