21CS401	ADVANCED DATABASES	L	T	P	C
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COURSE OBJECTIVES

The course aims to provide the students

To learn the NoSQL and use of MongoDB in NoSQL along with configuring mongo server

To learn to write Query for MongoDB

To learn indexing and its usage

To learn aggregation framework and MapReduce techniques in MongoDB

To learn replica management on MongoDB, configure sharding on MongoDB

PREREQUISITES

- Database Management Systems

UNIT I	INTRODUCTION, BASIC DATA TYPES, CREATING, UPDATING, AND DELETING DOCUMENTS	9

Introduction to NoSQL and MongoDB, Installation of MongoDB and GUI of MongoDB. Basic Data Types: Documents, Collections, Dynamic Schemas, Mongo Shell, Mongo Server and Client, Data Types, Embedded Documents, Creating Configuration file for Mongo. Creating, Updating, and Deleting Documents: Inserting and Saving Documents, Batch Insert, Insert Validation, Removing Documents, Updating Documents, Document Replacement, Using Modifiers, Upserts, Updating Multiple
Documents, Returning Updated Documents.

UNIT II	QUERY	9

Introduction to find, Query Criteria, Query Conditionals, Conditional Semantics, Type-Specific Queries, Regular Expressions, Querying Arrays, Querying on Embedded Documents, Cursors, Limits, Skips, Advanced Query Options, Getting Consistent Results Immortal Cursors.

UNIT III	INDEX, SPECIAL INDEX AND COLLECTION TYPES	9

Introduction to Indexing, Introduction to Compound Indexes, Using Compound Indexes, Indexing Objects and Arrays , Index Cardinality, Using explain() and hint(), The Query Optimizer, Index Administration, Changing Indexes, Capped Collections, Geospatial Indexing Storing Files with GridFS ,
Getting Started with GridFS: mongofiles, Working with GridFS from the MongoDB Drivers

UNIT IV	AGGREGATION, REPLICATION	10

The Aggregation Framework, Pipeline Operations, $match, $project, $group, $unwind, $sort, $limit, $skip, Using Pipelines, MongoDB and MapReduce, Aggregation Command. Introduction to Replication, Configuring a Replica Set, Networking, Elections, Member Configuration Options, Creating Election Arbiters, Priority, Heartbeats.

UNIT V	SHARDING	8

Introduction to Sharding, Config Servers, The mongos Processes,Adding a Shard from a Replica Set, Shard Keys,Hashed Shard Keys for GridFS , Shard Key-Rules and Guidelines.

Theory: 45	Tutorial: 0	Practical: 0	Project: 0	Total: 45 Periods

COURSE OUTCOMES	
At the end of the course students should be able to	
C216.1:	Understand the NoSQL and use of MongoDB in NoSQL
C216.2:	To add new document, modify and remove existing documents from collections
C216.3:	Write Query for MongoDB
C216.4:	Apply indexing concepts
C216.5:	Apply aggregation framework and MapReduce techniques in MongoDB.
C216.6:	Use replica management on MongoDB, configure sharding on MongoDB
TEXT BOOKS:	
T1:	MongoDB: The Definitive Guide, 2nd Edition,by Kristina Chodorow,Released May 2013,O'Reilly Media, Inc.
T2:	MongoDB in Action by Kyle Banker
REFERENCE BOOKS:	
R1:	MongoDb Applied Design Patterns 1st Edition, by Rick Copeland, O'Reilly Media, Inc
R2:	MongoDB: The Definitive Guide: Powerful and Scalable Data Storage 3rd Edition by Shannon Bradsh, Eoin Brazil, Kristina Chodorow