Full Stack Development

Course Code: **MCA-114** L T C

Course Name: **Full Stack Development** 3 1 4

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:-

1. The core concepts of both the frontend and backend programming.
2. The latest web development technologies.
3. Maintaining data using NoSQL data bases.
4. Complete web application development process.

PRE-REQUISITES:

1. HTML 5, CSS 3
2. JavaScript

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Relate the basics of Javascript (JS) and ReactJS	BTL1	PO1, PO2, PO3
CO2	Apply the concepts of props and State Management in React JS	BTL3	PO1, PO2, PO3, PO4, PO5
CO3	Examine Redux and Router with React JS	BTL4	PO1, PO2, PO3, PO4, PO6, PO7, PO10
CO4	Appraise Node JS environment and modular development	BTL5	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO10

CO5	Develop full stack applications using MongoDB	BTL6	PO1,PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11

UNIT – I

No. of Hours: 12 **Chapter / Book Reference: TB3 [Chapters: 1, 2, 4, 5, 6]**

Introduction to React: Definition of React, Obstacles and Roadblocks, React library, React Developer tools, Introduction to ES6, Declaring variables in ES6, Arrow Functions, ES6 Objects and Arrays, ES6 modules, Introduction to AJAX, Functions in AJAX.
Pure React: Page setup, virtual DOM, React Element, React DOM, Constructing Elements with Data, React Components, DOM Rendering, First React Application using Create React App, React with JSX, React Element as JSX.
Props, State and Component Tree: Property Validation, Validating Props with createClass, Default Props, ES6 Classes and stateless functional components, React state management, State within the component tree, state vs props, Forms in React.

UNIT – II

No. of Hours: 10 **Chapter / Book Reference: TB3 [Chapters: 7, 8, 9, 11]; TB4 [Chapters: 1, 2, 3, 5]**

Enhancing Components: Component Lifecycle, JavaScript library integration, Higher-Order Components, Managing state outside the react, Introduction to Flux
Redux and Router: State, Actions, Reducers, The Store, Middleware, React Redux, React Router, Incorporating the router, Nesting Router, Router parameters
JSON: Introduction, Syntax, Data types, Objects, Schema
REST API: Introduction, WRML, REST API Design, Identifier Design with URIs, Interaction Design with HTTP, Representation Design, Caching, Security

UNIT – III

No. of Hours: 12 **Chapter / Book Reference: TB2 [Chapters: 2-6]**

Introduction to Angular: Angular architecture; introduction to components, component interaction and styles; templates, interpolation and directives; forms, user input, form validations; data binding and pipes; retrieving data using HTTP; Angular modules
Node.js: Introduction, Features, Node.js Process Model
Environment Setup: Local Environment Setup, The Node.js Runtime, Installation of Node.js
Node.js Modules: Functions, Buffer, Module, Modules Types
Node Package Manager: Installing Modules using NPM, Global vs Local Installation, Attributes of Package.js on, Updating packages, Mobile-first paradigm, Using twitter bootstrap on the notes application, Flexbox and CSS Grids

File System: Synchronous vs Asynchronous, File operations
Web Module: Creating Web Server, Web Application Architecture, Sending Requests, Handling http requests

Express Framework: Overview, Installing Express, Request / Response Method, Cookies Management

UNIT – IV

No. of Hours: 10 **Chapter / Book Reference: TB1 [Chapters: 11-15]**

MongoDB: Introduction to NoSQL, Understanding MongoDB datatypes, Building MongoDB Environment (premise and cloud based), Administering Databases and User accounts, Configuring Access Control, Managing Collections, connecting to MongoDB from Node.js, Accessing and Manipulating Databases and Collections, Manipulating MongoDB documents from Node.js, Understanding Query objects, sorting and limiting result sets

TEXT BOOKS:

TB1. D. Brad, B. Dayley and C. Dayley, "Node.js, MongoDB and Angular Web Development: The definitive guide to using the MEAN stack to build web applications", Addison-Wesley Professional, 2nd Edition, 2017.

TB2. D. Herron, "Node.js Web Development", Packt Publishing, 2nd Edition, 2018.

TB3. A. Banks and E. Porcello, "Learning React: Functional Web Development with React and Redux", O'Reilly, 1st Edition, 2017.

TB4. M. Masse, "REST API – Design Rulebook", O'Reilly, 1st Edition, 2011.

REFERENCE BOOKS:

RB1. S. Pasquali and K. Faaborg, "Mastering Node.js", Packt Publishing Limited, 2nd Edition, 2017.

RB2. T. Dyl and K. Przeorski, "Mastering Full Stack React Web Development", Packt Publishing Limited, 1st Edition, 2017.

RB3. C.J. Ihrig and A Bretz, "Full Stack JavaScript Development with MEAN", SitePoint, 1st Edition, 2015.

RB4. E.W.I. Koroliova, "MERN Quick Start Guide: Build web applications with MongoDB, Express.js, React, and Node", Packt Publishing Limited, 1st Edition, 2018.