

Sarvajanik College of Engineering & Technology

Department of Information Technology



SUBJECT FILE

Subject Coordinator: Prof. Tushar Gohil

Prof. Karuna Patel

Name of Subject: NoSQL Databases

Code: BTIT14601

Year: B.Tech – III I.T.

Semester: VI

Academic Year: 2024-25

Term Date: 16/12/2024 to 26/04/2025

Address

**Dr. R. K. Desai Marg, Athwalines, Surat
www.scet.ac.in**

Index

Teaching Scheme and Syllabus	3
Course Outcomes	5
Lecture Plan	6
Lab Plan	8
Rubrics	9
Reference Books	10
Mid Sem Question Paper	11
Result Analysis	12
Counselling Report	13

Teaching Scheme



SARVAJANIK UNIVERSITY Sarvajani College of Engineering and Technology Bachelor of Technology



Year: B. Tech III (Semester VI)

Subject Name: NoSQL Databases
Type of course: Professional Elective Course

Subject Code: BTIT14604

Rationale: After studying this course, students will be able to Integrate MongoDB with Java, Node.js, Python and PHP application.

Teaching and Examination Scheme:

Teaching Scheme				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	
3	0	2	4	60	25	15	30	20	150

CA1: Continuous Assessment (assignments / projects / open book tests / closed book tests) CA2: Sincerity in attending classes / class tests / timely submissions of assignments / self-learning attitude / solving advanced problems TEE: Term End Examination TEP: Term End Practical Exam (Performance and viva on practical skills learned in course) CA3: Regular submission of Lab work / Quality of work submitted / Active participation in lab sessions / viva on practical skills learned in course.

Contents:

Sr. No.	Contents	Total Hours
1.	Introduction to NoSQL database: Difference between RDBMS and NoSQL databases, Key-Value database, Document-based database, Column-based database, Graph-based database, CAP theorem, The Value of Relational Databases, Getting at Persistent Data, Concurrency, Integration, NoSQL, Key Points.	10
2.	MongoDB: Introduction to MongoDB, Overview of NoSQL databases, History of MongoDB, document based storage, key features, advantages, MongoDB shell, Data modeling in MongoDB, MongoDB data types, Database create and drop, Collection create and drop MongoDB NoSQL Database Setup.	15
3.	CRUD operations: CRUD operations in MongoDB, Relationships in MongoDB, Indexing, Sorting, Aggregate functions, limit(), skip()	08
4.	Backup and Restore: Data backup and restore, Cassandra vs MongoDB, CouchDB vs. MongoDB, Redis vs MongoDB	06
5.	Connectivity: Java MongoDB, PHP MongoDB, Python MongoDB	06

Suggested Specification table with Marks (Theory): (For B. Tech only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	20	15	5	-	-

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (Revised Bloom's Taxonomy)

Reference Books:

Sr No.	Title of book /article	Author(s)	Publisher and details like ISBN
1	MongoDB in Action	Kyle Banker, Peter Bakkum, Shaun Verch ,Douglas Garrett, Tim Hawkins	Manning Publications Co ISBN: 978-9351199359
2	MongoDB : The Definitive Guide	Kristina Chodorow	O'Reilly ISBN: 978-9351102694

Note: Students should refer to the latest editions of books

Course Outcomes (CO):

Sr. No.	CO statements	Marks % weightage
CO-1	Develop competency in describing how NoSQL databases differ from relational databases from a theoretical perspective.	20%
CO-2	Understand the Mongo as a datastore.	30%
CO-3	Perform CRUD operations	20%
CO-4	Index Mongo Collections	15%
CO-5	Use data backup and restore techniques	15%

List of Open learning website:

- <https://www.mongodb.com/basics>
- <https://www.tutorialspoint.com/mongodb/index.htm>

Course Outcomes

Course Outcome	Statement	Weightage (%)
CO1	Develop competency in describing how NoSQL databases differ from relational databases from a theoretical perspective.	20
CO2	Understand the Mongo as a datastore	30
CO3	Perform CRUD operations	20
CO4	Index Mongo Collections	15
CO5	Use data backup and restore techniques	15

Lecture Plan

Faculties :	Prof. Tushar Gohil (2 Hrs) (TUE, THU) Prof.Karuna Patel (1 Hrs.) (FRI)
----------------	---

No.	Topics	Plan Date	Actual Date	Mode (B/M)*
Chapter 1:: Introduction to NoSQL database (10 Hrs.)				
1.	Difference between RDBMS and NoSQL databases, Key-Value database	20-12-24	27-12-24	B + M
2.	Document-based database, Column-based database,	27-12-24	27-12-24	B + M
3.	Graph-based database, CAP theorem	03-01-24	03-01-24	B + M
4.	The Value of Relational Databases	10-01-25	17-01-25	B + M
5.	Getting at Persistent Data	17-01-25	17-01-25	B + M
6.	Concurrency, Integration	24-01-25	24-01-25	B + M
7.	NoSQL, Key Points	31-01-25	31-01-25	B + M
8.	NoSQL applications discussion.	7-02-25	7-02-25	B + M
9.	NoSQL drivers	14-02-25	7-02-25	B + M
Chapter 2 ::MongoDB (15 Hrs.)				B + M
10.	Introduction to MongoDB	17-12-24	24-12-24	B + M
11.	Overview of NoSQL Databases	19-12-24	26-12-24	B + M
12.	History of MongoDB	24-12-24	31-12-24	B + M
13.	Document-Based Storage	26-12-24	02-01-25	B + M
14.	Key Features of MongoDB	31-12-24	02-01-25	B + M
15.	Advantages of MongoDB	02-01-25	07-01-25	B + M
16.	MongoDB Shell	02-01-25	09-01-25	B + M
17.	Data Modeling in MongoDB	07-01-25	16-01-25	B + M
18.	MongoDB Data Types	09-01-25	21-01-25	B + M
19.	Database Creation in MongoDB	16-01-25	23-01-25	B + M
20.	Database Dropping in MongoDB	21-01-25	28-01-25	B + M
21.	Collection Creation in MongoDB	23-01-25	30-01-25	B + M

22.	Collection Dropping in MongoDB	28-01-25	04-02-25	B + M
23.	MongoDB NoSQL Database Setup	30-01-25	04-02-25	B + M
24.	MongoDB Query Language Basics	04-02-25	06-02-25	B + M
Chapter 3 :: CRUD operations(8 Hrs.)				B + M
25.	CRUD Operations in MongoDB	06-02-25	11-02-25	B + M
26.	Relationships in MongoDB	11-02-25	13-02-25	B + M
27.	Indexing in MongoDB	13-02-25	18-02-25	B + M
28.	Indexing in MongoDB	18-02-25	11-03-25	B+M
29.	Sorting in MongoDB	11-03-25	13-03-25	B+M
30.	Aggregate Functions in MongoDB	13-03-25	20-03-25	B+M
31.	limit() in MongoDB	20-03-25	25-03-25	B+M
32.	skip() in MongoDB	25-03-25	25-03-25	B+M
Chapter 4:: Backup and Restore(6 Hrs.)				
33.	Data backup and restore	14-03-25	14-03-25	B + M
34.	Cassandra vs MongoDB	21-03-25	21-03-25	B + M
35.	CouchDB vs. MongoDB	28-03-25	28-03-25	B + M
36.	Redis vs MongoDB	4-04-25		B + M
Chapter 5::Connectivity (6 Hrs.)				
37.	Java MongoDB	27-03-25	27-03-25	B + M
38.	PHP MongoDB	01-04-25		B + M
39.	Python MongoDB	03-04-25		B + M
40.	Node.js MongoDB	08-04-25		B + M
41.	MongoDB Atlas Connectivity	15-04-25		B + M
42.	MongoDB Atlas Connectivity	17-04-25		B + M

* B - Black Board, M - Multi-media

* C-Computer

Lab Plan

		Plan Date	Actual Date
1.	MongoDB Create Database - How to Create Database & Collection in MongoDB.	19-12-2025	26-12-2025
2.	Add MongoDB Array using insert() Function.	26-12-2025	02-01-2025
3.	Mongodb Primary Key — Example to set _id field with ObjectId()	02-01-2025	09-01-2025
4.	MongoDB Query Document — using find() method with Examples	09-01-2025	16-01-2025
5.	MongoDB Query using Pretty() &Distinct() Functions.	16-01-2025	23-01-2025
6.	MongoDB Conditional Operator like gt,gte,lt,lte.	23-01-2025	30-01-2025, 06-02-2025
7.	MongoDB Sort() & Limit() — MongoDB order with Sort() & Limit() Query	30-01-2025, 06-02-2025	13-02-2025
8.	MongoDB Count() & Remove() Functions.	13-02-2025	13-03-2025
9.	MongoDB Update() Document.	13-03-2025	20-03-2025
10.	MongoDB Backup Methods — MongoDB Security, Monitoring & Backup (Mongodump)	20-03-2025	
11.	MongoDB Regular Expression — Use a Regular Expression \$Regex in MongoDB.	27-03-2025	

Rubrics

Category	Level of Performance		
	10-8 marks	7-4 marks	3-1 marks
Continuous Evaluation (5)	Able to write in time limit with correct result	Able to code in time limit, and get proper result	Able to write with error and no result
	5-4 marks	3-2 marks	1 marks
Attendance (5)	attended all classes	average attendance in class	poor attendance in class
Documentation Level			
	5-4 marks	3-2 marks	1 marks
Assignment Submission (5)	Completed on time	Incomplete but on time	Incomplete and delay

Reference Books

Reference Books:

Sr No.	Title of book /article	Author(s)	Publisher and details like ISBN
1	MongoDB in Action	Kyle Banker, Peter Bakkum, Shaun Verch ,Douglas Garrett, Tim Hawkins	Manning Publications Co ISBN: 978-9351199359
2	MongoDB : The Definitive Guide	Kristina Chodorow	O'Reilly ISBN: 978-9351102694

Note: Students should refer to the latest editions of books

Mid-semester Question Paper

B.Tech –III(6th Semester) CA (MIDTERM) EXAMINATION

Subject: NoSQL Databases

Time: 1 Hour 15 Minutes

Subject Code: BTIT14604

Total Marks: 25

Date:07-03-2025

Instruction: (1) Question 1 is compulsory.

(2) Draw the figure and label it wherever it is necessary.

Q. No	Question	Marks
Q:1	a. Discuss various types of NoSQL databases with examples.	4
	b. Differentiate between NoSQL and relational databases.	4
Q:2	a. Illustrate the key features of MongoDB with examples.	4
	b. Discuss the various MongoDB data types with examples.	4
	OR	
Q:2	b. What are the advantages of using MongoDB in modern applications?	4
Q:3	a. Illustrate how sorting works in MongoDB with an example.	4
	b. What are the advantages and disadvantages of indexing in MongoDB? Give an Example as well.	5
	OR	
Q:3	a. Develop a small CRUD application in Python using MongoDB and explain each step.	4
	b. Create a data model for a blogging platform using MongoDB and demonstrate CRUD operations.	5

*****All The Best*****

Mid-semester Result Analysis

Number of Students	Mid-I (Date)	Re-Mid (Date)
Total		34
Not allowed		-
Absent		00
Fail		00
Pass		34
Pass(%)		100 %
AA		27
AB		05
BB		02
BC		-
CC		-

Note: AA ($\geq 85\%$), AB ($\geq 75\% < 85\%$), BB ($\geq 65\% < 75\%$), BC ($\geq 55\% < 65\%$), CC ($\geq 45\% < 55\%$), CD ($\geq 40\% < 45\%$), FF ($< 45\%$)

Counseling Report

Date	Enrollment No.	Name Of Students	Details