AC–11-03-2025
Item No. – 03

Approved by the Bos in Bachelor of Science (Information of Technology) on 13-11-2024 Item No.03

As Per NEP 2020

Tolani College of Commerce (Autonomous)

Title of the Course: Next Generation Technology

Programme: B.Sc(Information Technology) Semester V

Syllabus for 4 Credit Course

From the academic year- 2025-2026

Name of the Course: Next Generation Technology

Sr. No.	Heading	Particulars
1	**Description of the course :**	Writing MongoDB queries to create, drop, insert, query, update, and delete databases. Connecting Java, PHP, and Python with MongoDB to insert, retrieve, update, and delete. Exporting MongoDB to JSON.
2	**Vertical:**	Major Elective
3	**Type:**	Theory and Practical
4	**Credit**:	4 credits
5	**Hours Allotted:**	60 Hours
6	**Marks Allotted**:	Total : 100 Marks Practical Evaluation: 40 Marks Semester-End: 60 Marks
7	**Course Objectives:** 1. Need of understanding big data 2. Concept of unstructured or NoSQL data 3. Handling unstructured data with MongoDB 4. Understand the architecture of MongoDB	
8	**Course Outcomes:** 1. Explain the term big data and its use in current world 2. Identify the difference between structured and unstructured data 3. Create unstructured data using MongoDB 4. Compare and contrast in-memory databases	

9	**Module1: (15 hours)**
	• **Big Data:** Getting Started, Big Data, Facts About Big Data, Big Data Sources, Three Vs of Big Data, Volume, Variety, Velocity, Usage of Big Data, Visibility, Discover and Analyze Information, Segmentation and Customizations, Aiding Decision Making, Innovation, Big Data Challenges, Policies and Procedures, Access to Data, Technology and Techniques, Legacy Systems and Big Data, Structure of Big Data, Data Storage, Data Processing, Big Data Technologies • **NoSQL:** SQL, NoSQL, Definition, A Brief History of NoSQL, ACID vs. BASE, CAP Theorem (Brewer's Theorem), The BASE, NoSQL Advantages and Disadvantages, Advantages of NoSQL, Disadvantages of NoSQL, SQL vs. NoSQL Databases, Categories of NoSQL Databases • **Introducing MongoDB:** History, MongoDB Design Philosophy, Speed, Scalability,and Agility, Non-Relational Approach, JSON-Based Document Store,Performance vs. Features, Running the Database Anywhere, SQLComparison
	Module2: (15 hours)
	• **The MongoDB Data Model:** The Data Model, JSON and BSON, The Identifier (_id), Capped Collection, Polymorphic Schemas, Object-Oriented Programming, Schema Evolution • **Using MongoDB Shell:** Basic Querying, Create and Insert, Explicitly Creating Collections, Inserting Documents Using Loop, Inserting by Explicitly Specifying _id, Update, Delete, Read, Using Indexes, Stepping Beyond the Basics, Using Conditional Operators, Regular Expressions, MapReduce, aggregate(), Designing an Application's Data Model, Relational Data Modeling and Normalization, MongoDB Document Data Model Approach • **MongoDB Architecture:** Core Processes, mongod, mongo, mongos,MongoDB Tools, Standalone Deployment, Replication, Master/Slave Replication, Replica Set, Implementing Advanced Clustering with Replica Sets, Sharding, Sharding Components, Data Distribution Process, Data Balancing Process, Operations, Implementing Sharding, Controlling Collection Distribution (Tag-Based Sharding).
	Module3: (15 hours)
	• **MongoDB Storage Engine:** Data Storage Engine, Data File (Relevant for MMAPv1), Namespace (.ns File), Data File (Relevant for WiredTiger), Reads and Writes, How Data Is Written Using Journaling,GridFS – The MongoDB File System, The Rationale of GridFS,GridFSunder the Hood, Using GridFS, Indexing, Types of Indexes,Behaviors and Limitations. • **MongoDB Use Cases:** Use Case 1 -Performance Monitoring, Schema Design, Operations, Sharding, Managing the Data, Use Case 2 – Social Networking, Schema Design, Operations, Sharding • **MongoDB Limitations:** MongoDB Space Is Too Large (Applicable for MMAPv1), Memory Issues (Applicable for Storage Engine MMAPv1), 32-bit vs. 64-bit, BSON Documents, Namespaces Limits,Indexes Limit, Capped Collections Limit - Maximum Number of Documents in a Capped Collection, Sharding Limitations.
	Module4: (15 hours)
	• **jQuery:** Introduction, Traversing the DOM, DOM Manipulation with jQuery, Events, Ajax with jQuery, jQuery Plug-ins, jQuery Image Slider. • **JSON:** Introduction, JSON Grammar, JSON Values, JSON Tokens,Syntax, JSON vs XML, Data Types, Objects, Arrays, Creating JSON,JSON Object, Parsing JSON, Persisting JSON, Data Interchange,JSON PHP, JSON HTML, JSONP.

10	**Reference Books:** 1) **Author/s:** Jack Franklin Russ Ferguson**, Title** : Beginning jQuery, **Publisher** : Apress, **Edition** : 2nd, **Year** :2018. 2) **https://e-next.in/bsc-it-ngt-notes-1/**	
11	**Internal Continuous Assessment: 40%**	**Semester End Examination: 60%**
12	**Continuous Evaluation through:**	Practical Assessment
13	**Format of Question Paper:**	

Scheme of Evaluation Pattern
Table 1A: Scheme of Continuous Evaluation (CE/Practical)
Scheme of Evaluation Pattern

Sub-components	Maximum Marks	Conditions for passing
1) Practical exam	30	A learner must be present for each of the sub-components
2) Journal and Viva	10	
Total	40	

Table 1B: Scheme of Semester End Examination (SEE) Evaluation
Question Paper Pattern for Semester End Examination (SEE)
Maximum Marks: 60 **Duration: 2 Hrs.**

Note: All questions are compulsory. Each question has an internal choice.

Question Number		Nature of Questions	Maximum Marks
1)		**Attempt any Three**	15
	a)		
	b)		
	c)		
	d)		
	e)		
2)		**Attempt any Three**	15
	a)		
	b)		
	c)		
	d)		
	e)		
3)		**Attempt any Three**	15
	a)		
	b)		

			c)		
			d)		
			e)		
		4)		**Attempt any Three**	15
			a)		
			b)		
			c)		
			d)		
			e)		

Course Name: Next Generation Technology Practical			
Periods per week (1 Period is 60 minutes)		**4**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**40**

Practical No	**Details**
1	**MongoDB Basics:** a) Write a MongoDB query to create and drop database. b) Write a MongoDB query to create, display and drop collection
2	**Simple Queries with MongoDB**
3	**Implementing Aggregation** a) Write a MongoDB query to use sum, avg, min and max expression. b) Write a MongoDB query to use push and addToSet expression.
4	**Replication, Backup and Restore** a) Write a MongoDB query to create Replica of existing database. b) Write a MongoDB query to create a backup of existing database.
5	**Java and MongoDB** a) Connecting Java with MongoDB and inserting, retrieving, updating and deleting.
6	**Programs on Basic jQuery** a) jQuery Basic, jQuery Events b) jQuery Selectors, jQuery Hide and Show effects
7	**jQuery Advanced** a)jQuery Animation effects, jQuery Chaining b) jQuery Callback, jQuery Get and Set Contents

8	**JSON** a)Creating JSON b)Parsing JSON

1	Q.1	15
2	Q.2	15
3	Viva	5
4	Journal	5
5	**Total**	**40**