

B.Sc. with Computer Science Syllabus

III Semester, DSC 1C

Database Management System

Unit I

Introduction: Database-System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Database Users and Administrators.

Introduction to the Relational Model: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.

Unit II

Database Design and the E-R Model: Overview of the Design Process, The Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues, Extended E-R Features, Alternative Notations for Modeling Data, Other Aspects of Database Design.

Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional-Dependency Theory, Decomposition Using Multivalued Dependencies, More Normal Forms, Database-Design Process.

Unit III

Database-System Architectures: Centralized and Client –Server Architectures, Server System Architectures, Parallel Systems, Distributed Systems, Network Types.

Introduction to SQL: Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Subqueries, Modification of the Database.

Unit IV

Intermediate SQL: Join Expressions, Views, Transactions, Integrity Constraints, SQL Data Types and Schemas, Authorization.

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Advanced SQL: Accessing SQL From a Programming Language, Functions and Procedures, Triggers, Recursive Queries.

Text book:

1. A. Silberschatz, H. Korth and S. Sudarshan, *Database System Concepts*, 6th Ed., Tata McGraw Hill, 2011

References:

1. J. Morrison, M. Morrison and R. Conrad, *Guide to Oracle 10g*, Thomson Learning, 2005.
2. Loney and Koch, *Oracle 10g: The Complete Reference*, Tata McGraw Hill, 2006.
3. David Flanagan, Java Script, *The Definitive Guide*, O'Reilly Media, 2006.
4. Marty Hall, Larry Brown, and Yaakov Chaikin, *Core Servlets and Java Server Pages: Core Technologies* (Vol. II), 2nd Ed., Sun Microsystems Press, 2006.
5. S.K. Singh, *Database Systems Concepts, Design and Applications*, Pearson Education 2006.
6. Spoken Tutorial on "MySQL" as E-resource for Learning:- <http://spoken-tutorial.org>

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Practical: Database Management System

NOTE:

- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25 – 30.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

Example programs:

1. Create a database having two tables with the specified fields, to computerize a library system of a Delhi University College.

LibraryBooks (Accession number, Title, Author, Department, PurchaseDate, Price)

IssuedBooks (Accession number, Borrower)

- a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
 - b) Delete the record of book titled “Database System Concepts”.
 - c) Change the Department of the book titled “Discrete Maths” to “CS”.
 - d) List all books that belong to “CS” department.
 - e) List all books that belong to “CS” department and are written by author “Navathe”.
 - f) List all computer (Department=“CS”) that have been issued.
 - g) List all books which have a price less than 500 or purchased between “01/01/1999” and “01/01/2004”.
2. Create a database having three tables to store the details of students of Computer Department in your college.

Personal information about Student (College roll number, Name of student, Date of birth, Address, Marks(rounded off to whole number) in percentage at 10 + 2, Phone number)

Paper Details (Paper code, Name of the Paper)

Student’s Academic and Attendance details (College roll number, Paper code, Attendance, Marks in home examination).

- a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
 - b) Design a query that will return the records (from the second table) along with the name of student from the first table, related to students who have more than 75% attendance and more than 60% marks in paper 2.
 - c) List all students who live in “Delhi” and have marks greater than 60 in paper 1.
 - d) Find the total attendance and total marks obtained by each student.
 - e) List the name of student who has got the highest marks in paper 2.
3. Create the following tables and answer the queries given below:

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Customer (CustID, email, Name, Phone, ReferrerID)

Bicycle (BicycleID, DatePurchased, Color, CustID, ModelNo)

BicycleModel (ModelNo, Manufacturer, Style)

Service (StartDate, BicycleID, EndDate)

- a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
 - b) List all the customers who have the bicycles manufactured by manufacturer "Honda".
 - c) List the bicycles purchased by the customers who have been referred by customer "C1".
 - d) List the manufacturer of red colored bicycles.
 - e) List the models of the bicycles given for service.
4. Create the following tables, enter at least 5 records in each table and answer the queries given below.

EMPLOYEE (Person_Name, Street, City)

WORKS (Person_Name, Company_Name, Salary)

COMPANY (Company_Name, City)

MANAGES (Person_Name, Manager_Name)

- a) Identify primary and foreign keys.
 - b) Alter table employee, add a column "email" of type varchar(20).
 - c) Find the name of all managers who work for both Samba Bank and NCB Bank.
 - d) Find the names, street address and cities of residence and salary of all employees who work for "Samba Bank" and earn more than \$10,000.
 - e) Find the names of all employees who live in the same city as the company for which they work.
 - f) Find the highest salary, lowest salary and average salary paid by each company.
 - g) Find the sum of salary and number of employees in each company.
 - h) Find the name of the company that pays highest salary.
5. Create the following tables, enter at least 5 records in each table and answer the queries given below.

Suppliers (SNo, Sname, Status, SCity)

Parts (PNo, Pname, Colour, Weight, City)

Project (JNo, Jname, Jcity)

Shipment (Sno, Pno, Jno, Qunatity)

- a) Identify primary and foreign keys.
- b) Get supplier numbers for suppliers in Paris with status>20.
- c) Get suppliers details for suppliers who supply part P2. Display the supplier list in increasing order of supplier numbers.
- d) Get suppliers names for suppliers who do not supply part P2.
- e) For each shipment get full shipment details, including total shipment weights.
- f) Get all the shipments where the quantity is in the range 300 to 750 inclusive.

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- g) Get part nos. for parts that either weigh more than 16 pounds or are supplied by suppliers S2, or both.
- h) Get the names of cities that store more than five red parts.
- i) Get full details of parts supplied by a supplier in Delhi.
- j) Get part numbers for part supplied by a supplier in Allahabad to a project in Chennai.
- k) Get the total number of project supplied by a supplier (say, S1).
- l) Get the total quantity of a part (say, P1) supplied by a supplier (say, S1).