

**Syllabus for Third Year B.Tech Program in Computer Engineering- Semester V (Autonomous)**  
(Academic Year 2021-2022)

Program: Third Year B.Tech. in Computer Engineering							Semester : V		
Course : Advanced Database Management System							Course Code: DJ19CEEC5012		
Course : Advanced Database Management System Laboratory							Course Code: DJ19CEEL5012		
Teaching Scheme  (Hours / week)				Evaluation Scheme					
				Semester End Examination Marks (A)			Continuous Assessment Marks (B)		
Lectures	Practical	Tutorial	Total Credits	Theory			Term Test 1	Term Test 2	Avg.
				75			25	25	25
				Laboratory Examination			Term work		Total Term work
3	2	-	4	Oral	Practical	Oral &Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal	
				-	-	25	15	10	25
50									

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<b>Detailed Syllabus: (unit wise)</b>		
<b>Unit</b>	<b>Description</b>	<b>Duration</b>
<b>1</b>	<b>Advance Databases</b> Indexing and Hashing: Types of Single-Level Ordered Indexes; Multilevel Indexes; Dynamic Multilevel Indexes Using B-Trees and B+-Trees; New database applications and architectures: e.g., Data Warehousing; Multimedia database; Mobility database; NoSQL, Native XML databases (NXD), Document orientated databases, Graph database, Federated Databases	<b>06</b>
<b>2</b>	<b>Query processing and Optimization</b> Query Processing: Overview, Measures of Query cost, Selection operation, Sorting, Join Operations, and other Operations, Evaluation of Expression Query Optimization: Translations of SQL Queries into relational algebra, Heuristic approach and cost-based optimization	<b>08</b>
<b>3</b>	<b>Distributed Databases</b> Introduction: Types of Distributed Database Systems, Distributed Database Architectures Distributed Database Design: Data Fragmentation, Replication and Allocation Techniques Distributed Query Processing (Semi join) Transaction Management, Concurrency Control (locking) and Recovery in Distributed Databases	<b>08</b>
<b>4</b>	<b>Document oriented database</b> Object Oriented Database: Need of object-oriented database, Impedance matching problem between OO languages and Relational database, Case study db4O Document Oriented Database: Need of Document Oriented database, difference between Document Oriented Database and Traditional database, Types of encoding XML, JSON, BSON, Representation XML, Json Objects. Case study on doc oriented based such a Mariadb	<b>08</b>
<b>5</b>	<b>Advanced data models</b> Temporal data models: Aspects of valid time, Bitemporal time and bi-temporal time with examples of each. Spatial model: Types of spatial data models - Raster, Vector and Image MYSQL Postgres, Mobile databases	<b>06</b>
<b>6</b>	<b>Data Security</b> Introduction to Database Security Issues; Authentication and authorization, Database auditing, Discretionary Access Control Based on Granting and Revoking Privileges, Mandatory Access Control and Role-Based Access Control for Multilevel Security Introduction to Statistical Database Security	<b>06</b>

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### Books Recommended:

#### Text books:

1. Elmasri&Navathe, “Fundamentals of Database Systems” IV edition. PEARSON Education.
2. Korth, Silberschatzsudarshan, “Database systems, concepts” 5th edition McGraw Hill
3. Raghu Ramkrishnan& Johannes Gehrke, “Database Management System” Tata McGraw Hill. III edition.
4. Ruosell J.T. Dyer, Learning MySQL and Mariadb.

#### Reference Books:

1. Chhanda Ray, “Distributed Database System”, Pearson Education India.
2. Hector Garcia-Molina, Jeffery D. Ullman, Jennifer Widom, “Database system Implementation”
3. Thomas M.Connolly Carolyn Begg, Database Systems: A practical Approach to Design, Implementation and Management, 4/e.

### Suggested List of Experiments:

LAB	Topic / Activity	Explanation of Activity
Lab1	SQL Programming	Case study on Professional and Commercial Databases: Summary and Comparison
Lab2	Query Optimization	Simulate Query optimization by applying an SQL Query on any database.
Lab3	Query Monitoring	Implementation of Query monitor (QEP- Query Execution Plan, Query Statistics)
Lab4	Distributed Database Design	Perform Fragmentation (Range, List, Hash and Key) in DDBS design.
Lab5	Distributed Database Design	Implementation of Replication transparency in DDB
Lab6	Distributed Database Design	Implementations of two phase / three phases commit protocol.
Lab7	XML Programming	Query execution on XML database.
Lab8	Document Database	Data handing using JSON. (eg. Display user information from JSON file downloaded from Mobile)
Lab9	Spatial and Temporal Data Handling	Processing of Spatial and temporal data
Lab10	Case study	Case study on Database security issues and measures taken to handle those issues.

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**Evaluation Scheme:**

***Semester End Examination (A):***

*Theory:*

1. Question paper based on the entire syllabus, summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

*Laboratory:*

1. Oral & Practical examination will be based on the entire syllabus including, the practical's performed during laboratory sessions.

***Continuous Assessment (B):***

*Theory:*

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in the two tests will be considered for final grading.

*Laboratory: (Term work)*

Laboratory work will be based on **DJ19CEEL5012** with minimum 10 experiments to be incorporated.

The distribution of marks for term work shall be as follows:

- i. Laboratory work (Performance of Experiments): 15 Marks
- ii. Journal Documentation (Write-up and Assignments): 10 marks

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the term work.

Prepared by

Checked by

Head of the Department

Principal