San José State University
Department of Computer Science
Spring Semester 2018
CS 157B – Database Management Systems II, Section 4

Course and Contact Information

Instructor:	Ahmed Ezzat
Office Location:	MH-218
Email:	Ahmed.Ezzat@sjsu.edu
Office Hours:	Mon+Wed 10:00AM – 12:00PM (by advanced reservation only)
Class Hours:	Tu+Th: 6:00PM – 7:15PM
Classroom:	DH-450
Prerequisites:	CS 157A (Introduction to Database Management Systems) with a grade of C- or better, or instructor's consent. The Department of Computer Science strictly enforces prerequisites. The instructor may drop any student who does not show up for the first two class meetings without providing a valid excuse ahead of time.

Grader: Rashmeet Kaur Khanuja **Email: rashmeetkaur.khanuja@sjsu.edu**

Course Description

Database management Systems II: Survey course. Object-oriented data model, definition language, query language and optimization. Object relational database systems. Database trends. Web database topics, namely, architectures, introduction to interface languages. Team projects. Prerequisite: CS 157A (with a grade of "C-" or better); Computer Science, Applied and Computational Math, or Software Engineering Majors only; or instructor consent.

Course Learning Outcomes (CLO)

Upon successful course completion, students would achieve the following:

- Refresh: Relational Algebra
- Learn Secondary Storage Management in Relational Database Systems
- Learn Relational Indexes: B-tree, Hash Tree, Multi-dimensional indexes, and Bit-map indexes
- Learn Query Processing & Optimization & IBM Optimizer (Case Study)
- Learn Dynamic Query Optimization (Case Study)
- Learn Concurrency Control in the context of RDBMS
- Learn Triggers (E-C-A)
- Learn Transaction Management , Constraints, and Views
- Learn Database Failure and Recovery
- Learn Parallel and Distributed Database
- Survey to Advanced Topics: In-Memory DB, Object and Object-Relational DBs, and XML Database

- Learn Data Warehouse vs. OLTP, and OLAP

Required Texts/Readings

- Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer D. Widom, "**Database Systems: The Complete Book**," Prentice-Hall, 2nd Edition, 2009, ISBN-13: 978-0-13-606701-6 [Mandatory]. Online Copy: https://robot.bolink.org/ebooks/Database%20Systems%20-%20The%20Complete%20Book.pdf

Recommended texts for self-study

- C. Date, "**An Introduction to database Systems**," Addison Wesley, 8th Edition, 2003, ISBN-13: 978-0-32-119784-9 [Optional].
- Ramez Elmasri and Shamkant B. Navathe, "**Fundamentals of Database Systems**," Addison Wesley, 5th Edition, 2006, ISBN-13: 978-0-32-136957-4 [Optional].

Course Requirements and Assignments

All the assignments and related documents must be handed in the classroom on due date. Students will lose 10% of the homework or project grade for each day delay, and after 5 days, homework or projects will not be accepted.

Homework and Project descriptions are available on Canvas:
Homework:

- Homework-1: Assignment is on Feb. 6, 2018, and is due back on Feb. 15, 2018.
- Homework-2: Assignment is on Feb. 27, 2018, and is due back on March 8, 2018.
- Homework-3: Assignment is on March 15, 2018, and is due back on March 22, 2018.
- Homework-4: Assignment is on April 3, 2018, and is due back on April 12, 2018.
- Homework-5: Assignment is on April 19, 2018, and is due back on May 1, 2018.

Projects:

- Project-1 (individual): Assignment is on Jan. 30, 2018, and project is due back on Feb 8, 2018.
- Project-2 (Group): Assignment is on Feb. 13, 2018, Proposal is due on Feb, 22, 2018 and Final is due back on April 26, 2018.
- Project-3 (Group): Assignment is on April 17, 2018, and Final is due on May 8, 2018.

Exams or Evaluation

The midterm and final examinations will be closed book and no notes. There will be no laptops, or any personal digital devices allowed. There will be no make-up exams. If a student misses an exam without a legitimate excuse, a grade of zero will be recorded. If a student missed an exam with a legitimate excuse then the grade for that exam will be

prorated. More details can be found on final examination in *University Policy S06-4 (http://www.sjsu.edu/senate/docs/S06-4.pdf) which states that "There shall be an appropriate final examination or evaluation at the scheduled time in every course, unless specifically exempted by the college dean who has curricular responsibility for the course."*

Grading Information

Your individual class grade will be weighted as follows:

• Homework (5)	20%	20 points	individual scores
• Projects (3)	25%	25 points	(5 pts P1 individual Project + 10 pts P2 Group project + 10 pts P3 Group project)
• Class Quizzes	10%	10 points	individual scores
• Midterm	20%	20 points	individual scores
• Final exam	25%	25 points	individual scores

Each assignment, project, and exam will be scored (given points) but not assigned a letter grade. The mean score will be announced after each exam.

Important NOTE:

In some occasions, the instructor may decide to administer evaluations where students are allowed to use their "paper notes"- (NO BOOK OR ELECTRONIC COPIES), so it is in your best interest to attend to class and take good notes; they may be handy in such situations. These individual in-class quizzes are not scheduled in-advance and they account to 10% of the overall class grade.

Determination of Grades

Final individual class letter grades will be assigned based on the class curve (i.e. relative grading). Your final class grade can be adjusted up or down depending on your level and quality of participation on your project team.

Classroom Protocol

It is expected that student attend classes, be active and participate in the class by asking/answering questions, arrive in time and leave only after the class is ended. No eating is allowed in the classroom, and it is expected to turn your cell off before entering the classroom.

University Policies

General Expectations, Rights and Responsibilities of the Student

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/"

CS 157B, Database Management Systems - II, Section 5, Course Schedule

Any changes in the schedule will be sent to registered students through SJSU email 1 week earlier.

Tentative course calendar

Week	Date	Item
1	Jan. 25th	Lecture: Course Overview + Overview of Relational Algebra
2	Jan. 30th	Lecture: Disk and Files, Records and Blocks organization, Storage (Ch. 13) + **Project-1 Preview**
2	Feb. 1st	Lecture: Relational Indexes: B-tree, Hash table, Multi-dimensional indexes using hash and tree structures, Bitmap indexes (Ch 14)
3	Feb. 6th	Lecture: Relational Indexes: (Contd.) + **HW-1 Preview**
3	Feb. 8th	Lecture: Query Processing + **Project-1 due**
4	Feb. 13th	Lecture: Query Optimization (Ch. 15 + Ch. 16) + **Project-2 Preview**
4	Feb. 15th	Lecture: Query Optimization (Contd.) + **HW-1 due**
5	Feb. 20th	Lecture: Query Optimization (Contd.) + **Case Study:** IBM Query Optimizer (Home Reading)
5	Feb. 22nd	Lecture: Dynamic Query Optimization + **Project-2 Proposal due**
6	Feb. 27th	Lecture: Concurrency Control (Ch. 18) + **HW-2 Preview**
6	March 1st	Lecture: Concurrency Control (Ch. 18) - Contd.
7	March 6th	Lecture: Concurrency Control: Contd.
7	March 8th	Lecture: Triggers (E-C-A) + **HW-2 due**
8	March 13th	Lecture: Transaction Management (Ch. 19), Constraints (Ch. 7), and Views (Ch. 8) + **Midterm Preview**
8	March 15th	Lecture: Transaction Management (Ch. 19), Constraints (Ch. 7), and Views (Ch. 8) – Contd. + **HW-3 Preview**
9	**March 20th**	**Midterm (Closed book)**
9	**March 22nd**	Lecture: Transaction Management (Ch. 19), Constraints (Ch. 7), and Views (Ch. 8): Contd. + **HW-3 due**

10	**March 27th**	**Spring Recess**
10	**March 29th**	**Spring Recess**
11	April 3rd	Lecture: System Failure & Recovery (Ch. 17) + **HW-4 Preview**
11	April 5th	Lecture: System Failure & Recovery (Ch. 17) – Contd.
12	April 10th	Lecture: Object and Object-Relational Databases
12	April 12th	Lecture: Object and Object-Relational Databases (Contd.) + **HW-4 due**
13	April 17th	Lecture: In-Memory Database (IMDB) + Column-oriented DB + **Project-3 Preview**
13	April 19th	Lecture: In-Memory Database (IMDB) + Column-oriented DB (Contd.) + **HW-5 Preview**
14	April 24th	Lecture: Parallel and Distributed Database (Ch. 20)
14	April 26th	Lecture: Parallel and Distributed Database (Ch. 20) – Contd. + **Project-2 due**
15	May 1st	Lecture: XML Database + **HW-5 due**
15	May 3rd	Lecture: XML Database (Contd.)
16	May 8th	Lecture: Data Warehouse and OLAP + **Project-3 due**
16	May 10th	Lecture: Data Warehouse and OLAP (Contd.) + **Final Preview**
17	May 17th	**Final (Closed book) – DH-450, Time is in this period: 5:15pm – 7:30pm**