Extended Node.js Syllabus (16 Academic Hours)

Focus: Full-Stack Development, Deployment & Best Practices

Hour 1 — Project Structure & Clean Architecture

- Backend folder organization
- Separation of concerns
- MVC pattern (intro)
- Refactoring app.js

Hour 2 — Environment Variables & Config Management

- Using .env files
- dotenv setup
- Securing secrets
- .gitignore best practices

Hour 3 — Error Handling & API Responses

- HTTP status codes
- Centralized error handling
- Consistent JSON responses
- Try/catch with async routes

Hour 4 — Middleware Deep Dive

- Request lifecycle
- Custom middleware
- Auth middleware
- Middleware order

Hour 5 — API Validation & Data Safety

- Why validation matters
- Backend vs frontend validation
- Basic validation rules
- Error messages

Hour 6 — Authentication Best Practices

- Password hashing with bcrypt
- JWT security
- Token expiration
- Protected routes

Hour 7 — Authorization & Roles

- Auth vs authorization
- User roles
- RBAC
- Admin-only routes

Hour 8 — File Uploads & Static Assets

- Uploading files
- multer intro
- Serving static files
- Security concerns

Hour 9 — Full-Stack Integration

- Frontend-backend responsibilities
- CORS
- Environment configs
- Error handling between layers

Hour 10 — API Testing & Debugging

- Postman / Thunder Client
- Debugging backend issues
- Testing auth flows
- Understanding logs

Hour 11 — Deployment Concepts

- Local vs production
- Servers & hosting
- CI/CD concepts
- Common mistakes

Hour 12 — Backend Deployment

- Deploying Node APIs
- Dynamic ports
- Env variables on servers
- Reading deployment logs

Hour 13 — Frontend Deployment

- Deploying React apps

- Connecting to backend
- CORS in production
- Testing live apps

Hour 14 — Production Best Practices

- Clean code
- Security basics
- API versioning
- Monitoring concepts

Hour 15 — Final Full-Stack Mini Project

- CRUD backend
- Authentication
- Frontend integration
- Deployment

Hour 16 — Review & Career Guidance

- Concept recap
- Junior developer roadmap
- Next learning steps
- Q&A;