MERN STACK STANDARD COURSE CONTENTS

(DURATION 19 DAYS)

Prerequisite - Participants must have a good understanding of Database, HTML, JS, Jquery & Bootstrap.

Course Objectives -This course will offer a deep dive into Web Application Development & Mobile-Based Application Development. Also, the participants will have full exposure of RESTFUL Services or REST API. Will understand the complete CRUD operation using the MEAN Stack.

Lab Setup Details :
Hardware requirement:

CPU : I4/I5 , Hard Disk : 50GB , RAM :8 GB

Software Requirement:

- XAMPP https://www.apachefriends.org/download.html (DOWNLOAD VERSION 5.6.31)
- MSOFFICE 2010
- NOTEPAD++ https://notepad-plus-plus.org/download/v7.5.1.html (DOWNLOAD VER 7.5.1)
- SUBLIME TEXT3 https://www.sublimetext.com/3
- Visual Studio Code https://code.visualstudio.com/download
- PDF READER https://adobe-reader.en.softonic.com/download
- Browser Google Chrome OS Window 10

MongoDB (5 days)

Overview - SQL/NoSQL

- Datastore design considerations
- Relational v/s NoSQL stores
- Entities, Relationships and Database modelling
- When to use Relational/NoSQL
- Relational Storage Structures
- Categories of NoSQL stores
- Examples of NoSQL stores
- NoSQL Storage Structures

Data Formats

- What are Data Formats
- Difference between Data Formats and Data Structures
- Serializing and de-serializing data
- JavaScript Fundamentals
- The JSON Data Format
- BSON Data Format
- Advantages of BSON

Introduction to MongoDB

- Key Features of MongoDB
- Installing MongoDB
- Starting and Stopping the server
- Important file system locations
- Using the shell
- Integrating with other languages

MongoDB Concepts

- Servers
- Connections
- Databases
- Collections
- Documents
- Fields
- Indexes

MongoDB CRUD

- A look at a few use cases
- Insert (C)
- Simple Query Examples (R)
- Update (U)
- Remove (D)

Indexing

- Capped Collections
- Setting up Profiling
- Indexing concepts
- Types of Indexes
- Indexes covering queries

Querying MongoDB

- Query Expression Objects
- Query Options
- Cursors
- Mongo Query Language
- Dot Notation
- Full Text Search
- Cursors
- Adding Custom JavaScript

Advanced querying

- Joins
- Server-side v/s Client-side querying
- Retrieving a subset of fields
- Conditional operators
- Aggregation
- Grouping
- Projections

Replication

- Why Replication?
- Difference between replication and backup
- Replication Setups
- Master/Slave Replication
- Replica sets
- Setting up an Arbiter
- Failover
- Using data for replication analysis
- Oplogs
- Heartbeats
- Removing replica set members

    - Overriding the default sync target

- Write concerns Dummy Project

ReactJS (5 days)

Introduction

- Functions as first-class objects
- ES6 Concepts
- Pure functions
- Webpack

Setting up the Dev environment

- Webpack
- Webpack HMR
- React Developer Tools Chrome Extension

Introduction to React

- Evolution of client-side MVC and component-based architectures
- Hello World
- Introduction to JSX
- Component based architecture
- Composing Components
- Props and States
- Component life cycle
- Lists and keys
- Handling events
- Forms

Getting into depth

- Type checking with prop types
- Controlled components
- Parent to child and child to parent communication
- State management challenges, Observer pattern and Event Emitters
- Communication across the component hierarchy
- refs and context
- React Hooks
- Context APIs
- Error Boundaries
- Optimizing Performance in React

- Code Splitting
- Suspense

Patterns

- Mixin pattern
- Container and Presentation Components
- Higher Order Components
- Composition vs Inheritance and comparison of paradigms
- Anti-patterns

Integrating 3rd party components

- React-select case study
- React data grid React Router
- Introduction to Routing and History APIs
- Introduction to React Router
- URL parameters
- Redirects
- Link component
- history manipulation

State management

- Need for state management
- Redux (without React)
- React with Redux
- Mobx
- Comparison of different state management solutions

React Testing

- React Test Utilities
- Shallow rendering
- Jest

    - Enzyme

- Mocha

NODEJS (5 days)

JS in the Server

- A short history of Javascript
- Javascript in the server
- Difference between JS as a programming language and JS in the browser

Installation

- Node.js as a Javascript shell
- Node.js Hello World
- Reading command line arguments
- Working with Console APIs

Sync v/s Async

- Synchronous programming
- Asynchronous programming
- Event driven, single-threaded server
- Multi-threaded server
- Async gotchas (or things to remember when using Node)
- Cluster APIs
- Async module

File System APIs

- Reading files
- Writing files
- Synchronous v/s Asynchronous operations
- Working with directories

- Buffers

Modules

- Built-in modules
- Writing your own modules
- Installing 3rd party modules using npm
- Forever
- ExpressJS
- SocketIO

Misc (skim)

- Debugging Node.js apps
- Timers
- Deploying Node.js apps
- Exception Handling

- LoggingDummyProject

Express JS (4 days)

Getting Started

- Installation
- What is Express?

Routing and URL Building

- Basic routing in an Express application
- HTTP method
- Using dynamic routes

Middleware

- What is “Middleware”?
- Learn to write a simple middleware function

Templating

- Understanding Templating
- Installing templating engine for Express
- Using template engines with Expres
- Using Pug – a case study

Database Integration in Express

- Learn to connect databases to Express apps
- Connecting to MongoDB – a case study

RESTful APIs

- REST principles
- RESTful URIs and methods
- Creating API in Express

Scaffolding

- What is Scaffolding?
- Scaffolding tools for Express

Error handling and Debugging

- Error handling in Express using middleware
- Functions for error handling
- Express Debug module

LIVE PROJECT BASED ON MEAN STACK