

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING - DATA SCIENCE

COURSE MODULE OF THE SUBJECT TAUGHT FOR THE SESSION 2026-27 (ODD SEM)

Course Syllabus with CO's

Faculty Name: Mr. J N Karthik			Academic Year: 2026- 2027				
Department: Computer Science – Data Science							
Course Code	Course Title	Core / Elective	Prerequisite	Contact Hours			Total Hrs/ Sessions
				L	T	P	
BCD515C	NOSQL Databases	Core	RDBMS	3	-	-	40L
Course Learning Objectives	CLO 1. Understand the importance and need of NoSQL CLO 2. Exposure to Map-reduce and Key-Value databases CLO 3. Understand fundamentals of Document Databases CLO 4. Identify different use cases where graph databases are advantageous						
Topics Covered as per Syllabus							
Module-1: Why NoSQL : The Value of Relational Databases, Getting at Persistent Data, Concurrency, Integration, A (Mostly) Standard Model, Impedance Mismatch, Application and Integration Databases, Attack of the Clusters, The Emergence of NoSQL Aggregate Data Models: Aggregates, Example of Relations and Aggregates, Consequences of Aggregate Orientation, Summarizing Aggregate-Oriented Databases. More Details on Data Models: Relationships, Graph Databases, Schema less Databases, Materialized Views, Text Book 1: Chapter : 1, 2, 3							
Module-2: Distribution Models: Single Server, Sharding, Master-Slave Replication, Peer-to-Peer Replication, Combining Sharding and Replication. Consistency: Update Consistency, Read Consistency, Relaxing Consistency, The CAP Theorem. Version Stamps: Business and System Transactions, Version Stamps on Multiple Nodes. Text Book 1: Chapter : 4, 5, 6							
Module-3: Map-Reduce: Basic Map-Reduce, Partitioning and Combining, Composing Map-Reduce Calculations, A Two Stage Map-Reduce Example, Incremental Map-Reduce Key-Value Databases: What Is a Key-Value Store, Key-Value Store Features: Consistency, Transactions, Query Features, Structure of Data, Scaling, Suitable Use Cases: Storing Session Information, User Profiles, Preference, Shopping Cart Data, When Not to Use: Relationships among Data, Multioperation Transactions, Query by Data, Operations by Sets Text Book 1: Chapter : 7, 8							

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Module-4:

Document Databases: What Is a Document Database? Features: Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases: Event Logging, Content Management Systems, Blogging Platforms, Web Analytics or Real-Time Analytics, ECommerce Applications, When Not to Use: Complex Transactions Spanning Different Operations, Queries against Varying Aggregate Structure

Text Book 1: Chapter : 9

Module-5:

Graph Databases: What Is a Graph Database? Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases: Connected Data, Routing, Dispatch, and Location-Based Services, Recommendation Engines, When Not to Use.

Text Book 1: Chapter : 11

List of Textbooks

Text Books

1. Sadalage, P. & Fowler, NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence, Pearson Addison Wesley, 2012

Reference Books:

1. Dan Sullivan, "NoSQL For Mere Mortals", 1st Edition, Pearson Education India, 2015. (ISBN13: 978-9332557338)
2. Dan McCreary and Ann Kelly, "Making Sense of NoSQL: A guide for Managers and the Rest of us", @#@#@ 12082024 Annexure-II 4 1st Edition, Manning Publication/Dreamtech Press, 2013. (ISBN-13: 978-9351192022)
3. Kristina Chodorow, "MongoDB: The Definitive Guide - Powerful and Scalable Data Storage," 2nd Edition, O'Reilly Publications, 2013. (ISBN-13: 978-9351102694)

Web links and Video Lectures (e-Resources)

Web links and Video Lectures (e-Resources):

1. <https://www.neo4j.com/docs/cypher-manual/current/introduction/>
2. <https://www.mongodb.com>

Course Outcomes

CO 1. Understand the importance and need of NoSQL CO 2. Exposure to Map-reduce and Key-Value databases CO 3. Understand fundamentals of Document Databases CO 4. Identify different use cases where graph databases are advantageous

Assessment Details (both CIE and SEE):

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

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Continuous Internal Evaluation:

- For the assignment component of CIE, there are 25 marks, and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has to be covered, and the second test will be administered after 85-90% of the syllabus has to be covered.
- Any two assignment methods mentioned in the 22OB2.4, if an assignment is project based, then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment. Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (duration 03 hours).

- The question paper will have ten questions. Each question is set for 20 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.
- The students have to answer 5 full questions, selecting one full question from each module.
4. Marks scored shall be proportionally reduced to 50 marks

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Subject Code	BCD515C	TITLE: NOSQL DATABASES						Faculty Name	J N Karthik			
List of Course Outcomes	Program Outcomes											Total
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	
CO-1	2	-	-	-	-	-	-	-	-	-	2	4
CO-2	2	2	2	-	-	-	-	-	-	-	2	8
CO-3	2	-	-	-	2	-	-	-	-	-	2	6
CO-4	2	-	2	-	-	-	-	-	-	-	2	6
Total	8	02	04	-	02	-	-	-	-	-	8	24

Note: 3 = Strong Contribution, 2 = Average Contribution, 1 = Weak Contribution, - = No Contribution

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The Correlation of Course Outcomes (CO's) and Program Specific Outcomes (PSO's)

Subject Code	BCD515C	TITLE: NOSQL DATABASES	Faculty Name	J N Karthik
List of Course Outcomes	Program Specific Outcomes			Total
	PSO-1	PSO-2		
CO-1	-	-	-	
CO-2	-	2	2	
CO-3	-	2	2	
CO-4	-	2	2	
Total	-	6	6	

