Government of Pakistan

**National Vocational and Technical Training Commission**

**Blended International IT Trainings –**

**BIITT 2025**



**Course Contents/ Lesson Plan**

**Course Title:** IBM Full-Stack JavaScript Developer Professional Certificate

**Duration: 3** Months

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| **Trainer Name** |  |
| **Course Title** | **IBM Full-Stack JavaScript Developer Professional Certificate** |
| **Objective of Course** | A full-stack JavaScript developer is responsible for both the front-end (client-side) and back-end (server side) development of web applications.In this program, you’ll learn to build, deploy, test, run, and manage cloud-native full-stack applications. Technologies covered include **HTML, CSS, GitHub, JavaScript, Node.js, Express, React, DevOps, Containers, Docker, Kubernetes, NoSQL databases, Microservices, Serverless computing**, and more. You’ll also **develop several applications using front-end and back-end technologies** and deploy them using cloud-native methodologies. In the final course, you learn inside tips and steps to perform effectively at interviews and **unlock exclusive access to career support resources** to help you in your job search.Upon completing the full program, you will have a portfolio of projects that will not only boost your confidence but also prepare you to excel in interviews. Additionally, you will be awarded a Professional Certificate and a badge from IBM, serving as tangible proof of your skills and proficiency to potential employers. |
| **Course Execution Plan** | Total Duration of Course: **3 Months (12 Weeks)** |
| Class Hours: **3 Hours per day** |
| **Theory: 30% Practical: 70%** |
| Weekly Hours: **15 Hours Per week** |
| Total Contact Hours: **200 Hours** |

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| **Learning Outcome of the Course** | By the end of the course, students will have acquired a comprehensive skill set in:* Master the full-stack development languages, frameworks, tools, and technologies to develop job-ready skills valued by employers.
* Develop websites and front-end software using HTML, CSS, JavaScript, and React.
* Write, deploy, and scale cloud-native back-end applications using Node, NoSQL databases, containers, microservices, and serverless.
* Employ DevOps practices and Agile methodologies to continuously build and deploy software using CI/CD tools.
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| **Companies Offering Jobs in the respective trade** | * IBM
* Accenture
* Cognizant
* Infosys
* Capgemini
* Amazon
* Flipkart
* Turing
* Andela
* Deel
* Freelancing

These companies, Hands-on, project-based learning, end-to-end understanding of frontend, backend & deployment and proven skills in modern JavaScript tools & frameworks. |
| **Job Opportunities** | Over the past decade, JavaScript has evolved into the backbone of modern web development, powering everything from single-page applications to enterprise-level platforms. With the rapid shift toward cloud-based and responsive digital solutions, full-stack JavaScript developers are in high demand across industries. Graduates of this certification can pursue roles such as:* Full-Stack JavaScript Developer
* Frontend Developer (React.js)
* Backend Developer (Node.js, Express)
* Web Developer
* Junior Software Engineer
* MERN Stack Developer
* API Developer
* DevOps Support Engineer
* Technical Support Engineer (Web Stack)
* Freelance Web Developer
* Cloud Web Application Developer
* Deployment Engineer (CI/CD)
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| **No of Students** |  25-30 |

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| **Learning Place** | Labs |
| **Instructional Resources** | The following link will be accessible for students once they are enrolled in the program:https://www.coursera.org/professional-certificates/ibm-full-stack-javascript-developer |
| **Scheme of Study** |

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| **Sr. No**  | **Main Topics**  | **Theory Hrs.** | **Practical Hrs.** | **Total Hrs.** |
| **1.** | Introduction to Software Engineering | **12** | **3** | **15** |
| **2.** | Introduction to Software Engineering / Introduction to HTML, CSS, & JavaScript | **7** | **8** | **15** |
| **3.** | Getting Started with Git and GitHub / JavaScript Programming Essentials | **4** | **11** | **15** |
| **4.** | JavaScript Programming Essentials / Developing Front-End Apps with React | **4** | **11** | **15** |
| **5.** | Developing Front-End Apps with React / Developing Back-End Apps with Node.js and Express | **4** | **11** | **15** |
| **6.** | Developing Back-End Apps with Node.js and Express / Get Started with Cloud Native, DevOps, Agile, and NoSQL | **4** | **11** | **15** |
| **7.** | Get Started with Cloud Native, DevOps, Agile, and NoSQL / Introduction to Containers w/ Docker, Kubernetes & OpenShift | **3** | **12** | **15** |
| **8.** | Introduction to Containers w/ Docker, Kubernetes & OpenShift / Application Development using Microservices and Serverless | **4** | **11** | **15** |
| **9.** | Application Development using Microservices and Serverless / Node.js & MongoDB: Developing Back-end Database Applications | **4** | **11** | **15** |
| **10.** | Node.js & MongoDB: Developing Back-end Database Applications | **3** | **12** | **15** |
| **11.** | Node.js & MongoDB: Developing Back-end Database Applications / JavaScript Full Stack Capstone Project | **2** | **13** | **15** |
| **12.** | JavaScript Full Stack Capstone Project / Software Developer Career Guide and Interview Preparation | **3** | **12** | **15** |
| **Total** | **54** | **126** | **180** |

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| **Scheduled Week** | **Module Title** | **Day** | **Learning Units** | **Tasks** |
| Week 1/12 | Introduction to Software Engineering | Day 1 | The Software Development Lifecycle | Create an Architectural Diagram |
| Day 2 | Introduction to Software Development |
| Day 3 | Basics of Programming |
| Day 4 | Software Architecture, Design, and Patterns |
| Day 5 | Job Opportunities and Skillsets in Software Engineering |
| Week 2/12 | Introduction to Software Engineering / Introduction to HTML, CSS, & JavaScript | Day 1 | Quiz and Final Project | Simple Interest Calculator |
| Day 2 | HTML Overview |
| Day 3 | CSS Overview & HTML5 Elements |
| Day 4 | JavaScript Programming for Web Applications |
| Day 5 | Career Opportunities and Final Project |
| Week 3/12 | Getting Started with Git and GitHub / JavaScript Programming Essentials | Day 1 | Git and GitHub Fundamentals | Cloning and Forking GitHub Projects |
| Day 2 | Git Commands and Managing GitHub Projects |
| Day 3 | Project and Assessment |
| Day 4 | Working with GitHub from Your Windows Desktop |
| Day 5 | Introduction to JavaScript Development |
| Week 4/12 | JavaScript Programming Essentials / Developing Front-End Apps with React | Day 1 | Arrays and Objects in JavaScript | Develop an Application for Healthcare Census |
| Day 2 | Working with DOM in JavaScript |
| Day 3 | JavaScript Async |
| Day 4 | Final Project and Course Wrap-up |
| Day 5 | Introduction to React and Class Components |
| Week 5/12 | Developing Front-End Apps with React / Developing Back-End Apps with Node.js and Express | Day 1 | Understanding Function Components with Array and DOM Manipulation | Async Callback Programing  |
| Day 2 | In-depth Understanding of Advanced React Functionality |
| Day 3 | Practice, Final Project, and Peer Review Assignment |
| Day 4 | Introduction to Server-Side JavaScript |
| Day 5 | Asynchronous I/O with callback programming |
| Week 6/12 | Developing Back-End Apps with Node.js and Express / Get Started with Cloud Native, DevOps, Agile, and NoSQL | Day 1 | Express Web Application Framework | Friends List Application Using Express Server with JWT |
| Day 2 | Final Project |
| Day 3 | Introduction to Cloud Native |
| Day 4 | DevOps & CI/CD |
| Day 5 | Agile & Scrum |
| Week 7/12 | Get Started with Cloud Native, DevOps, Agile, and NoSQL / Introduction to Containers w/ Docker, Kubernetes & OpenShift | Day 1 | NoSQL Databases in Cloud | Tax Calculator application |
| Day 2 | Final Project and Final Exam |
| Day 3 | Containers and Containerization |
| Day 4 | Kubernetes Basics |
| Day 5 | Managing Applications with Kubernetes |
| Week 8/12 | Introduction to Containers w/ Docker, Kubernetes & OpenShift / Application Development using Microservices and Serverless | Day 1 | The Kubernetes Ecosystem: OpenShift, Istio, etc. | Build and Deploy a Simple Guestbook App |
| Day 2 | Final Assignment |
| Day 3 | Final Assignment |
| Day 4 | Introduction to Microservices |
| Day 5 | Web API Essentials: REST API and GraphQL |
| Week 9/12 | Application Development using Microservices and Serverless / Node.js & MongoDB: Developing Back-end Database Applications | Day 1 | Serverless Overview | Product Price Comparison Application |
| Day 2 | Create and Deploy Microservices using Serverless |
| Day 3 | Final Project |
| Day 4 | OpenShift Essentials/Working with OpenShift and Istio |
| Day 5 | Introduction to Working with Databases |
| Week 10/12 | Node.js & MongoDB: Developing Back-end Database Applications | Day 1 | Introduction to Working with Databases | Deploying a Dockerized Node App for Customer Portals |
| Day 2 | Working with Node and Databases |
| Day 3 | Working with REST API’s and advanced Node concepts |
| Day 4 | Error Handling and Middleware |
| Day 5 | Scaling and Deploying Node Applications |
| Week 11/12 | Node.js & MongoDB: Developing Back-end Database Applications / JavaScript Full Stack Capstone Project | Day 1 | Final Project | Social Media Dashboard |
| Day 2 | Final Quiz, and Course Wrap-Up   |
| Day 3 | Project Introduction, Repository Setup, User Stories and Database Setup |
| Day 4 | Back-end APIs and Services |
| Day 5 | Add Front-end Pages |

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| Week 12/12 | JavaScript Full Stack Capstone Project / Software Developer Career Guide and Interview Preparation |  Day 1 | Back-end APIs for Front-end Components | Capstone Project |
| Day 2 | CI/CD, Containerize, and Deploy |
| Day 3 | Final Project Submission |
| Day 4 | Building a Foundation |
| Day 5 | Applying and Preparing for an Interview  |

List of Machinery / Equipment

1. **Software List**

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| **Sr. No** | **Software Name** |
| 1. | MS Office(Installed on each PC) |
| 2. | Operating System (Windows, Linux or other Operating Systems) |
| 3. | Programming Languages including JavaScript (Front-End & Back-End with Node.js), HTML5, CSS3, React.js, Express.js, MongoDB Query Language (MQL), JSON, Python, SQL  |

1. **Minimum Qualification of Teachers / Instructor**

The qualification of teachers / instructor of this course should be a minimum of bachelor’s in computer science / software engineering with minimum 3 years of development experience in relevant trade.

1. **Eligibility for the trainees:**

As defined by NAVTTC

1. **List of Machinery/Equipments**

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| **Sr. No** | **Name of item as per curriculum** | **Quantity physically available at the training location** |
| 1 | Computers Minimum Core-i5 8th Generation* LCD Display 17” with built in speakers
 | 25 |
| 2 | DSL Internet Connection (Minimum 5 MB) | Available on every PC |
| 3 | **Accessories/Devices*** Connectors
* Multimedia
* Audio/visual aid
* White Board
* Flip Chart Board
 | 25 each |
| 4 | **Wires, data cables, power plugs, power supply** | For every PC |
| 5 | **UPS** | Available |
| 6 | **Generator / Solar Backup** | Available |
| 7 | **Air Conditioner (2 Tons)** | Available |