جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

Course Syllabus: Databases - CS 245

Division	Computer, Electrical and Mathematical Sciences & Engineering
Course Number	CS 245
Course Title	Databases
Academic Semester	Spring
Academic Year	2018/2019
Semester Start Date	01/27/2019
Semester End Date	05/23/2019
Class Schedule (Days & Time)	10:30 AM - 12:00 PM | Sun Tue

Instructor(s)

Name	Email	Phone	Office Location	Office Hours
Panagiotis Kalnis	panos.kalnis@kaust.edu.sa	+966128080343	0111, 1, Al-Khawarizmi (bldg. 1)	I am at the office most of the days. Send en email to arrange an appointment.

Teaching Assistant(s)

Name	Email
N.A.	N.A.

Course Information

Comprehensive Course Description	We will start with a revision of the relational model, relational algebra, SQL and OLAP. Then, we will focus on implementation issues such as buffer management, indexing, query optimization and query execution; this part will be useful for your project. Next, we will review the normalization theory, followed by transactions, concurrency control, failures and recovery. We will continue with a brief introduction to the semi-structured model (XML, XPath, XQuery). Towards the end of the semester, time permitting, we will talk about modern topics on data management, such as spatio-temporal data and the Map-Reduce framework.
Course Description from Program Guide	Database design and use of database management systems for applications. The relational model, relational algebra and SQL, the standard language for creating, querying and modifying relational and object-relational databases. XML data including the query languages XPath and XQuery. UML database design and relational design principles based on functional dependencies and normal forms. Other topics include indexes, views, transactions, authorization, integrity constraints and triggers. Advanced topics from data warehousing, data mining, Web data management, Datalog, data integration,data streams and continuous queries and data-intensive Web services.
Goals and Objectives	Understand the internals of modern data-base management systems.
Required Knowledge	Working knowledge of basic discrete mathematics (e.g., sets, functions and relations) and good programming skills (C or C++ or Java, Linux).

Reference Texts	Database System Concepts Publisher: McGraw-Hill Author: Abraham Silberschatz, Henry Korth, S. Sudarshan Edition Number: 6 ISBN:0073523321 NOTE: we will use roughly 35% of the contents this book Database Systems: The Complete Book Publisher: Pearson Prentice Hall Author: Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom Edition Number: 2 ISBN: 0131873253 Database Management Systems Publisher: McGraw-Hill Author: Raghu-Ramakrishnan, Johannes Gehrke Edition Number: 3 ISBN: 0072465638
Method of evaluation	**25.00**% - Course Project(s) **30.00**% - Homework /Assignments **5.00**% - Others - Please specify **40.00**% - Final exam
Nature of the assignments	-3 homeworks (10% each) -1 Lab exercise (5%) -Programming project (25%) -Final exam, open book (40%)
Course Policies	**ATTENDANCE POLICY:** You are advised to attend all lectures **HONOR CODE:** In accordance with the University policy and professional standards, the highest levels of academic integrity are expected in this class. The code of student conduct is strictly enforced. Academic dishonesty will result in reductions in grades and/or expulsions from this class and/or the University. In addition, with respect to the course project: Everybody is expected to work individually and provide his/her own code. Cases of plagiarism will be taken very seriously and will result to 0 (zero) marks plus disciplinary actions from the university. If plagiarism is suspected, the instructor reserves the right to ask the student to prove his/her abilities by implementing in the instructor's office within limited time a similar operator.
Additional Information	n.a.

Tentative Course Schedule *(Time, topic/emphasis & resources)*		
Week	**Lectures**	**Topic**
1	Sun 01/27/2019 Tue 01/29/2019	Introduction
2	Sun 02/03/2019 Tue 02/05/2019	Relational Model
3	Sun 02/10/2019 Tue 02/12/2019	Relational Algebra
4	Sun 02/17/2019 Tue 02/19/2019	SQL
5	Sun 02/24/2019 Tue 02/26/2019	OLAP
6	Sun 03/03/2019 Tue 03/05/2019	Data storage
7	Sun 03/10/2019 Tue 03/12/2019	Trees
8	Sun 03/17/2019 Tue 03/19/2019	Hashing
9	Sun 03/24/2019 Tue 03/26/2019	External sorting, Projection, Aggregation
10	Sun 03/31/2019 Tue 04/02/2019	Joins and Query Optimization
11	Sun 04/07/2019 Tue 04/09/2019	Spatial Databases
12	Sun 04/14/2019 Tue 04/16/2019	Functional dependencies
13	Sun 04/21/2019 Tue 04/23/2019	Normalization
14	Sun 04/28/2019 Tue 04/30/2019	XML
15	Sun 05/05/2019 Tue 05/07/2019	Transactions and concurrency control
16	Sun 05/12/2019 Tue 05/14/2019	Failures and recovery
17	Sun 05/19/2019 Tue 05/21/2019	Final Exam Week

Note

The instructor reserves the right to make changes to this syllabus as necessary.