

Node.js Complete Syllabus

1. Introduction to Node.js

- What is Node.js?
- Features of Node.js
- Node.js vs Traditional Web Servers (PHP, Java, etc.)
- Installing Node.js and npm
- Running your first Node.js script

2. Node.js Fundamentals

- Node.js Architecture (Event Loop, V8 Engine)
- Global Objects (console, __dirname, __filename)
- Modules and require()
- Creating custom modules
- exports vs module.exports

3. File System (fs Module)

- Reading/Writing files (Sync & Async)
- Working with directories
- File operations: delete, rename, append
- Streams and Buffers

4. Events and EventEmitter

- Creating and handling custom events
- EventEmitter class usage
- Integrating with file system and HTTP modules

5. HTTP and Web Servers

- Creating a basic web server
- Handling different routes and HTTP methods
- Sending responses: HTML, JSON, etc.
- Query parameters and URL parsing

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- Status codes and headers

6. Express.js Framework

- What is Express.js?
- Setting up Express app
- Routing (GET, POST, PUT, DELETE)
- Route parameters and query strings
- Serving static files
- Middleware (built-in, third-party, custom)
- Error handling middleware

7. Working with Databases

- MongoDB (Mongoose): Connecting, CRUD operations, Schema & Model design
- MySQL/PostgreSQL (optional): Connecting, Performing queries

8. Templating Engines

- Introduction to EJS / Handlebars / Pug
- Rendering dynamic HTML
- Passing data to templates

9. RESTful APIs with Node.js

- Creating REST APIs using Express
- Handling JSON data
- Input validation (Joi or express-validator)
- API versioning
- Testing APIs with Postman

10. Authentication and Authorization

- User registration and login
- Password hashing (bcrypt)

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- JWT authentication
- Session and Cookies
- Role-based access control

11. Error Handling and Logging

- Try/catch and async error handling
- Express error middleware
- Logging with Winston or Morgan

12. Deployment

- Preparing Node.js app for production
- Environment variables using .env
- Using PM2 for process management
- Deploying on Heroku, Vercel, Railway, etc.

13. Advanced Topics

- Async Programming (callbacks, promises, async/await)
- Working with WebSockets
- Node.js Streams and Pipes
- Cluster and child processes
- Caching with Redis
- Rate Limiting

14. Testing and Debugging

- Unit Testing with Mocha/Chai/Jest
- Integration Testing
- Debugging using Chrome DevTools or VS Code

15. Real-world Projects (Suggestions)

- Blogging Platform

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- E-commerce REST API
- Chat App with Socket.IO
- Authentication System
- File Upload App