

PCAC2003 WEB AND APPLICATION DEVELOPMENT (3-0-0)

OVERALL COURSE OBJECTIVES: To enable learners to apply HTML5, CSS, Javascript, Git, GitHub, React, Node.js, and Express effectively in creating dynamic and interactive websites and web applications, understand and implement front-end and back-end development practices, effectively use version control for collaboration and demonstrate competencies in widely-used web technologies and server-side frameworks.

Module 1: [Introduction to Web Development with HTML, CSS, JavaScript](#) [13 Hours]

This starter course is designed for individuals aiming to become Web Developers, offering an introduction to the roles of front-end, back-end, and full-stack developers in development projects. It also familiarizes learners with the terminology and skills essential for a web development career. The focus is given to the languages needed for website or application development with a comprehensive understanding of HTML and CSS for creating the structure and style of websites. JavaScript is introduced to enable dynamic page features like interactive forms, dynamic content modification, and sophisticated menu systems. On completing this course, learners will be able to create a basic structure for a website, format and layout for web applications, enhance websites with rich, interactive applications, increase user interactivity and experience, and provide their websites with a unique appeal. Hands-on labs provide practical application opportunities, and a final portfolio-worthy project involves creating a webpage to showcase the skills learned.

Sub-Topic

Introduction to Application Development
CSS Overview & HTML5 Elements
HTML Overview
JavaScript Programming for Web Applications

Formative Assessments:

4 graded quizzes and 1 Peer-review assignment.

Module 2: [Getting Started with Git and GitHub](#) [18 Hours]

This self-paced introductory course provides an in-depth understanding of Git and GitHub, essential tools for collaboration and social coding in modern software engineering and DevOps culture. Starting with Git and GitHub fundamentals, it covers key Git concepts such as branching and repositories, along with the use of Git commands. The course includes hands-on labs, augmenting understanding of Git concepts including forking, cloning, and merging workflows, and fostering team productivity on GitHub. It concludes with a final project that allows students to begin building their portfolio with a public/open-source GitHub project, thus demonstrating their Git and GitHub skills and providing a valuable addition to their resume. All activities are browser-based, negating any need for specialized software installation on the learner's computer.

Sub-Topic

Git and GitHub Fundamentals
Using Git Commands and Managing GitHub Projects
Cloning and Forking GitHub Projects

Formative Assessments:

2 graded quizzes and 1 Peer-review assignment.

Module 3: [Developing Front-End Apps with React](#) [14 Hours]

This course provides comprehensive instruction on React, a popular framework for web and front-end application development. The curriculum includes building rich front-end applications with React and ES6, connecting React components using data and state, and writing advanced React components using Hooks and Redux. Learners will gain access to the React web framework UI library and learn to run rich React applications, modify their properties and states, and connect to an external server from a React page. The course also introduces various testing tools to verify components without manual checking. Hands-on labs and a final portfolio-worthy project form part of the course, demonstrating learners' acquired React skills. This course is beneficial for those looking to further their IT career as front-end or full-stack developers. Prior knowledge of HTML, CSS, JavaScript, and Git/GitHub is required.

Sub-Topic

Advanced React
Building Rich Front-End Applications with React and ES6
React Components
Introduction to TypeScript
Passing Data and States Between Components

Formative Assessments:

3 graded quizzes and 1 Peer-review assignment.

Module 4: [Developing Back-End Apps with Node js and Express](#) [12 Hours]

This course primarily focuses on Node.js and Express, two popular web technologies. Node.js, the most commonly used server-side technology, and Express, the most prevalent server-side web framework, are vital for developing modern web applications. In this course, you will concentrate on crafting applications using asynchronous callbacks and promises, creating REST APIs, and performing CRUD operations. You will also learn to implement authentication and session management. Ample hands-on labs provide practical experience, and a final project allows you to demonstrate your Node.js skills and add to your portfolio. This course equips you to thrive as a back-end or full-stack developer and is perfect for IT professionals aspiring for career advancement, new graduates looking to refine their server-side skills, and those managing cloud-centric projects. Prerequisites include knowledge of JavaScript and Git.

Sub-Topics

Introduction to Server-Side JavaScript
Asynchronous I/O with callback programming
Express Web Application Framework

Formative Assessments:

3 graded quizzes and 1 Peer-review assignment.

LEARNING OUTCOMES: On successful completion of the course the students shall be able to:

1. Demonstrate the fundamentals of HTML5, CSS, and JavaScript to create dynamic websites and web applications.

2. Utilize Git and GitHub for version control, collaboration, and social coding effectively in software engineering and DevOps practices.
3. Leverage React and ES6 to construct rich and interactive front-end applications with features like Hooks and Redux.
4. Design and manipulate dynamic user interfaces through React components, their properties, and states.
5. Develop back-end applications using Node.js and Express with features like asynchronous callbacks, REST APIs, CRUD operations, and session management.
6. Exhibit proficiency in server-side technologies, focusing on most popular server-side web framework- Express.