

TEXTBOOKS:

- T1** Sadalage, P. & Fowler, NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence, Wiley Publications, 1st Edition, 2019.

REFERENCE BOOKS:

- R1** Carpenter, J. & Hewitt, E. (2022). Cassandra: The Definitive Guide (3rd ed.). O'Reilly.
R2 Redmond, E. & Wilson, J. (2018). Seven Databases in Seven Weeks (2nd ed.). Pragmatic Bookshelf. *(Riak, Neo4j)*

e-Resources:

1. <https://www.ibm.com/cloud/learn/nosql-databases>
2. <https://www.coursera.org/lecture/nosql-databases/introduction-to-nosql-VdRNp>
3. <https://www.geeksforgeeks.org/introduction-to-nosql/>
4. <https://www.javatpoint.com/nosql-databa>

PART-B**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I: Introduction to NoSQL Databases**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction, course objectives, Course Outcomes, CO-PO mapping, Syllabus,	1	2.12.2025		TLM 1&2	
2.	Overview & History: Understand evolution from RDBMS to NoSQL	1	4.12.2025		TLM 1&2	
3.	Four Types of NoSQL, Value of RDBMS	1	5.12.2025		TLM 1&2	
4.	Persistent Data & Concurrency - Explain data access and concurrency issues	1	9.12.2025		TLM 1&2	
5.	Integration & Impedance Mismatch - Understand integration challenges	1	11.12.2025		TLM 1&2	
6.	Application vs Integration DBs - Differentiate use cases	1	12.12.2025		TLM 1&2	
7.	Attack of the Clusters - Explore distributed systems	1	16.12.2025		TLM 1&2	
8.	Emergence of NoSQL - Justify NoSQL adoption	1	18.12.2025		TLM 1&2	
No. of classes required to complete UNIT-I: 08				No. of classes taken:		

UNIT-II: RDBMS vs NoSQL & Data Models

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
9.	RDBMS vs NoSQL - Compare architectures and models	1	19.12.2025		TLM 1&2	
10.	MongoDB, Cassandra, HBase, Neo4j - Explore deployment and use cases	1	23.12.2025		TLM 1&2	
11.	Application, RDBMS approach, Challenges NoSQL approach	1	26.12.2025		TLM 1&2	
12.	Key-Value & Document Models - Understand structure and access	1	30.12.2025		TLM 1&2	
13.	Column-Family Stores - Analyze columnar storage	1	02.01.2024		TLM 1&2	
14.	Aggregate-Oriented DBs - Learn aggregation logic	1	06.01.2025		TLM 1&2	
15.	Replication & Sharding - Understand scaling methods	1	08.01.2025		TLM 1&2	

16.	MapReduce - Apply distributed querying	1	09.01.2025		TLM 1&2	
17.	Distribution Models - Compare server architectures	1	20.01.2025		TLM 1&2	
18.	Master-Slave Replication, Peer-to-Peer Replication	1	22.01.2025		TLM 1&2	
19.	Combining Sharding and Replication.	1	23.01.2025		TLM 1&2	
No. of classes required to complete UNIT-II: 11				No. of classes taken:		

UNIT-III: Document-Oriented NoSQL Databases

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
20.	MongoDB Architecture - Understand internal structure	1	03.02.2025		TLM 1&2	
21.	Features: Consistency, Transactions - Explore ACID/BASE trade-offs	1	05.02.2025		TLM 1&2	
22.	Availability & Query Feature - Learn query optimization	1	06.02.2025		TLM 1&2	
23.	Scaling - Apply horizontal scaling	1	10.02.2025		TLM 1&2	
24.	Use Cases - Identify suitable applications	1	12.02.2025		TLM 1&2	
25.	Event Logging, Content Management Systems, Blogging Platforms	1	13.02.2025		TLM 1&2	
26.	Web Analytics or Real-Time Analytics, E-Commerce Applications	1	17.02.2025		TLM 1&2	
27.	Complex Transactions - Handle multi-op queries	1	19.02.2025		TLM 1&2	
28.	Varying Aggregate Structures - Query flexible schemas	1	20.02.2025		TLM 1&2	
No. of classes required to complete UNIT-III: 09				No. of classes taken:		

UNIT-IV: Column-Oriented NoSQL Databases

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
29.	Column-oriented NoSQL databases using Apache HBASE	1	24.02.2025		TLM 1&2	
30.	Column-oriented NoSQL databases using Apache Cassandra	1	26.02.2025		TLM 1&2	
31.	Architecture of HBASE, Column-Family Data Store Features	1	27.02.2025		TLM 1&2	
32.	Consistency, Transactions, Availability & Query Features - Learn query patterns	1	03.03.2025		TLM 1&2	
33.	Scaling Apply distributed scaling, Use Cases - Identify suitable domains	1	05.03.2025		TLM 1&2	
34.	Event Logging, Content Management Systems, Blogging Platforms, Counters, Expiring Usage.	1	06.03.2025		TLM 1&2	
No. of classes required to complete UNIT-IV: 06				No. of classes taken:		

UNIT-V: Key-Value & Graph Databases

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
35.	Riak Architecture Understand key-value storage	1	10.03.2025		TLM 1&2	
36.	Key-Value Databases, Key-Value Store Features -Explore basic operations	1	12.03.2025		TLM 1&2	
37.	Consistency, Transactions, Query Features & Scaling-Apply query logic	1	13.03.2025		TLM 1&2	

38.	Suitable Use Cases, Storing Session Information	1	17.03.2025		TLM 1&2	
39.	User Profiles, Preferences, Shopping Cart Data	1	19.03.2025		TLM 1&2	
40.	Relationships among Data, Multi operation Transactions, Query by Data, Operations by Sets	1	20.03.2025		TLM 1&2	
41.	Graph DBs: Neo4j- Explore graph structures	1	24.03.2025		TLM 1&2	
42.	Graph Features- Understand traversal & relationships	1	26.03.2025		TLM 1&2	
43.	NoSQL Dev Tools-Use MongoDB Compass, Neo4j Browser	1	27.03.2025		TLM 1&2	
44.	Programming Languages Apply Python/Java with NoSQL	1	02.04.2025		TLM 1&2	
No. of classes required to complete UNIT-V: 10				No. of classes taken:		

CONTENT BEYOND THE SYLLABUS:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
45.	Vector Databases & AI Integration	1			TLM 1&2	
46.	Polyglot Persistence & Multi-Model Databases	1			TLM 1&2	

Teaching Learning Methods			
TLM1	Chalk and Talk	TLM4	Demonstration (Lab/Field Visit)
TLM2	PPT	TLM5	ICT (NPTEL/Swayam Prabha/MOOCs)
TLM3	Tutorial	TLM6	Group Discussion/Project

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
PSO 2	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.
PSO 3	To provide a concrete foundation and enrich their abilities for Employment and Higher studies in Artificial Intelligence and Data science with ethical values.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
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Name of the Faculty	Ms V Sowjanya	Ms V Sowjanya	Dr. D. Srinivasa Rao	Dr. P. Bhagath
Signature				