



**BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE**  
(An AUTONOMOUS INSTITUTION, APPROVED BY AICTE-NEW DELHI, PERMANENTLY  
AFFILIATED TO JNTUK-KAKINADA, ACCREDITED BY NAAC 'A' GRADE,  
2 PROGRAMMES (CSE,EEE) ACCREDITED BY NBA ( For A.Y 2023-24 to 2025-26)  
Post Box: 26, Amalapuram 533201, Dr.B R Ambedkar Konaseema Dt., A.P.

**BR23-CSE II YEAR II SEMESTER SYLLABUS**

II Year II Semester

**DATABASE MANAGEMENT SYSTEMS**  
(Common to CSE, INF, AI & ML Branches)  
(23CS4T05)

L	T	P	C
3	0	0	3

**Course Objectives:**

The main objectives of the course is to

- Introduce database management systems and to give a good formal foundation on the relational model of data and usage of Relational Algebra
- Introduce the concepts of basic SQL as a universal Database language
- Demonstrate the principles behind systematic database design approaches by covering conceptual design, logical design through normalization
- Provide an overview of physical design of a database system, by discussing Database indexing techniques and storage techniques

**Course Outcomes:**

- Illustrate basic concepts of database management systems through Entity-Relationship diagrams (UNDERSTAND)
- Interpret relational model of data and usage of Relational Algebra (APPLY)
- Practice the concepts of basic SQL as a Universal Data base Language (APPLY)
- Demonstrate the principles behind systematic database design through normalization (APPLY)
- Structure the physical design of a Database system by means of indexing and storage techniques for database (ANALYZE)

				M.L. Haritha	
Dr.N.Rama Krishnaiah, Professor of CSE,UCEK & Control of Examination JNTUK, kakinada.	Dr.C.Krishna Mohan, Professor of CSE,IIT, Kandi, Hyderabad.	Dr.P.Radha Krishna, Professor of CSE,NIT, Warangal	Mr.Rajesh Bobburi Chief Operating Officer, HighQ Labs Private Limited, Rajahmundry	Dr.Lakshmi Haritha Medida, Associate Professor, R.M.K.Engineering College,Kavaraipettai ,Tamilnadu	Dr.K.Srinivas Professor & HoD Department CSE, B.V.C.I.T.S, Batlapalem



**BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE**  
(An AUTONOMOUS INSTITUTION, APPROVED BY AICTE-NEW DELHI, PERMANENTLY  
AFFILIATED TO JNTUK-KAKINADA, ACCREDITED BY NAAC 'A' GRADE,  
2 PROGRAMMES (CSE,EEE) ACCREDITED BY NBA ( For A.Y 2023-24 to 2025-26)  
Post Box: 26, Amalapuram 533201, Dr.B R Ambedkar Konaseema Dt., A.P.

**UNIT I:**

Introduction: Database system, Characteristics (Database Vs File System), Database Users, Advantages of Database systems, Database applications. Brief introduction of different Data Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure, environment, Centralized and Client Server architecture for the database.

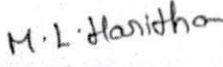
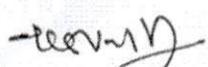
Entity Relationship Model: Introduction, Representation of entities, attributes, entity set, relationship, relationship set, constraints, sub classes, super class, inheritance, specialization, generalization using ER Diagrams.

**UNIT II:**

Relational Model: Introduction to relational model, concepts of domain, attribute, tuple, relation, importance of null values, constraints (Domain, Key constraints, integrity constraints) and their importance, Relational Algebra, Relational Calculus. BASIC SQL: Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update).

**UNIT III:**

SQL: Basic SQL querying (select and project) using where clause, arithmetic & logical operations, SQL functions (Date and Time, Numeric, String conversion). Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering, implementation of different types of joins, view (updatable and non-updatable), relational set operations.

					
Dr.N.Rama Krishnaiah, Professor of CSE,UCEK & Control of Examination JNTUK, kakinada.	Dr.C.Krishna Mohan, Professor of CSE,IIT, Kandi, Hyderabad.	Dr.P.Radha Krishna, Professor of CSE,NIT, Warangal	Mr.Rajesh Bobburi Chief Operating Officer, HighQ Labs Private Limited, Rajahmundry	Dr.Lakshmi Haritha Medida, Associate Professor, R.M.K.Engineering College,Kavaraipettai ,Tamilnadu	Dr.K.Srinivas Professor & HoD Department CSE, B.V.C.I.T.S, Ballapalem



**BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE**  
(An AUTONOMOUS INSTITUTION, APPROVED BY AICTE-NEW DELHI, PERMANENTLY  
AFFILIATED TO JNTUK-KAKINADA, ACCREDITED BY NAAC 'A' GRADE,  
2 PROGRAMMES (CSE,EEE) ACCREDITED BY NBA ( For A.Y 2023-24 to 2025-26)  
Post Box: 26, Amalapuram 533201, Dr.B R Ambedkar Konaseema Dt., A.P.

**UNIT IV:**

Schema Refinement (Normalization): Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency Lossless join and dependency preserving decomposition, (1NF, 2NF and 3NF), concept of surrogate key, Boyce-Codd normal form (BCNF), MVD, Fourth normal form (4NF), Fifth Normal Form (5NF).

**UNIT V:**

Transaction Concept: Transaction State, ACID properties, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for Serializability, lock based, time stamp based, optimistic, concurrency protocols, Deadlocks, Failure Classification, Storage, Recovery and Atomicity, Recovery algorithm.

Introduction to Indexing Techniques: B+ Trees, operations on B+ Trees, Hash Based Indexing:

**Text Books:**

- 1) Database Management Systems, 3<sup>rd</sup> edition, Raghurama Krishnan, Johannes Gehrke, TMH (For Chapters 2, 3, 4)
- 2) Database System Concepts, 5<sup>th</sup> edition, Silberschatz, Korth, Sudarsan, TMH (For Chapter 1 and Chapter 5)

				M. L. Haritha	
Dr. N. Rama Krishnaiah, Professor of CSE, UCEK & Control of Examination JNTUK, Kakinada.	Dr. C. Krishna Mohan, Professor of CSE, IIT, Kandi, Hyderabad.	Dr. P. Radha Krishna, Professor of CSE, NIT, Warangal	Mr. Rajesh Bobburi Chief Operating Officer, HighQ Labs Private Limited, Rajahmundry	Dr. Lakshmi Haritha Medida, Associate Professor, R.M.K. Engineering College, Kavaraipettai, Tamilnadu	Dr. K. Srinivas Professor & HoD Department CSE, B.V.C.I.T.S, Batlapalem



## BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

(An AUTONOMOUS INSTITUTION, APPROVED BY AICTE-NEW DELHI, PERMANENTLY  
AFFILIATED TO JNTUK-KAKINADA, ACCREDITED BY NAAC 'A' GRADE,  
2 PROGRAMMES (CSE,EEE) ACCREDITED BY NBA ( For A.Y 2023-24 to 2025-26)  
Post Box: 26, Amalapuram 533201, Dr.B R Ambedkar Konaseema Dt., A.P.

### Reference Books:

- 1) Introduction to Database Systems, 8<sup>th</sup> edition, C J Date, Pearson.
- 2) Database Management System, 6<sup>th</sup> edition, RamezElmasri, Shamkant B. Navathe, Pearson
- 3) Database Principles Fundamentals of Design Implementation and Management, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning.

### Web-Resources:

- 1) <https://nptel.ac.in/courses/106/105/106105175/>
- 2) [https://infyspringboard.onwingspan.com/web/en/app/toc/lex\\_auth\\_01275806667282022456\\_shared/overview](https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01275806667282022456_shared/overview)

				H. L. Haritha	
Dr.N.Rama Krishnaiah, Professor of CSE,UCEK & Control of Examination JNTUK, Kakinada.	Dr.C.Krishna Mohan, Professor of CSE,IIT, Kandi, Hyderabad.	Dr.P.Radha Krishna, Professor of CSE,NIT, Warangal	Mr.Rajesh Bobburi Chief Operating Officer, HighQ Labs Private Limited, Rajahmundry	Dr.Lakshmi Haritha Medida, Associate Professor, R.M.K.Engineering College,Kavaraipettai ,Tamilnadu	Dr.K.Srinivasa Professor & HoD Department CSE, B.V.C.I.T.S. Batlapalem