RAMDEOBABA UNIVERSITY

[RBU]

NAGPUR – 440013

RBU

RAMDEOBABA UNIVERSITY, NAGPUR

Formerly Shri Ramdobaba College of Engineering & Management (RCOEM) Est. 1984

PROGRAMME SCHEME & SYLLABI
B. Tech Computer Science & Engineering

Multidisciplinary Minor [MDM]

2024-25

School of Computer Science & Engineering

Multidisciplinary Minor [MDM] Track in Computer Science & Engineering

Sr. No.	Sem	Course Code	Name of Course	Hours per week		Credits	Maximum Marks			ESE Duration Hrs
				L	P		Continuous Evaluation	End Sem Exam	Total	
1	III	24CS01TH0305	Introduction to Web Development	3	0	3	50	50	100	3
2	IV	24CS01TH0407	Front End Development	3	0	3	50	50	100	3
3	V	24CS01TH0507	Backend Technologies	3	0	3	50	50	100	3
4	VI	24CS01TH0605	Cloud Technologies	3	0	3	50	50	100	3
			TOTAL	**12**	**0**	**12**	**200**	**200**	**400**	

Course Code : 24CS01TH0305 **Course : Introduction to Web Development**

L: 3Hrs, T: 0 Hr, P: 0Hrs, Per Week **Total Credits: 03**

Course Objectives

1. To learn HTML, CSS and Bootstrap to create visually appealing and user-friendly websites.
2. To understand the basics of JavaScript programming language and gain proficiency in handling events and user interactions.
3. To explore advanced ES6 concepts and best practices for web development.

SYLLABUS

UNIT I: Fundamentals of HTML: Basics of HTML, Elements, Attributes, Headings, Paragraphs, Formatting Tags, Lists, Hyperlinks, Images, Table, HTML Forms, Navigation in Web page, Multimedia based tags i.e. audio, video, iframe tag.

UNIT II: Fundamentals of CSS: Introduction to Cascading Style Sheets (CSS), Benefits, Syntax, Types: Inline, Internal and External Style Sheet, CSS Selectors, Backgrounds, Borders, Text, Fonts, Tables, Box Model and Display Positioning.

UNIT III: Introduction to Bootstrap: Features and Benefits of Bootstrap, Bootstrap Grid Basic, Typography, Tables, Components, Forms & Input Elements, Navigation & Menus, Flexbox, Modals, Tooltips & Popovers.

UNIT IV: JavaScript: Introduction to JavaScript, Syntax, Variables and Data Types, Statements, Operators, Literals, Objects, Strings, Arrays, Functions, Handling Events in JavaScript, Form Validation.

UNIT V: Exploring ES6 Features: Let and Const Declarations, Arrow Functions and Template Literals, Destructuring and Spread/Rest Operators, Classes and Modules, Exploring Array Methods and Iterators, Promises and Async/Await.

Course Outcomes:

On successful completion of the course, students will be able to:

1. Design static web pages using HTML.
2. Demonstrate proficiency in web page styling using CSS.
3. Develop modern, responsive web applications using Bootstrap.
4. Design and develop dynamic web pages using JavaScript.
5. Apply ES6 features to create interactive and dynamic web designs.

Text Books

1. Mastering HTML, CSS & Javascript Web Publishing, Laura Lemay, Rafe Colburn and Jennifer Kyrnin, BPB Publications, 1st edition, 2016
2. Bootstrap 5 Foundations, Daniel Charles Foreman, Independently published, 2021.
3. Simply ES6: Mastering JavaScript and ES6 to its fullest, Anna Voice, Ray Voice, independently published, 2nd edition, 2020.

Reference Books

1. HTML & CSS: The Complete Reference, Thomas Powell, MGH, 5th edition, 2017.
2. JavaScript: The Complete Reference, Thomas Powell, Fritz Schneider, MGH, 3rd edition, 2012
3. "Exploring ES6", Axel Rauschmayer, Leanpub, 2018.

Course Code : 24CS01TH0407 **Course : Front End Development**

L: 3Hrs, T: 0 Hr, P: 0Hrs, Per Week **Total Credits: 03**

Course Objectives

1. To learn the fundamentals of React with JavaScript and JSX to create templates with React components and their importance in building reusable UI elements.
2. To familiarize the students with essential skills for modern front-end web development using ReactJS features.
3. To comprehend the concept of Single Page Applications (SPAs) using React Router.

Syllabus

UNIT I: Introduction to React: ReactJS Introduction, Advantages of React JS, Introduction to JSX, Difference between JS and JSX, Templating using JSX, Working with React, create Element, Expressions, logical operators, specifying attributes, children and Fragments.

UNIT II: React Components overview: Types of components, Controlled, Split Up, Composable, Reusable, Component Declarations and Styling Components, Conditional Rendering, List Rendering.

UNIT III: Props and State: State and its significance, Read state and setState, Passing data to components using props, Validating props using prop Types, Supplying default values to props using default Props.

UNIT IV: Event Handling: Lifecycle Methods, Handling events in React Components, React Forms, Controlled Components, Uncontrolled components.

UNIT V: Routing with React Router: Need of react Router, React Router Installation, Components in React Router, Adding Navigation using Link component.

Course Outcomes:

On successful completion of the course, students will be able to:

1. Understand the fundamentals of React with JavaScript and JSX.
2. Develop modular and reusable React components to build scalable web applications.
3. Utilize props and state effectively to manage data flow and UI interactions in React applications
4. Implement event handling to create interactive user experiences
5. Demonstrate dynamic routing and navigation in a React application.

Text Books

1. React Up & Running: Building Web Applications - Stoyan Stefanov, O'Reilly Media, Second Edition, 2021.
2. Learning React: Modern Patterns for Developing React Apps - Alex Banks & Eve Porcello, O'Reilly Media, Second Edition, 2020.
3. React in Action 1st Edition - Mark Tielens Thomas, Manning Pubns Co, First Edition, 2018.

Reference Books

1. Pure React- a step-by-step guide - Dave Ceddia
2. Road to learn react - Robin Wieruch

Course Code : 24CS01TH0507 **Course : Backend Technologies**

L: 3Hrs, T: 0 Hr, P: 0Hrs, Per Week **Total Credits: 03**

Course Objectives

1. Understand the basics of how web applications work behind the scenes.
2. Learn to build and deploy simple backend systems.
3. Learn how to integrate databases and APIs.
4. Understand the importance of security and data management in backend systems.
5. Understand Deployment of backend applications.

SYLLABUS

UNIT I: Introduction to Backend Development: Overview of Backend Technologies Client-Server Architecture, Frontend vs. Backend vs. Full Stack, HTTP/HTTPS Protocols, HTTP Methods (GET, POST, PUT, DELETE), Web Servers & Deployment

UNIT II: Server-Side Programming: Server-Side Languages: Introduction to Node.js (JavaScript/TypeScript), Python (Django/Flask), Java (Spring Boot), PHP (Laravel)

UNIT III: Database Integration: Databases: Introduction to Databases, SQL vs NoSQL, MySQL/PostgreSQL (Relational), MongoDB (NoSQL), Connecting databases with Node.js/Express or Python, CRUD operations with database

UNIT IV: Authentication and Security: Authentication vs Authorization Session and Token-based Authentication (JWT), User login/register system, Data validation and sanitization, Security best practices: Hashing (bcrypt), HTTPS, CORS, Helmet.js Preventing SQL Injection, XSS, CSRF

UNIT V: Deployment: Deploying backend applications, Cloud platforms, Overview of microservices and serverless architecture

Course Outcomes:

On successful completion of the course, students will be able to:

1. Understand working of web applications.
2. To build and deploy simple backend systems.
3. To integrate databases and APIs.
4. To Understand the importance of security in backend systems.
5. To Deploy of backend applications.

Text Books and Reference Books

1. Web Development with Node and Express, Author: Ethan Brown, O'Reilly Media Edition: 2nd Edition (2019)
2. Flask Web Development: Developing Web Applications with Python, Miguel Grinberg, Publisher: O'Reilly Media, 2nd Edition (2018)
3. Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5, Robin Nixon Publisher: O'Reilly Media Edition: 6th Edition (2021)

Course Code : 24CS01TH0605 **Course : Cloud Technologies**

L: 3Hrs, T: 0 Hr, P: 0Hrs, Per Week **Total Credits: 03**

Course Objectives

1. Understand the core concepts and architecture of cloud computing.
2. Explore various service models such as IaaS, PaaS, and SaaS.
3. Learn about different cloud deployment models and platforms.
4. Gain knowledge of virtualization and containerization technologies.
5. Implement applications using public cloud services like AWS, Azure, or GCP.
6. Identify challenges and solutions related to cloud security and management.

SYLLABUS

UNIT I: Introduction to Cloud Computing: Definition and Characteristics of Cloud Computing, Cloud Service Models: IaaS, PaaS, SaaS, Cloud Deployment Models: Public, Private, Hybrid, Community, Advantages and Challenges of Cloud Computing, Cloud Computing vs. Traditional Computing

UNIT II: Virtualization and Containerization: Introduction to Virtualization, Types of Virtualization: Hardware, OS, Storage, Network, Hypervisors: Type 1 and Type 2, Introduction to Containers and Docker, Comparing VMs and Containers

UNIT III: Cloud Infrastructure and Platforms: Cloud Infrastructure Components: Compute, Storage, Network, Overview of AWS, Microsoft Azure, Google Cloud Platform, Storage Services: S3, Blob, Google Cloud Storage, Compute Services: EC2, Azure VM, GCP Compute Engine, Deployment and Configuration Management Tools

UNIT IV: Cloud Security and Compliance: Security Challenges in the Cloud, Cloud Security Principles and Controls, Identity and Access Management (IAM), Compliance Standards: ISO, GDPR, HIPAA, Security Tools and Best Practices

UNIT V: Cloud Application Development and Management: Developing Applications for the Cloud, Cloud Native vs. Cloud Enabled Applications, DevOps in the Cloud: CI/CD Pipelines, Monitoring and Performance Management, Cost Management and Auto-scaling

Course Outcomes:

On successful completion of the course, students will be able to:

CO1: Define the basic concepts and models of cloud computing.
CO2: Compare and contrast various cloud service and deployment models.
CO3: Apply virtualization and container technologies for cloud environments.
CO4: Utilize major cloud platforms for deploying applications.
CO5: Analyze cloud security issues and implement best practices for cloud management.

Text Books

1. Cloud Computing: Concepts, Technology & Architecture – Thomas Erl.
2. Cloud Computing Bible – Barrie Sosinsky.

Reference Books

1. Cloud Computing: Principles and Paradigms – Rajkumar Buyya, James Broberg, Andrzej Goscinski.
2. Architecting the Cloud– Michael J. Kavis.
3. Amazon Web Services in Action – Michael Wittig, Andreas Wittig.
4. Official documentation from AWS, Azure, and GCP.