Course: BTech **Semester:** 6

Prerequisite: Database Management system, SQL, Basics of Javascript and web development

Rationale: 1. Understanding the basics of web development and JavaScript programming 2. Learning how to use MongoDB, a popular NoSQL database, to store and retrieve data 3. Learning how to use Node.js, a server-side JavaScript runtime, to create APIs and handle server-side logic 4. Learning how to use Express.js, a lightweight web application framework for Node.js, to build web applications 5. Learning how to use AngularJS, a powerful front-end JavaScript framework, to create dynamic user interfaces and connect with APIs 6. Building a full-stack web application from scratch using the MEAN stack 7. Understanding best practices for deploying, testing, and maintaining MEAN stack applications

Teaching and Examination Scheme

Teaching Scheme					Examination Scheme					Total
					Internal Marks			External Marks		
Lecture Hrs/Week	Tutorial Hrs/Week	Lab Hrs/Week	Hrs/Week	Credit	T	CE	P	T	P	
3	0	0	-	3	20	20	-	60	-	100

SEE - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

Course Content

W - Weightage (%) , **T** - Teaching hours

Sr.	Topics	W	T
1	**Introduction to Web Development and the MEAN Stack:** Overview of web development, Introduction to the MEAN stack, Setting up the development environment	4	2
2	**MongoDB:** Introduction to NoSQL databases, Installation and configuration of MongoDB, CRUD operations in MongoDB, Indexing and querying in MongoDB, Schema design and data modeling	20	10
3	**Node.JS & Express JS:** Introduction to Node.js and Express.js, Introduction to Node.js and Express.js, Middleware and routing, Authentication and security with Passport.js, Error handling and logging	20	10
4	**Angular:** Introduction to Angular, Setting up an Angular application, Components, modules, and services, Data binding and templates, Forms and validation, Routing and navigation, HTTP and observables, Building a complete frontend for the MEAN stack application	30	13
5	**Integration:** Integrating the Angular frontend with the Express.js API, Authentication and user management integration , Handling real-time data with WebSockets, Error handling and testing	10	3
6	**Deployment and Best Practices:** Preparing the application for deployment, Hosting and server setup options, Security best practices, Performance optimization and testing, Version control and continuous integration.	6	3
7	**Final Project:**Project	10	4

Reference Books	
1.	**MEAN Web Development" by Amos Q. Haviv (Publisher: Packt Publishing) (TextBook)**
2.	**"Learning Node.js: A Hands-On Guide to Building Web Applications in JavaScript" by Marc Wandschneider (Publisher: Addison-Wesley Professional)**
3.	**"AngularJS: Up and Running: Enhanced Productivity with Structured Web Apps" by Shyam Seshadri and Brad Green (Publisher: O'Reilly Media)**
4.	**"MongoDB: The Definitive Guide: Powerful and Scalable Data Storage" by Shannon Bradshaw, Kristina Chodorow, and Eoin Brazil (Publisher: O'Reilly Media)**

Course Outcome

After Learning the Course the students shall be able to:

1. Have a comprehensive understanding of the technologies and frameworks that make up the MEAN stack, including MongoDB, Expíess.js, AngularJS, and Node.js.
2. Build full-stack web applications.
3. Understand web development best practices:
4. Work on real-world projects using the MEAN stack. This could include developing a portfolio of projects of contributing to open-source projects.

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Lecture Hrs/Week	Tutorial Hrs/Week	Lab Hrs/Week	Hrs/Week	Credit	T	CE	P	T	P	
0	0	2	-	1	-	-	20	-	30	50

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Course Outcome

After Learning the Course the students shall be able to:
1. Have a comprehensive understanding of the technologies and frameworks that make up the MEAN stack, including MongoDB, Expíess.js, AngularJS, and Node.js. 2. Build full-stack web applications. 3. Understand web development best practices: 4. Work on real-world projects using the MEAN stack. This could include developing a portfolio of projects of contributing to opensource projects.

List of Practical

1.	**1. Introduction to MEAN stack 2. Setting up the development environment 3. Overview of MongoDB, Express.js, Angular, and Node.js**
2.	**1. Creating and configuring MongoDB 2. Creating and configuring Express.js 3. Building RESTful APIs with Express.js**
3.	**1. Introduction to Angular 2. Building basic UI components with Angular 3. Creating a Single-Page Application (SPA) with Angular**
4.	**1. Introduction to Node.js 2. Creating and configuring Node.js 3. Building server-side applications with Node.js**
5.	**1. Integrating all components to build a full-stack application 2. Testing and debugging the application 3. Deploying the application on a cloud platform**