INT222:ADVANCED WEB DEVELOPMENT

L:2 T:0 P:2 Credits:3

Course Outcomes: Through this course students should be able to

CO1 :: demonstrate Node.js modules and I/O operations for efficient asynchronous data handling.

CO2 :: build basic HTTP services and routing for handling client requests with Node.js and Express.

CO3 :: utilize socket communication and middleware for real-time and session management in Node.js

CO4 :: perform basic CRUD operations and database management using MongoDB and Node.js

CO5 :: execute basic SQL commands and CRUD operations using PostgreSQL

CO6 :: apply testing, deployment, and third-party rendering techniques for REST APIs

Unit I

Getting Started with Node.JS : Introducing Node.JS, Installing Node.js, Using Node.js Read Evaluate Print Loop(REPL), Node Pacakage Manager (npm), Initialize Node js project using npm init, NPM modules (Core Modules, Local Modules, Third Party Modules), EventEmitter in Node.js, Callbacks in Node.js

Handling Data I/O in Node.js : Working with fs module, Working with JSON, Using Stream Module to Stream Data, Compressing and Decompressing Data with Zlib, Promises and async/await

Unit II

Implementing HTTP Services in Node.JS : Introduction to HTTP module,, Setting up a basic HTTP server, Understanding Request and Response objects, Implementing basic routing, Setting response headers and status codes

Basic Websites With Node.JS : Introducing Express, Installing Express, GET and POST, body-parser, express.Router, express validator

Unit III

Socket Services in Node.js: : Understanding Network Sockets, Creating a basic WebSocket server, Sending and receiving messages, A Socket.IO Chat Server

Creating middlewares : Introduction to middleware, Implementing basic middleware, cookie-parser, cookie-session, express-session, app.use(), app.all()

Unit IV

Getting Started with MongoDB : Introduction to MongoDB, MongoDB database installation and shell installation, MongoDB Terminology - database, collection, document and filed, Getting familiar with MongoDB documents and collections, MongoDB shell commands - create database, create documents, create collections, drop collection, drop database, data manipulation - insert, update, delete, find, Connect MongoDB using Node.js and perform basic crud operations

Introduction to Mongoose : Schema definition, Models, CRUD operations

Unit V

Introduction to PostgreSQL : Introduction to PostgreSQL database, PostgreSQL installation, Basic SQL commands, CRUD operations

Unit VI

Testing and Deployment : Testing RestAPI, Deployment with GitHub, Third party rendering

List of Practicals / Experiments:

List of Practicals

- Install Node.js and manage packages using NPM.
- Create a Node.js script using EventEmitter and callbacks.
- Perform file operations using the fs module.
- Stream data between files and compress/decompress using Zlib.
- Build a basic HTTP server with routing and response handling.

- Create Express routes for GET and POST requests with body-parser.
- Validate request data using express-validator in Express.
- Set up a WebSocket server using Socket.IO for real-time messaging.
- Develop a simple chat application with Socket.IO.
- Implement custom middleware and session management in Express.
- Perform CRUD operations on MongoDB using Node.js.
- Define schemas and perform CRUD operations using Mongoose.
- Install PostgreSQL and execute basic SQL CRUD commands.
- Test REST APIs and deploy applications using GitHub and third-party tools.

Text Books:

1. NODE.JS GUIDEBOOK by DHRUTI SHAH, BPB PUBLICATIONS

References:

1. MODERN FULL-STACK REACT PROJECTS: BUILD, MAINTAIN, AND DEPLOY MODERN WEB APPS USING MONGODB, EXPRESS, REACT, AND NODE.JS by DANIEL BUGL, PACKT PUBLISHING