COURSE TITLE	**SERVER SIDE DEVELOPMENT USING NODEJS**
COURSE CODE	**05CA0603**
COURSE CREDITS	**4**

Objective:

1. To introduce server-side programming concepts using NodeJS and ExpressJS framework.
2. To train students in designing and implementing RESTful APIs with secure data handling.
3. To enable students to integrate NodeJS applications with MongoDB databases using Mongoose.
4. To prepare students for deploying real-world backend services with authentication, authorization, and API security.

Course Outcomes: After completion of this course, student will be able to:

1. Describe the core concepts of NodeJS, event-driven architecture, and Express middleware.
2. Develop RESTful APIs with CRUD functionality using NodeJS and Express.
3. Analyze database schema design and implement secure data transactions using MongoDB and Mongoose.
4. Build and deploy a backend server with authentication, error handling, and integration with frontend apps.

Pre-requisite of course: React JS

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
2	0	4	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Introduction to NodeJS & Express** What is NodeJS? Event Loop and Architecture, Setting up NodeJS Environment, Node Core Modules (fs, path, http), NPM Packages and Dependency Management, Introduction to ExpressJS Framework, Express Routing – GET, POST, PUT, DELETE, Middleware Functions in Express, Request & Response Objects, Error Handling in Express, RESTful API Basics	15

Contents : Unit	Topics	Contact Hours
2	**Database Integration & API Security** MongoDB Basics and Collections, Connecting MongoDB using Mongoose, Schema Design and Validation, CRUD Operations using Mongoose, Authentication & Authorization (JWT), Securing Routes in Express, Environment Variables and dotenv, API Versioning and REST Best Practices, Postman for API Testing, MVC Architecture in NodeJS	15
Total Hours		**30**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Unit 1** Building RESTful APIs with NodeJS, Initializing Node Project with npm, Creating a Basic Server with Express, Building Modular Route Handlers, Connecting MongoDB and Performing CRUD, Building APIs with Query Parameters, Implementing Authentication using JWT, API Input Validation with express-validator, Protecting Routes with Middleware, File Upload using Multer, Testing APIs with Postman	30
2	**Unit 2** Capstone Project – MERN Backend, Project Planning and Backend Design, User Module – Registration, Login, Profile, Product/Blog Module – CRUD Operations, Role-based Access Control, Pagination and Search APIs, Integration with Frontend (Optional), Error Logs and Exception Handling, Deployment using Render / Railway / Cyclic, Codebase Documentation, Final Demo and Viva	30
Total Hours		**60**

Textbook :

1 Learning Node.js: A Hands-On Guide to Building Web Applications in JavaScript, Marc Wandschneider, Pearson, 2016

References:

1 Learning Node.js: A Hands-On Guide to Building Web Applications in JavaScript, Learning Node.js: A Hands-On Guide to Building Web Applications in JavaScript, Marc Wandschneider, Addison-Wesley Professional (Pearson), 2016

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery

Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
10.00	15.00	25.00	25.00	25.00	0.00

Instructional Method:

1 PPT, Demo & Practical

Supplementary Resources:

1 https://nodejs.org/en