



CS-220 Database Systems

Course Code:	CS-220	Semester:	3rd
Credit Hours:	3+1	Prerequisite Codes:	CS-101 or Equivalent
Instructor:	Ms. Hirra Anwar	Class:	BESE – 5AB
Office:	A-104	VoIP:	2183
Lecture Days:	Tues, Wed, Thurs	E-mail:	hirra.anwar@seecs.edu.pk
Class Room:		Consulting Hours:	By Appointment
Lab Engineer:	Ms. Sadia Amir	Lab Engineer Email:	sadia.amir@seecs.edu.pk
Knowledge Group:	Data Management	Updates on LMS:	Daily basis

Course Description:

Databases are at the heart of modern software systems. They are used to store large amounts of data for efficient update and retrieval. The purpose of this course is to provide an introduction to the design and use of database systems.

Course Objectives:

The course objective is that its successful completion should enable students to engineer database system and handle practical problems in modeling and implementation of real-world data repositories.

Course Learning Outcomes (CLOs):

At the end of the course the students will be able to:	PLO	BT Level*
1. Develop a database schema that incorporates keys and integrity constraints.	3,5	C-3
2. Formulate SQL queries to retrieve information from a relational database.	1,3,4	C-5
3. Design a relational schema using the entity relationship model.	1,2,3,5	C-5
4. Deduce the normal form of a relation.	1,2,3,4	C-4
5. Convert a relation in 1NF or 2NF into a set of 3NF relations.	3	C-2

* BT= Bloom's Taxonomy, C=Cognitive domain, P=Psychomotor domain, A= Affective domain

Mapping of CLOs to Program Learning Outcomes

PLOs/CLOs	Level of Emphasis of PLO (1: High, 2: Medium, 3: Low)	CLO1	CLO2	CLO3	CLO4	CLO5
PLO 1 (Engineering Knowledge)	2		X	X	X	
PLO 2 (Problem Analysis)	1			X	X	
PLO 3 (Design/Development of Solutions)	1	X	X	X	X	X
PLO 4 (Investigation)	3		X		X	
PLO 5 (Modern tool usage)	1	X		X		



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PLO 6 (The Engineer and Society)							
PLO 7 (Environment and Sustainability)							
PLO 8 (Ethics)							
PLO 9 (Individual and Team Work)							
PLO 10 (Communication)							
PLO 11 (Project Management)							
PLO 12 (Lifelong Learning)							

Mapping of CLOs to Assessment Modules and Weightages (In accordance with NUST statutes)

To be filled in at the end of the course.

Assessments/CLOs	CLO1	CLO2	CLO3	CLO4	CLO5
Theory: 75%					
Quizzes: 10%					
Assignments: 10%					
OHT-1: 20%					
OHT-2: 20%					
End Semester Exam: 40%					
Labs: 25%					
Lab Tasks: 60%					
Semester Project: 40%					
Total : 100 %					

Books:

Text Book: 1. R. Elmasri, S.B. Navathe (2011): Fundamentals of Database Systems, 6/E, Addison-Wesley

Reference Books: 1. J. A. Hoffer, V. Ramesh, and H. Topi (2013): Modern Database Management 11/E, Pearson
2. Silberschatz, Korth and Sudarshan (2010): Database System Concepts 6/E, McGraw-Hill

Week	Lecture Topic	Reading List
01	Introduction to Databases	FDS (Ch#1)
02	Database Systems Concepts and Architecture	FDS (Ch#2)
03	Relational Data Model & Relational Database Constraints	FDS (Ch#3)
04	Introduction to SQL, Data Types, DDL Commands	FDS (Ch#4)
05	Retrieving Data with SELECT, Aggregation	FDS (Ch#4)
06	OHT-1	
07	Inner and Outer Joins, Handling Null Values	FDS (Ch#5)
08	Correlated/Non-correlated sub-queries, Recursion	FDS (Ch#5)
09	View, Triggers	FDS (Ch#5)
10	Relational Algebra	FDS (Ch#6)
11	Data Modelling Using ER Model	FDS (Ch#7)
12	OHT-2	
13	Data Modelling Using EER Model	FDS (Ch#8)
14	Relational Database Design	FDS (Ch#9)



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15	Basics of Functional Dependencies – Normalization	FDS (Ch#15)
16	Complex Dependencies	FDS (Ch#16)
17	Application Development	FDS (Ch#10)
18	End Semester Exam	

Lab Experiments	
01	MySQL and Workbench Environment
02	Working with Sakila Database – Select Queries
03	Functions in SQL (Single Row & Multiple Row)
04	SQL Operators, DDL, DML
05	Scalar and Vector Aggregation
06	Referential integrity constraints in SQL
07	Inner Joins, Outer Joins
08	Correlated and Non-correlated sub-queries
09	Views, Triggers
10	Relational Algebra
11	Database Design (ER-Modeling)
12	ER- Modeling
13	Database Design & Normalization
14	Database Application Development

Tools / Software Requirement:
MySQL Workbench(6.1+), Java SE (JDK 8), Eclipse (Luna 4.4+)

Grading Policy:	
Quiz Policy:	The quizzes may be unannounced and normally last for ten minutes. The question framed is to test the concepts involved in last few lectures.
Assignment Policy:	The course website will be the primary source for announcements and submitting assignments.
Lab Conduct:	The labs will be conducted for three hours every week. A lab handout will be given in advance for study and analysis. The lab handouts will also be placed on LMS. The students are to submit their lab tasks at the end of lab for evaluation. One submission per group will be required. However, students may also be evaluated by oral viva during the lab.
Plagiarism:	Collaboration and group work is encouraged but each student is required to submit his/her own contribution(s). Your writings must be your own thoughts. You must cite and acknowledge all sources of information in your assignments. Cheating and plagiarism will not be tolerated and will lead to strict penalties including zero marks in assignments as well as referral to the Dean for appropriate action(s).