



Spring Term

Basic Information:

Title:	Database Management System	Code	IT-261
Program:	BBIT	Credit Hours:	Three (03)
Sessions:	30 Classes + Mid Term + Final Term	Pre-Requisite:	IT 161

Course Description:

Databases are part of our everyday life. Whether we are accessing our bank accounts, paying bills, searching the Web or calling a call center, our requests are most likely posted to a database management system. IT-0261 is the course offered to the students of BBIT at Institute of Business & Information Technology of University of the Punjab. It teaches a paradigm shift from "computation" to "information" and covers some of the core concepts on data structuring and querying. It covers fundamentals of database architecture, database management systems, and database systems, Principles and methodologies of database design, and techniques for database application development.

Learning Outcomes:

After the completion of this course, it is expected that students who will involve themselves in the knowledge base working of the course will be capable to

1. Design and Implement a Relational database for real life problems
2. Write Complex Queries and Use SQL Functions
3. Suggest a Centralized Distributed system according to organizational needs
4. Design and implement solutions for the small business organizations

Teaching Learning Methodology:

The formal teaching component of this course consists of: active student participation in and contribution to all forms of teaching and learning i.e. lectures, discussions, research assignments and projects. Lectures will be twice a week of 90 min each.

Group Configurations:

One of the objectives of this course is to encourage and facilitate team work. Class will have to make a group of four for projects and research assignments. It is recommended that student will form their own groups. As a general guideline, your group should have members with diverse skill sets including people who are proficient or have aptitude for different subject areas.

All Groups must submit their team rosters in the form of a memo by the end of 8th week. The memo should include Student Names, and ID numbers of all members and it should also identify a designated group leader who will serve as the primary point of contact for me to communicate with the group.

Weekly Term Plan

Wk	Lecture Topic	Textbook	Activity
01	<i>Introduction to Database Systems</i>		
02	<i>Database Models & Schema</i>	Ch 01	
03	<i>Database Architecture</i>	Ch 02	A-01
04	<i>Relational Model and RDBMS</i>	Ch. 05	Quiz 01
05	<i>Relational Data Model & Relational Database Constraints</i>	Ch. 05	A-02
06	<i>Relational Algebra</i>	Ch. 06	A-03
07	<i>SQL: Schema Definition, Constraints, Queries, Views</i>	Ch. 06	A-04
08	<i>SQL: Triggers, Stored Procedures</i>	Ch. 08	Quiz 02
09	<i>Mid Term Examination</i>		
10	<i>Functional Dependencies</i>	Ch. 10	
11	<i>Normalization for Relational Databases</i>	Ch. 10	A-05
12	<i>Normalization for Relational Databases</i>	Ch. 10	A-06
13	<i>ER Modeling and EER Modeling</i>	Ch. 03	Quiz 03, A07
14	<i>ER to Relational Mapping</i>	Ch 07	A-08
15	<i>EER to Relational Mapping</i>	Ch. 07	Quiz 04
16	<i>Final Term Examination</i>		



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Topics in Detail

Databases

Introducing the Database;
 Field Definitions and Naming Conventions
 Components of DB Applications
 DB Tools; Microsoft Access, Oracle, Informix

Database Systems

Legacy DB Systems
 File Processing Systems
 Hierarchical Model
 Network Model

Database Models

Semantic Data Model
 Relational Model
 Database Models and the Internet

Relational Database Management Systems

A logical view of Data; Entities and Attributes
 Tables and their Characteristics, Keys

Integrity Rules

Entity Integrity
 Referential Integrity
 Relational Database Operators

Relational Algebra

Unary Operations
 Binary Operations
 Cartesian Product
 Set Operations
 SQL Operators
 Relational Algebra and SQL

Structured Query Language

Introduction to DDL and DML
 Data Control Language
 Complex Queries and SQL Functions

Ordering a Listing, Listing Unique Values
 Aggregate Function in SQL, Grouping Data
 Virtual Tables, Views, View Types
 SQL Indexes, Joining Database Tables

Procedural SQL

Triggers
 Stored Procedures
 PL/SQL Stored Functions

Normalization of Database Tables

Need for Normalization
 Conversion to First Normal Form
 Conversion to Second Normal Form
 Conversion to Third Normal Form
 Boyce-Codd Normal Form (BCNF)

Database Life Cycle (DBLC)

Database Initial Study
 Database Design
 Database Design Strategies
 Centralized versus Decentralized Design

Entity Relationship (E-R) Modeling

Basic Modeling Concepts
 Degrees of Data Abstraction
 Association and Cardinality
 Relationship Participation
 Composite Entities, Super Entity and subtypes
 Enhanced Entity Relationship Diagram
 Challenge of Database Design, Conflicting Goals
 Transform ER/EER to Relational Model

Transaction Management

What is a Transaction?
 Evaluating Transaction Results
 Transaction Management with SQL
 Transaction Log, Transaction Types

Text & Recommended Readings

1. Fundamentals of Database Systems
 Ramez Elmasri, Shamkant Navathe
 5th Edition 2009 ISBN: 9788131716250
2. Database Management Systems
 C. J. Dates
 8th Edition, 2001 ISBN 0-901-543432-8
3. Database System Concept
 Peter Rob, Carlos Coronel
 ISBN: 9788131509708
4. Introduction to PL\SQL by Oracle Press

Tools

1. Microsoft Access & Microsoft Visio
2. Oracle
3. PHP
4. Unified Modeling Language
5. Microsoft Word for Documentation
 Headings Arial 11pt Bold
 Normal Text Times New Roman 10pt
 Header Footer Times New Roman 8pt
 Paragraph Single Line Spacing
 First Line Indent 1.0 cm
 Page Margins 2 cm from each side

Assignments:

No	Title	Due Date
A-01	<i>Comparative Analysis of Legacy Database Systems</i>	<i>1st Class of 4th Week</i>
A-02	<i>Relational Model of IBIT Examination System</i>	<i>1st Class of 6th Week</i>
A-03	<i>Query Design with Relational Algebra for Examination System</i>	<i>1st Class of 7th Week</i>
A-04	<i>Comprehensive Query Design using Relational Algebra Operators</i>	<i>1st Class of 8th Week</i>
A-05	<i>Normalization of Purposed System</i>	<i>1st Class of 12th Week</i>
A-06	<i>Comprehensive Normalization</i>	<i>1st Class of 13th Week</i>
A-07	<i>Complete Project Design Document</i>	<i>Last Friday of 15th Week</i>



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RDBMS Lab

Week	Class Content	Lab Topics	Activity
01.	Database System Concepts and Architecture	Introduction to Microsoft Access, Create Database ⇒ Create Table, Data types, ⇒ DML (insert, delete, update) operations ⇒ Concept of primary key	
02.	Relational Data Model and Relational Database Constraints	More than One table Concept of join and foreign key, Referential Integrity Cascade update and Cascade delete operations Master-Details tables and DML	
03.	The Relational Algebra	Concept of QBE(Query by Example) grid ⇒ Writing Queries using QBE ⇒ Aggregate functions ⇒ Datasheet, SQL and design view	Lab Quiz
04.	The Relational Algebra	Relational Algebra Tool	
05.	The Database Language SQL	ORACLE Introduction and Installation (ORACLE 10g) ⇒ User Login ⇒ Simple Select Statement ⇒ Select and Project operations ⇒ Where clause	
06.	The Database Language SQL	Operators (Arithmetic, Logical, Concatenation) Null value in Expressions Between, In , Like operators Column Alias Sorting (order by clause) Single Row Functions Post Lab Exercise on SQL Basic Queries	
07.	The Database Language SQL: Schema Definition, Constraints	Group functions ⇒ Group By, Having Clause ⇒ Joins & Types ⇒ ANSII vs. Proprietary Syntax	
08.	The Database Language SQL: Schema Definition, Constraints, Queries, and Views, Transactions	Database Concepts ⇒ DDL and DML ⇒ Transactions	Lab Quiz on SQL
09.	Functional Dependencies and Normalization for Relational Databases	Transactions and concurrency Control ⇒ Locking, Commit and Rollback ⇒ Deadlock ⇒ Backup (Import and Export)	
10.	Functional Dependencies and Normalization for Relational Databases	Introduction to PHP ⇒ Xamp installation ⇒ Page Deployment/Port Check And Change	Lab Exam on SQL
11.	Functional Dependencies and Normalization for Relational Databases	Introduction to web server architecture PHP constructs (If, Loops, Assignment, Functions) ⇒ HTML page Development ⇒ HTML forms (get and post method) & Hyperlinks	
12.	ER Modeling Enhanced ER Modeling	⇒ mySQL Introduction ⇒ Database Connectivity with mySQL	Lab Quiz on PHP
13.	ER Modeling Enhanced ER Modeling	Database Connectivity(Login Problem) ⇒ Save, Retrieve, Update using PHP & MySQL ⇒ Data movement between page navigation	
14.	Relational Database Design by ER EER-to-Relational Mapping	⇒ User Level Security and Access Rights ⇒ Relational Modeling using Erwin	



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Grading Policy:

Final Grade for this course will be the cumulated result of the following term work with relevant participation according to the quoted percentage.

Sessional	25%	Mid Term	35%	Final Term	40%
Assignments	10 %	Mid Term Exam	25%	Final Exam	30%
Quizzes	10%	Major Report/Work	10%	Case Study/ Project/ Term Paper	10%
Presentations	05%				

Remember subdivision of Mid Term and Final Term Examination should be done only in extreme cases of very essential and major Grading Instruments.

Dishonest Practices & Plagiarism

Any student found responsible for dishonest practice/cheating (e.g. copying the work of others, use of unauthorized material in Grading Instruments) in relation to any piece of Grading Instrument will face penalties like deduction of marks, grade 'F' in the course, or in extreme cases, suspension and rustication from IBIT.

For details consult Plagiarism Policy of PU at <http://pu.edu.pk/dpcc/downloads/Plagiarism-Policy.pdf>

Grading System:

Letter Grade	Grade Point	Num Equivalence
A	4.00	85 – 100 %
A-	3.70	80 – 84 %
B+	3.30	75 – 79%
B	3.00	70 – 74 %
B-	2.70	65 – 69 %
C+	2.30	61 – 64 %
C	2.00	58 – 60 %
C-	1.70	55 – 57 %
D	1.00	50 – 54 %
F	0.00	Below 50 %
I	Incomplete	*
W	Withdraw	*

Norms to Course:

- ✓ Submission Date and Time for the term instruments is always **Un-Extendable**
- ✓ 5 Absentees in class will result in forced withdrawal. **(PU Policy)**
- ✓ Re-sit in Mid and Final Term will cause you a loss of 2 and 3 grade marks respectively. **(PU Policy)**
- ✓ This is your responsibility to keep track of your position in class evaluation units.
- ✓ After the submission date, NO excuse will be entertained.
- ✓ **Keep a copy of all submitted Grading Instruments.**
- ✓ Assignment is acceptable only in its Entirety.
- ✓ No make up for any assignment and quiz.
- ✓ Copied & Shared work will score Zero.
- ✓ Assignments are Individual.

Good Luck
 For the Spring Term