**UNIT-I**

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| **Lecture No.** | Topics to be Covered | CO Mapped |
| 1 | Database & Database users and basics of SQL, characteristics and advantages of the database,  Database systems, concepts and architecture | CO1 |
| 2 | Data models, schemas & instances, Codd’s Rule | CO1 |
| 3 | Three-Schema architecture & data independence | CO1 |
| 4 | Database languages & interfaces, Centralized and Client/Server Architecture of DBMS | CO1 |
| 5 | Classification of DBMS | CO1 |
| 6 | ER Diagrams | CO1 |
| 7 | EER Diagrams | CO1 |
| 8 | Mapping of ER and EER Model to Relations | CO1 |

**UNIT-II**

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| **Lecture No.** | **Topics to be Covered** | **CO Mapped** |
| 9 | Relational model Concepts, Relational model constraint & relational database schemas,  transactions, and dealing with constraint Violation, | CO3 |
| 10 | DBMS Keys | CO3 |
| 11 | Relational Algebra, Unary relational operation, Binary relational operations and,  relational algebra operations from set Theory | CO3 |
| 12 | Relational Calculus; and implementation in SQL | CO3 |
| 13 | Informal Design guideline for relational Schemas, Functional Dependencies,  Normal forms based on primary keys, (1NF, 2NF, 3NF & BCNF) | CO3, CO4 |
| 14 | lossless join and dependency preserving decomposition,  Multivalued dependencies (4NF, 5NF), domain key normal form | CO3, CO4 |

**UNIT-III**

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| **Lecture No.** | **Topics to be Covered** | **CO Mapped** |
| 15 | DBMS Instance, DBMS Internal Memory Structure, Background Processes,  Data Types, Roles & Privileges | CO3 |
| 16 | Introduction to Query Processing | CO3 |
| 17 | Translating SQL Queries into Relational Algebra | CO3 |
| 18 | Translating Relational Algebra into SQL Queries | CO3 |
| 19 | Algorithms for External Sorting | CO3 |
| 20 | Algorithms for SELECT and JOIN Operations | CO3 |
| 21 | Algorithms for PROJECT and SET Operations | CO3 |
| 22 | Implementing Aggregate Operations and Outer Joins | CO3 |

**UNIT-IV**

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| **Lecture No.** | **Topics to be Covered** | **CO Mapped** |
| 23 | Introduction, Secondary Storage Devices,  Buffering of Blocks and Placing File Records on Disk, Operations on Files | CO2 |
| 24 | Heap Files, Sorted Files | CO2 |
| 25 | Hashing Techniques | CO2 |
| 26 | Parallelizing Disk Access using RAID Technology | CO2 |
| 27 | Secondary Access Paths, Types of Single-Level Ordered Indexes | CO2 |
| 28 | Multilevel Indexes, Dynamic Multilevel Indexes Using B-Trees and B+ Trees | CO2 |
| 29 | Indexes on Multiple Keys | CO2 |

**UNIT-V**

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| **Lecture No.** | **Topics to be Covered** | **CO Mapped** |
| 30 | Introduction to Transaction Processing, Transaction and System Concepts | CO5 |
| 31 | Desirable Properties of Transactions | CO5 |
| 32 | Characterizing Schedules based on Recoverability | CO5 |
| 33 | Characterizing Schedules based on Serializability | CO5 |
| 34 | Introduction to Concurrency Control | CO5 |
| 35 | Two Phase Locking Techniques | CO5 |
| 36 | Concurrency Control on Timestamp Ordering | CO5 |
| 37 | Validation Concurrency Control Techniques | CO5 |
| 38 | Granularity of Data items | CO5 |
| 39 | Multiple Granularity Locking,  Recovery Concepts, Recovery Techniques Based on Deferred and Immediate Update | CO5 |
| 40 | Shadow Paging | CO5 |

**UNIT-VI**

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| **Lecture No.** | **Topics to be Covered** | **CO Mapped** |
| 41 | Overview of Object-Oriented Concepts, Object Model of ODMG,  Object Definition Language, Object Query Language | CO6 |
| 42 | Object Database Conceptual Design, Distributed Database Concepts | CO6 |
| 43 | Data Fragmentation, Replication and Allocation Techniques for Distributed Design | CO6 |
| 44 | Types of Distributed Database Systems | CO6 |
| 45 | Query Processing in Distributed Databases,  Overview of Concurrency Control and recovery techniques in Distributed Databases | CO6 |

\*Green highlighted lectures are in asynchronous mode.

**ASYNCHRONOUS SESSION PLAN**

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| Session Plan | | |
| Lect. | Topics to be Covered | CO-Mapped |
| 1 | Centralized and Client/Server Architecture of DBMS | CO1 |
| 2 | Classification of DBMS | CO1 |
| 3 | EER Diagrams | CO1 |
| 4 | Multivalued dependencies (4NF, 5NF), domain key normal form | CO3,CO4 |
| 5 | DBMS Instance, DBMS Internal Memory Structure, Background Processes,  Data Types, Roles & Privileges | CO3 |
| 6 | Algorithms for PROJECT and SET Operations | CO3 |
| 7 | Implementing Aggregate Operations and Outer Joins | CO3 |
| 8 | Hashing Techniques | CO2 |
| 9 | Parallelizing Disk Access using RAID Technology | CO2 |
| 10 | Indexes on Multiple Keys | CO2 |
| 11 | Multiple Granularity Locking,  Recovery Concepts, Recovery Techniques Based on Deferred and Immediate Update | CO5 |
| 12 | Shadow Paging | CO5 |
| 13 | Overview of Object-Oriented Concepts, Object Model of ODMG,  Object Definition Language, Object Query Language | CO6 |
| 14 | Types of Distributed Database Systems | CO6 |
| 15 | Query Processing in Distributed Databases,  Overview of Concurrency Control and recovery techniques in Distributed Databases | CO6 |

Signature of Faculty Date: