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| **Semester – V** | | | | |
| **Course Name** | : MongoDB | | **Course Code :** | 20IS553 |
| **No. of Lecture Hours / Week** | : | 03 | **CIE Marks :** | 50 |
| **No. of Tutorial / Practical Hours / Week** | : | 00 | **SEE Marks :** | 50 |
| **Total No. of Lecture + Tutorial / Practical Hours** | : | 40 | **SEE Duration :** | 03 Hrs. |
| **L:T:P** | : | 3:0:0 | **Credits :** | 03 |
| **Course Overview**  This course introduces development techniques that capitalize on the strengths of Back-end database for many modern Full stack developments, this course concentrates on basics and intermediate level of MongoDB. | | | | |
| **Course Learning Objectives (CLO)**   * Create the databases using the MongoDB. * Understand the programs and Queries written in MongoDB. * Demonstrate the different operations supported in the MongoDB. | | | | |
| **MODULES** | | | | **TEACHING HOURS** |
| **MODULE 1**  **A database for the modern web 3:** Built for the internet, MongoDB’s key features, Document data model, Ad hoc queries, Indexes, Replication, Speed and durability, Scaling, MongoDB’s core server and tools, Core server, JavaScript shell, Database drivers, Command-line tools, Why MongoDB? MongoDB versus other databases, Tips, and limitations.  **MongoDB through the JavaScript shell:**Diving into the MongoDB shell  Starting the shell, Databases, collections, and documents, Inserts and queries, Updating documents, Deleting data, Other shell features, Creating and querying with indexes, Creating a large collection, Indexing and explain( ), Basic administration, Getting database information, How commands work*.*  **Textbook 1:** Chapter 1 and 2  **SLE:** Use cases and production deployments, History of MongoDB. | | | | **08** |
| **MODULE 2**  **Writing programs using MongoDB:** MongoDB through the Ruby lens, Installing and connecting, inserting documents in Ruby, Queries and cursors, Updates and deletes, Database commands, How the drivers work, Object ID generation, building a simple application, setting up Gathering data.  **Textbook 1:** Chapter 3  **SLE:** Viewing the archive. | | | | **08** |
| **Module 3**  **Document-oriented data:**Principles of schema design, Designing an e-commerce data model, Schema basics, Users and orders, Reviews, Nuts and bolts: On databases, collections and documents, Databases, Collections.  **Constructing queries:** E-commerce queries, Products, categories, and reviews, Users and orders, MongoDB’s query language, Query criteria and selectors.  **Textbook 1:** Chapter 4 and 5  **SLE:** Documents and insertion, Query options. | | | | **08** |
| **Module 4**  **Aggregation:**Aggregation framework overview, E-commerce aggregation example, Products, categories, and reviews, User and order, Aggregation pipeline operators, $project, $group, $match, $sort, $skip, $limit, $unwind, $out, Reshaping documents, String functions, Arithmetic functions, Date functions, Logical functions, Set Operators, Miscellaneous functions, Understanding aggregation pipeline performance, Aggregation pipeline options , The aggregation framework’s, explain( ) function, allow Disk Use option, Aggregation cursor option, Other aggregation capabilities, .count( ) and .distinct( ) .  **Textbook 1:** Chapter 6  **SLE:** map-reduce. | | | | **08** |
| **Module 5**  **Updates, atomic operations, and deletes:** A brief tour of document updates  Modify by replacement, Modify by operator and Both methods compared, Deciding: replacement vs. operators, E-commerce updates, Products and categories, Reviews, Orders, Atomic document processing, Order state transitions, Inventory management, Nuts and bolts: MongoDB updates and deletes, Update types and options, Update operators, The find And Modify command, Deletes, Concurrency, atomicity, and isolation, Update performance notes.  **Textbook 1:** Chapter 7  **SLE:** Reviewing update operators. | | | | **08** |

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| **Textbook:**   * MongoDB in Action, Second Edition, Kyle Banker, Peter Bakkum, Shaun Verch, Douglas Garrett, Tim Hawkins 2016 by Manning Publications Co.   **Reference Book:**   * MongoDB: The Definitive Guide, 3rd Edition, Shannon Bradshaw, Eoin Brazil, Kristina Chodorow, December 2019, O'Reilly Media, Inc. | |
| **COURSE OUTCOMES (COs)**  At the end of the course, students will be able to | |
| **CO1** | Understand the basics of MongoDB. |
| **CO2** | Apply MongoDB concepts for managing data. |
| **CO3** | Construct the queries by analyzing the problem. |
| **CO4** | Design simple database and apply all operations using appropriate framework. (ABA) |

# CO – PO – PSO MAPPING

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|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** | **PS04** |
| **CO1** | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  | 3 |  |
| **CO2** |  | 2 |  |  |  |  |  |  |  |  |  |  |  |  | 3 |  |
| **CO3** |  |  | 2 |  |  |  |  |  |  |  |  |  |  |  | 3 |  |
| **CO4** |  |  |  |  | 2 |  |  |  |  |  |  |  |  |  | 3 |  |
| **Avg.** | 2 | 2 | 2 |  | 2 |  |  |  |  |  |  |  |  |  | 3 |  |