

Lecture Plan - Backend Development

S. No.	Lecture No.	Topic	Subtopics
1	L1	Introduction to Back-end Development	Overview of backend, Client-server architecture, Introduction to web servers and databases
2	L2	Programming Languages & Tools	Introduction to server-side languages (Node.js, Python, PHP), Syntax and semantics
3	L3	Setting up Development Environment	Installing Node.js/Python, Using IDEs, Running basic scripts
4	L4	Version Control Basics	Introduction to Git, Creating repositories, Basic commands
5	L5	Advanced Git & Collaboration	Branching, Merging, Pull Requests, GitHub/GitLab usage
6	L6	Database Management - I	Introduction to SQL, Database design concepts, Schema creation
7	L7	Database Management - II	CRUD operations, Primary and Foreign Keys, Joins
8	L8	NoSQL Databases	Introduction to MongoDB, Collections vs Tables, CRUD in NoSQL
9	L9	Connecting Backend with Databases	Database drivers, ORMs, Writing queries in code
10	L10	Server-Side Frameworks - I	Introduction to Express.js/Django/Flask, Project setup
11	L11	Server-Side Frameworks - II	Routing, Handling HTTP requests and responses
12	L12	Middleware & Templates	Using middleware, Templating engines like EJS, Jinja
13	L13	API Development - I	Introduction to REST APIs, Designing endpoints
14	L14	API Development - II	CRUD API implementation, Postman testing

15	L15	Authentication Basics	Sessions, Cookies, JWT concepts
16	L16	Authorization & Access Control	Role-based access, OAuth2, Third-party login
17	L17	Web Security - I	Common vulnerabilities (SQL injection, XSS), Prevention methods
18	L18	Web Security - II	CSRF, HTTPS, Security best practices
19	L19	Error Handling & Logging	Error types, Logging tools, Debugging techniques
20	L20	Performance Optimization	Caching strategies, Query optimization, Load balancing basics
21	L21	Testing & Debugging - I	Unit testing, Integration testing
22	L22	Testing & Debugging - II	Automated testing, Postman/Newman, Continuous Integration
23	L23	Deployment - I	Basics of deployment, Using platforms like Heroku, Vercel
24	L24	Deployment - II	Docker introduction, Containerization basics
25	L25	CI/CD Pipelines	Introduction to DevOps, GitHub Actions, Jenkins basics
26	L26	Microservices Architecture	Concepts, Advantages vs Monolith, Example case study
27	L27	GraphQL Basics	Introduction to GraphQL, Queries and Mutations
28	L28	Realtime Communication	WebSockets, Socket.io implementation
29	L29	Cloud Backend Services	AWS, Firebase, Google Cloud usage in backend
30	L30	Future Trends in Backend Development	Serverless architecture, Edge computing, AI in backend