Backend Development
Curriculum

Axia Africa

Executive Summary:

The Backend Development curriculum aims to equip students with the essential skills and knowledge necessary to build robust and scalable server-side applications. Through a structured approach, students will learn the core concepts of Node.js and Express, along with essential tools and technologies such as MongoDB, Mongoose, and RESTful API design. By the end of the program, students will have the proficiency to create efficient server-side logic, manage databases, and effectively collaborate in backend development projects.

Learning Objectives

1. **Understand Core Backend Concepts:** Grasp the foundational principles of backend development, including server-client architecture, request-response cycles, and middleware.
2. **Master Node.js and Express:** Gain proficiency in using Node.js for server-side JavaScript and Express as a framework to build scalable and efficient web applications.
3. **Database Management:** Learn to interact with databases, particularly MongoDB, and utilize ORM tools like Mongoose to manage data with ease and efficiency.
4. **RESTful API Development:** Design and implement RESTful APIs to enable communication between the server and client, adhering to best practices for API development.
5. **Authentication and Security:** Implement robust authentication and authorization mechanisms, and learn best practices for securing backend applications.
6. **Deploy and Monitor Applications:** Acquire skills to deploy backend applications to cloud services, monitor performance, and manage versions using tools like Git and CI/CD pipelines

Learning Activities

1	Introduction to Node.js and Express	■ Learn about the basics of Node.js and Express ■ Install Node.js and set up a basic Express server ■ Complete introductory exercises to understand the fundamentals of Node.js and Express
2	Middleware and Routing	■ Understand middleware and how to use it in Express ■ Implement routing in an Express application ■ Practice creating custom middleware and handling different routes
3	Working with Data: MongoDB and Mongoose	■ Learn about MongoDB and how to integrate it with Node.js and Express ■ Explore Mongoose and its role in ORM for database management ■ Complete exercises to practice CRUD operations with MongoDB and Mongoose
4	RESTful API Design	■ Understand the principles of RESTful API design ■ Design and implement RESTful APIs using Express Practice creating routes for different API endpoints and handling various HTTP methods

Learning Activities

5	Authentication and Authorization	• Learn about JSON Web Tokens (JWT) and how to use them for secure API authentication • Create authentication middleware to protect routes and endpoints
6	Error Handling and Testing	• Understand error handling in Express applications • Implement error-handling middleware • Learn about testing frameworks like Jest and Supertest for testing Node.js and Express applications
7	Deployment and CI/CD	• Explore different deployment options for Node.js and Express applications • Deploy a backend application to a cloud platform like Heroku or Railway.
8	Building more application	• Learning more by doing. Creating the backend side of the TODO list • Creating the backend part of the E-commerce application