

Branch Name:	Bachelor of Computer Application (BCA)
Program Code:	CS101
Course Title:	Web Designing with Node JS
Course Code:	17-CAE401-4C
Pre-requisite Course:	Students should have basic knowledge of Computer Networks (TCP/IP, OSI model), Operating Systems (Windows/Linux), Web Technologies. Understanding of programming concepts (C/Python/Java) and introductory information security concepts is recommended. Awareness of cyber ethics and legal responsibilities is also desirable.

Course Objective (CO):

This course is intended to make the students:

- Understand modern web designing concepts and server-side development.
- Introduce Node.js environment and backend web development.
- Develop dynamic web applications using Node.js and Express.js.
- Implement database connectivity using MongoDB.
- Build full-stack web applications following industry practices.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
2	--	4	4	50	25	25	25	100

Course Contents:

Sr. No	Topics	Total Hours	Weightage (%)
1.	Fundamentals of Web Designing & Modern Web Technologies: Introduction to Web Designing, Evolution of Web Technologies, Client-Server Architecture, Web Browsers and Web Servers, HTML5 Fundamentals, CSS3 Styling Techniques, Responsive Web Design Concepts, Introduction to Bootstrap Framework, JavaScript Basics for Web Development, DOM Manipulation Concepts	10	20
2.	Introduction to Node.js: Introduction to Node.js, Features and Advantages of Node.js, Installation and Environment Setup, Node.js Architecture (Event Loop), Node Package Manager (NPM), Modules in Node.js, Built-in Modules (HTTP, File System, Path, OS), Creating Web Server using Node.js, Asynchronous Programming Concepts, Callbacks, Promises and Async/Await (Practical Component: Creating basic Node.js server)	10	20
3.	Express.js Framework: Introduction to Express.js, Installing and Configuring Express, Routing in Express, Middleware Concepts, Handling HTTP Requests & Responses, Template Engines (EJS Basics), Static Files Handling, Form Handling using Express, RESTful API Development, Error Handling Techniques (Practical Component: Developing Express-based web application)	10	20
4.	Database Integration with Node.js: Introduction to NoSQL Databases, MongoDB Fundamentals, CRUD Operations, Connecting Node.js with MongoDB, MongoDB Atlas Overview, Mongoose ODM Introduction, Schema and Model Creation, Data Validation Techniques, Authentication Basics, Session Management (Practical Component: CRUD application using MongoDB)	09	20
5.	Full Stack Application & Deployment: MVC Architecture Concept, □ Building Full Stack Web Application, User Authentication System, REST API Integration, Introduction to JWT Authentication, Web Security Basics, Deployment Concepts, Hosting Node.js Applications, Introduction to Cloud Deployment (Render/Heroku Conceptual), Case Study: Complete Web Application Development (Practical Component: Mini Project Development)	09	20

Course Learning Outcomes (CLO):

At the end of this course, the student would be able

- CLO1: Understand modern web designing principles.
- CLO2: Develop server-side applications using Node.js.
- CLO3: Build web applications using Express framework.
- CLO4: Integrate databases with Node.js applications.
- CLO5: Develop and deploy full-stack web applications.

List of Text Book:

1. David Herron — *Node.js Web Development* (Packt Publishing)
2. Ethan Brown — *Web Development with Node and Express*
3. Jon Duckett — *HTML & CSS: Design and Build Websites*

List of Reference Book:

1. Alex Banks & Eve Porcello — *Learning React*
2. Brad Dayley — *Node.js, MongoDB and Angular Web Development*
3. MDN Web Documentation (Online Resource)

E-Resource / Web Links:

- <https://nodejs.org>
- <https://expressjs.com>
- <https://mongodb.com>
- <https://developer.mozilla.org>
- <https://www.w3schools.com>
- <https://nptel.ac.in>

Mapping of CLO with PO and PSO

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CLO1		H	H		M		M						L		
CLO2	H			H	H		M			M	M		M	L	M
CLO3	H			M	H								M	M	
CLO4	H				H								H	M	M
CLO5	H			H	H	H	M	M	M		H		H	H	M

H: High, M: Medium, L: Low

Practical List (Open-Source Platforms Only)

1. Create responsive webpage using HTML & CSS.
2. JavaScript DOM manipulation program.
3. Install Node.js and create first server.
4. File handling using Node.js.
5. Create routing using Express.js.
6. Form handling using Express.
7. REST API creation.
8. MongoDB CRUD operations.
9. Authentication module implementation.
10. Mini Full Stack Web Application Project



Category	Tools
OS	Kali Linux
Virtualization	VirtualBox
Scanning	Nmap
Packet Analysis	Wireshark
Vulnerability Scan	OpenVAS
Web Testing	DVWA
Password Testing	John the Ripper
Forensics	Autopsy
Log Analysis	ELK Stack
Disk Imaging	dd