**COURSE FILE**

**Course Title and Code: Database Management Systems** (CS1133)

Name of the Faculty: Dr. S.Taruna

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| Hours per Week | **L-T-P: 3-0-2** |
| Credits | **4** |
| Students who can take | B.Tech. III Sem |
| Prerequisites | None |
| Weightage | Theory 55% Lab 45% |
| **Course Objective:** This course aims to introduce the concepts of databases and database management systems. At the end of the course, students will have a good understanding of relational data model, relational query languages, database processing, SQL, transaction management and database recovery. | |
| **Learning Outcome:**  On successful completion of this course, the students should be able to:   1. Understand data and relational database concepts 2. Model high level system requirements using conceptual modelling (ER) 3. Develop relational and physical database design 4. Compose queries using SQL 5. Apply Transactions to a real application 6. Understand algorithms and techniques to recover from data loss | |

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| **Evaluation Scheme** | |  |
| **Sr. No** | **Specifications** | **Marks** |
| 1 | **Attendance** | **05** |
| 2 | **Assignment** | **10** |
| 3 | Class Participation | Nil |
| 4 | **Quiz** | **10** |
| 5 | Theory Exam-I | **Nil** |
| 6 | **Theory Exam-II** | **15** |
| 7 | **Theory Exam-III** | **30** |
| 8 | Report-I | Nil |
| 9 | Report-II | Nil |
| 10 | Report-III | Nil |
| 11 | **Project-I (Presentation, Report, Viva)** | **20** |
| 12 | Project-II | Nil |
| 13 | Project-III | Nil |
| 14 | **Lab Evaluation-I (Continuous)** | **10** |
| 15 | Lab Evaluation-II (Exam) | Nil |
| 16 | Course Portfolio | Nil |
| 17 | Presentation | Nil |
| 18 | Viva | Nil |
|  | **Total (100)** | **100** |

**Course Contents:**

Unit 1: Introductory Concepts of Data - Transactional, Analytical and Master Data, Structured, Unstructured and Semi Structured Data, Data file and Database - Data File systems versus Database, Database system concepts and architecture along with logical database and physical database concepts. (3 hr)

Unit 2: Conceptual Database Design - High-level conceptual modeling, ER Modeling concepts, ER Diagrams, Cardinality constraints, Higher-order relationships: Aggregate and Specialization, ER to relational mapping. ( 6 hr)

Unit 3: Querying Relational Data: Structured Query Language - data definition language, integrity constraints, data manipulation language, data control language. Simple queries, queries using Joins, using aggregate functions. Joins - inner, left outer, right outer, full outer and cross joins. Updates and updates with joins, Relational Algebra and Relational Calculus. ( 10 hrs)

Unit 4: Relational Schema Refinement and Normal Forms - Functional dependencies, Armstrong Axioms, Concept of Closure: Attribute and FD, Normal forms upto Boyce-Codd Normal Forms . ( 8 hrs)

Unit 5: Physical Database Design, Transaction Processing and Concurrency Control - ACID properties, Transaction states, Concurrency issues, Conflict-serializability, View serializability, Concurrency control: Locking, Time stamp ordering, Cascading rollbacks, Deadlocks and starvation, Database Recovery Techniques. ( 9 hrs)

**Text Books:**

1. Henry F. Korth, Abraham Silberschatz, S. Sudarshan, Database System Concepts, 6th edtion, Tata McGraw Hill 2013, ISBN-10: 9332901384)
2. R. Elmasri and S. B. Navathe, Fundamentals of Database Systems, 6th edition, Pearson Education
3. R. Ramakrishnan and J. Gehrke, Database Management Systems, 3rd edition, McGraw Hill, 2014, ISBN-10: 9339213114.

**Reference Online Course:**

1. Introduction to Databases by Meta – Coursera: [Introduction to Databases Course (Meta) | Coursera](https://www.coursera.org/learn/introduction-to-databases)
2. The Structured Query Language (SQL) – Coursera: [The Structured Query Language (SQL) | Coursera](https://www.coursera.org/learn/the-structured-query-language-sql)

**Course Articulation Matrix: (Mapping of COs with POs)**

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| **CO** |  | | | **CORRELATION WITH PROGRAM OUTCOMES** | | | | | | | | | |  |  | **CORRELATI** **ON WITH**  **PROGRAM SPECIFIC**  **OUTCOMES** | |
|  | PO 1 | PO  2a | PO  2b | PO  2c | PO  3a | PO  3b | PO  3c | PO  4a | PO  4b | PO  4c | PO  5a | PO  5b | PO  6 | PO  7a | PO  7b | PSO  1 | PSO 2 |
| CS1106.1 | 1 |  |  |  |  |  |  |  |  |  |  |  |  | 1 |  |  |  |
| CS1106.2 | 1 |  | 1 |  |  | 2 |  | 2 |  |  | 1 |  | 2 |  |  | 2 | 2 |
| CS1106.3 | 1 |  |  |  | 1 | 2 | 1 |  | 1 |  |  | 1 |  |  |  | 2 |  |
| CS1106.4 | 1 |  | 2 |  |  |  |  |  |  | 2 |  |  |  |  | 2 |  |  |
| CS1106.5 | 1 | 1 |  | 1 | 2 |  | 1 |  | 1 |  |  | 2 |  | 1 |  | 1 | 2 |
| CS1106.6 | 1 |  |  |  |  | 1 |  |  |  | 2 | 1 | 1 |  |  | 2 | 1 |  |

**1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**