**A Theory (60 Hours)** **4 Credits**

1. **Introduction** (6 L)

   Characteristics of database approach, data models, database system architecture and data independence.

2. **Entity Relationship(ER) Modelling** (8 L)

   Entity types, relationships, constraints.

3. **Relation data model** (20 L)

   Relational model concepts, relational constraints, relational algebra, SQL queries.

4. **Database design** (15 L)

   Mapping ER/EER model to relational database, functional dependencies, Lossless decomposition, Normal forms (upto BCNF).

5. **Transaction Processing** (3 L)

   ACID properties, concurrency control.

6. **File Structure and Indexing** (8 L)

   Operations on files, File of Unordered and ordered records, overview of File organizations, Indexing structures for files ( Primary index, secondary index, clustering index), Multilevel indexing using B and B+ trees.

**B Practical (60 Hours)** **2 Credits**

Create and use the following database schema to answer the given queries.

EMPLOYEE Schema

| Field | Type | NULL | KEY | DEFAULT |
|---|---|---|---|---|
| Eno | Char(3) | No | PRI | NIL |
| Ename | Varchar(50) | No | | NIL |
| Job_type | Varchar(50) | No | | NIL |
| Manager | Char(3) | Yes | FK | NIL |
| Hire_date | Date | No | | NIL |
| Dno | Integer | Yes | FK | NIL |
| Commission | Decimal(10,2) | Yes | | NIL |
| Salary | Decimal(7,2) | No | | NIL |

DEPARTMENT Schema

| Field | Type | NULL | KEY | DEFAULT |
|---|---|---|---|---|
| Dno | Integer | No | PRI | NULL |
| Dname | Varchar(50) | Yes | | NULL |
| Location | Varchar(50) | Yes | | New Delhi |

Query List

1. Query to display Employee Name, Job, Hire Date, Employee Number; for each employee with the Employee Number appearing first.
2. Query to display unique Jobs from the Employee Table.
3. Query to display the Employee Name concatenated by a Job separated by a comma.
4. Query to display all the data from the Employee Table. Separate each Column by a comma and name the said column as THE_OUTPUT.
5. Query to display the Employee Name and Salary of all the employees earning more than $2850.
6. Query to display Employee Name and Department Number for the Employee No= 7900.
7. Query to display Employee Name and Salary for all employees whose salary is not in the range of $1500 and $2850.
8. Query to display Employee Name and Department No. of all the employees in Dept 10 and Dept 30 in the alphabetical order by name.
9. Query to display Name and Hire Date of every Employee who was hired in 1981.
10. Query to display Name and Job of all employees who don't have a current Manager.
11. Query to display the Name, Salary and Commission for all the employees who earn commission.
12. Sort the data in descending order of Salary and Commission.
13. Query to display Name of all the employees where the third letter of their name is A.
14. Query to display Name of all employees either have two R's or have two A's in their name and are either in Dept No = 30 or their Manger's Employee No = 7788.
15. Query to display Name, Salary and Commission for all employees whose Commission Amount is 14 greater than their Salary increased by 5%.
16. Query to display the Current Date.
17. Query to display Name, Hire Date and Salary Review Date which is the 1st Monday after six months of employment.
18. Query to display Name and calculate the number of months between today and the date each employee was hired.
19. Query to display the following for each employee <E-Name> earns < Salary> monthly but wants < 3 * Current Salary >. Label the Column as Dream Salary.
20. Query to display Name with the 1st letter capitalized and all other letter lower case and length

of their name of all the employees whose name starts with 'J', 'A' and 'M'.

21. Query to display Name, Hire Date and Day of the week on which the employee started.
22. Query to display Name, Department Name and Department No for all the employees.
23. Query to display Unique Listing of all Jobs that are in Department # 30.
24. Query to display Name, Dept Name of all employees who have an 'A' in their name.
25. Query to display Name, Job, Department No. And Department Name for all the employees working at the Dallas location.
26. Query to display Name and Employee no. Along with their Manger's Name and the Manager's employee no; along with the Employees' Name who do not have a Manager.
27. Query to display Name, Dept No. And Salary of any employee whose department No. and salary matches both the department no. And the salary of any employee who earns a commission.
28. Query to display Name and Salaries represented by asterisks, where each asterisk (*) signifies
29. $100.
30. Query to display the Highest, Lowest, Sum and Average Salaries of all the employees
31. Query to display the number of employees performing the same Job type functions.
32. Query to display the no. of managers without listing their names.
33. Query to display the Department Name, Location Name, No. of Employees and the average salary for all employees in that department.
34. Query to display Name and Hire Date for all employees in the same dept. as Blake.
35. Query to display the Employee No. And Name for all employees who earn more than the average salary.
36. Query to display Employee Number and Name for all employees who work in a department with any employee whose name contains a 'T'.
37. Query to display the names and salaries of all employees who report to King.
38. Query to display the department no, name and job for all employees in the Sales department.

**Course Outcomes:**

| CO No. | Course Outcomes | Cognitive Level | PO Addressed | PSO Addressed |
|---|---|---|---|---|
| CO1 | Ability to define the database systems and database management systems software, formulate, using SQL, solutions to a broad range of query and data update problems | R(1) | PO1 | PSO1 |

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| | | | | |
|---|---|---|---|---|
| CO2 | Ability to understand the basics of transaction processing and concurrency control and understand the database storage structures and access techniques. | U(2) | PO2 | PSO1<br>PSO2 |
| CO3 | Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database. | Ap(3) | PO3 | PSO2 |
| CO4 | Compare, contrast and analyse the various emerging technologies for database systems. | An(4) | PO4 | PSO3<br>PSO4 |
| CO5 | Analyse strengths and weaknesses of the applications of database technologies to various subject areas. | E(5) | PO4 | PSO4 |
| CO6 | Ability to model data in applications using conceptual modelling tools such as ER Diagrams and design data base schemas based on the model. | C(6) | PO6 | PSO6 |

R= remembering, U = understanding, Ap = applying, An = analysing, E = evaluating, and C = creating

**Reference Books**


1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
2. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002.
3. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010.
4. R. Elmasri, S.B. Navathe Database Systems Models, Languages, Design and application Programming, 6th Edition, Pearson Education, 2013.


| **SEMESTER- V** |
|---|
| Name of the course: **Internet Technologies** →100% modification |
| Course code: **UGCMSCC11** |
| Total Class Hours: **120** Credit: **4+2 (Theory & Lab)** |

**Course Objectives:**

1. Knowledge of the design and functionality of Internet and the issues related to it.
2. Capability to develop basic webpages and other internet based services.

**SYLLABUS**

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|---|---|---|---|---|
| CO4 | software engineering teams. | | | PSO5 |
| CO5 | Ability to develop efficient, reliable, robust and cost-effective software solutions. | C(6) | PO6 | PSO6 |

R = remembering, U = understanding, Ap = applying, An = analysing, E = evaluating, and C = creating

**Reference Books**


1. R.S. Pressman, Software Engineering: A Practitioner's Approach (7th Edition), McGraw-Hill, 2009.
2. P. Jalote, An Integrated Approach to Software Engineering (2nd Edition), Narosa Publishing House, 2003.
3. K.K. Aggarwal and Y. Singh, Software Engineering (2nd Edition), New Age International Publishers, 2008.
4. I. Sommerville, Software Engineering (8th edition), Addison Wesley, 2006.
5. D. Bell, Software Engineering for Students (4th Edition), Addison-Wesley, 2005.
6. R. Mall, Fundamentals of Software Engineering (2nd Edition), Prentice-Hall of India, 2004.


| SEMESTER- IV |
|---|
| Name of the course: **Database Management Systems** → 100% modification |
| Course code: **UGCMSCC10** (MAC7) |
| Total Class Hours: **120** Credit: **4+2 (Theory & Lab)** |

**Course Objectives:**

1. Gain knowledge of database systems and database management systems software, formulate, using SQL, solutions to a broad range of query and data update problems.
2. Be acquainted with the basics of transaction processing and concurrency control and understand the database storage structures and access techniques.
3. Understanding of normalization theory and apply such knowledge to the normalization of a database.

**SYLLABUS**

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