Web Development
(Fast-Track & Skill-Oriented Training Program)

IFAD
INTERNATIONAL
FUND FOR
AGRICULTURAL
DEVELOPMENT

University of Engineering & Technology, Peshawar

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1. Introduction

The Full-Stack Web Development Training Program, meticulously designed by the University of Engineering and Technology (UET), Peshawar, is a comprehensive 45-hour training initiative tailored for aspiring developers. This program equips beginners with foundational to intermediate-level skills in modern web development using the MERN stack (MongoDB, Express.js, React.js, and Node.js). Through a balanced combination of theoretical instruction and hands-on projects, participants learn to build scalable, dynamic web applications covering both frontend and backend development. The curriculum emphasizes industry-relevant practices such as RESTful API development, database integration, deployment strategies, and portfolio building, ensuring that learners are job-ready for entry-level roles in the tech industry

2. Training Objectives

1. Comprehend the core concepts of full-stack web development using the MERN stack, including frontend technologies (HTML, CSS, JavaScript, React.js), backend frameworks (Node.js, Express.js), and database systems (MongoDB, Mongoose)

2. Develop robust and secure RESTful APIs, implement user authentication mechanisms, and manage application data effectively through backend services.

3. Design responsive and interactive web applications and deploy them on cloud platforms such as Heroku and Netlify, while building a professional portfolio through hands-on, real-world projects.

3. Training Learning Outcomes (TLOs)

TLO 1: Participants will be able to explain the core concepts of full-stack development and the MERN stack architecture, including frontend (React.js), backend (Node.js & Express.js), and database (MongoDB) integration. They will also understand version control using Git, and deployment platforms like Netlify and Heroku.

TLO 2: Participants will be able to design, develop, and deploy a fully functional web application using the MERN stack. They will demonstrate proficiency in integrating frontend and backend, performing CRUD operations with MongoDB, handling user authentication, and deploying the app to a live server.

4. Assessment

Component	Marks	Passing Criteria
Theory (MCQs + Short Questions)	30	50% (15 marks)
Practical (Capstone + Presentation)	70	60% (42 marks)
Total	100	To be eligible for the Certificate of Competency in Full-Stack Web Development, trainees must maintain at least 75% attendance and successfully pass both the theory and practical components of the assessment.

5. Who Should Enrol?

- **Beginners:** Individuals new to web development or studying computer science, IT, or related fields who want to build practical skills in full-stack development.
- **DAE Holders and Professionals:** Those with technical backgrounds seeking to upgrade their skills or transition into web development roles by gaining hands-on experience.
- **Technology Enthusiasts:** Anyone interested in creating modern web applications with real project and deployment experience.

6. Training Module and Delivery plan

Total Training Hours	45 Hours
Training Methodology	**Theory**: 9 Hours (20%) **Practical**: 36 Hours (80%)
Medium of Instruction & Assessment	English & Urdu

7. Training Schedule

S.no	Module Title	Learning Unit	Tools/ Libraries Used	Theory Hours	Practical Hours
1	**M1:** Introduction to MERN Stack & Frontend Basics	**LU1.1:** Overview of Full-Stack Development and MERN Stack **LU1.2**: Setting Up Development Environment (Node.js, VS Code) **LU1.3**: Introduction to HTML5 and CSS3 Basics **LU1.4**: Building a Simple Web Page Layout **LU1.5**: Introduction to Git & Version Control **Practical Exercises**: Creating a structured HTML page with CSS styling and Git setup	- VS Code: Code editor -Git/GitHub: Version control - HTML5, CSS3: Web structure and styling	1hr	6hrs
2	**M2**: JavaScript Essentials & DOM Manipulation	**LU2.1**: JavaScript Fundamentals: Variables, Loops, Functions **LU2.2**: DOM Manipulation: Accessing and modifying HTML elements **LU2.3**: Event Handling and Basic Animations	- JavaScript (ES6): Client-side logic - DOM API: Web page manipulation - Chrome -DevTools: Debugging	1hr	6hrs

		LU2.4: Introduction to ES6 Features: Arrow Functions, Let/Const, Template Literals -**Practical Exercises**: Building interactive elements and handling user events			
3	**M3**: React.js Fundamentals	**LU3.1**: Introduction to React.js and JSX **LU3.2**: Functional Components and State Management **LU3.3**: Props, Event Handling, and Conditional Rendering **LU3.4**: React Router Basics for Navigation -**Practical Exercises**: Creating reusable React components and basic navigation	- React.js: Frontend library - React Router: Page routing - Babel/Webpack: React compilation (implicitly via Create React App)	1hr	6hrs
	Exam	**Quiz**		30min	0
	Assignment	**Capstone Project**			
4	**M4**: Backend Development with Node.js & Express.js	**LU4.1**: Introduction to Node.js Express.js and event loops. **LU4.2**:Setting up REST APIs, MVC and Routes **LU4.3**: Working with HTTP Methods (GET, POST, PUT, DELETE) **LU4.4**: Understanding Middleware in Express **-Practical Exercises**: Building simple CRUD APIs	- Node.js: JavaScript runtime - Express.js: Backend framework - Postman: API testing	1hr	6hrs

5	**M5**: Database Integration with MongoDB Deployment	**LU5.1**: Introduction to NoSQL and MongoDB **LU5.2**: Connecting MongoDB with Express.js **LU5.3**: Performing CRUD Operations (Create, Read, Update, Delete) **LU5.4**: Introduction to Mongoose for Data Modeling -**Practical Exercises**: Building a simple database-driven application -Building a Full-Stack MERN Application Integrating Frontend (React) with Backend (Express, MongoDB) -Managing Application State and Data Flow -Implementing Authentication and Authorization Basics	- MongoDB Atlas: Cloud database - Mongoose: ODM for MongoDB -Node.js -Express.js -Dotenv -Postman -React.js -Axios -React Router -Context API JWT -bcrypt.js	1hr	7hrs
6	**M6**: Deployment	**LU6.1**: Deployment to Heroku or Netlify	-Netlify (frontend) / Render or Heroku (backend -GitHub Pages: For static site hosting (require Credit Card Details)	1hr	2hrs
	Entrepreneurship	Introduction to technology entrepreneurship (focusing on web development), Turning MERN projects into startups, covering MVP, business models, deployment, and pitch basics.		2hrs	0
	Exam	Short Question		30min	0
	Project Demo	Capstone Project Demonstration & Presentation		0	3hrs
			Total	9	36
				45	

8. Trainer Qualification Level

Qualification Level of trainer	Qualification / Certification	Purpose / Importance
Minimum Mandatory	12 years of education or Diploma of Associate Engineer (DAE) in the relevant field: Completion of courses online, such as Coursera, Udemy etc.	Provides essential theoretical foundations and fundamental technical skills necessary for effective training, while enabling skilled technical trainers without formal degrees to demonstrate their competence through practical, Hands-on experience.
Preferred	16 years of education in the relevant field ● The trainer's specialization should be in Full-Stack Web Development or a closely related field.	These requirements ensure trainers have the necessary education and expertise to deliver high-quality, industry-relevant instruction, enhancing the learning experience and credibility of the program.

9. Training Resources (Consumable/ Non-Consumable)

Type	Category	Items Needed
Consumable	Markers Notebook Pens Duster for whiteboard Cleaning Printer paper (A4 Pages 1 Rim) Pencils Sharpener Eraser	(1 Box Black or Blue) (50 Notebook) (4.5 Dozen) (2) (500 pages) (2 Dozen) (1 Dozen) (1 Dozen)
Non-consumable	- Computer/Laptop (min: Core i5, 8GB RAM recommended) - Minimum Wi-Fi Speed: 10 Mbps - HDMI Connector - VS Code, Node.js & npm, Git/GitHub, MongoDB Compass/Atlas, Postman - Web Browser (Chrome/Firefox), Optional tools: React.js, Express.js, etc. - Computer/Laptop with required software, GitHub access, MongoDB setup - Access to deployment platforms (Netlify, Heroku, Render) - Multimedia projector/large screen, Whiteboard - Reliable power supply, Power sockets, Stable Wi-Fi	

10. Job Opportunities

- Front-End Developer: Builds user-facing website interfaces.
- Back-End Developer: Develops server-side logic and databases.
- Full-Stack Developer: Handles both front-end and back-end development.
- Web Application Developer: Creates dynamic web applications.
- JavaScript Developer: Specializes in JavaScript programming for web projects.
- Database Developer / Administrator: Manages and optimizes databases.
- Freelance Web Developer: Offers independent web development services.

11. Recommended Books

- Eloquent JavaScript by Marijn Haverbeke, 3rd Edition, 2018.
- Learning React by Kirupa Chinnathambi, 1st Edition, 2019, Addison-Wesley
- MDN Web Docs (HTML, CSS, JavaScript documentation), continuously updated, Mozilla Foundation
- Official Node.js Documentation, latest edition, 2023, Node.js Foundation
- MongoDB University Tutorials, updated 2022, MongoDB Inc.

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