# Full Stack Mobile Application Development with React Native and Node.js

**Duration: 10 days**
**Prerequisites : Knowledge of APIs, JavaScript and React JS**

### Day 1: Introduction to Node.js & Express – REST API Fundamentals

- **Theory (2.5 hrs)**
  - What is Node.js? Use cases in mobile backend
  - Node.js architecture (event loop, async I/O)
  - Introduction to Express.js
  - RESTful concepts (resources, verbs, status codes)
  - Project structure and best practices
- **Hands-on (5.5 hrs)**
  - Initialize project, install Express
  - Create REST API with GET, POST routes
  - Use nodemon for hot-reloading
  - Test APIs using Postman
  - Organize routes with Express Router

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### Day 2: Express Routing, Middleware & Stateless Authentication

- **Theory (3.0 hrs)**
  - Express Router in-depth
  - Custom middleware functions
  - HTTP lifecycle in Express
  - Introduction to input validation
- **Hands-on (5.0 hrs)**
  - Modularize /users, /auth routes
  - Add custom middleware (logger, validator)
  - Handle JSON and form data
  - Create simple login/register flow (no DB yet)

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### Day 3: MongoDB Integration & JWT Authentication

- **Theory (3.0 hrs)**
  - NoSQL basics and MongoDB Atlas overview
  - Introduction to Mongoose (schema, model)
  - JWT authentication, hashing with bcrypt
  - CORS, Helmet, and security best practices
- **Hands-on (5.0 hrs)**
  - Connect to MongoDB
  - Create User schema with Mongoose
  - Build full login/register API with hashed passwords
  - Implement JWT token generation and verification
  - Secure private routes using token middleware

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**Day 4: Mobile API Features & Backend Deployment**

- **Theory (2.5 hrs)**
  - Structuring scalable APIs for mobile
  - Filtering, pagination, and sorting
  - Deployment platforms: Render, Railway, Vercel
  - Managing environment variables
- **Hands-on (5.5 hrs)**
  - Add filtered /tasks endpoint with pagination
  - Use .env for secrets
  - Deploy backend using Render with GitHub integration
  - Final backend mini project: secure CRUD task manager

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**Day 5: Firebase for Cloud Integration**

- **Theory (3.0 hrs)**
  - Firebase overview (Auth, Firestore, Storage, Functions)
  - Firebase vs traditional backend
  - Emulator suite, pricing, and best use cases
- **Hands-on (5.0 hrs)**
  - Initialize Firebase project
  - Implement Auth with email/password
  - CRUD in Firestore with snapshot listeners
  - Upload/download files with Firebase Storage
  - Deploy a simple Cloud Function (Node.js)

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**Day 6: React Native – Setup & Fundamentals**

- **Theory (3.0 hrs)**
  - Introduction to React Native (Expo & CLI)
  - JSX, components, styles
  - Flexbox layout, ScrollView, SafeAreaView
- **Hands-on (5.0 hrs)**
  - Setup development environment (Expo or CLI)
  - Build a simple mobile UI with View, Text, Image
  - Implement layouts using Flexbox and ScrollView
  - Navigation between static screens using Stack Navigator

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**Day 7: Navigation & State Management in React Native**

- **Theory (2.5 hrs)**
  - React Navigation: stack, tab, drawer
  - State: useState, useEffect, Context API
  - Props vs state, lifting state up
- **Hands-on (5.5 hrs)**
  - Implement a login flow with navigation guard

    - Use Context API for auth and global state
    - Build reusable UI components
    - Persist login session with AsyncStorage

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**Day 8: Performance Optimization & Memory Management**

- **Theory (2.5 hrs)**
    - Optimizing FlatList, avoiding re-renders
    - Memoization: useMemo, useCallback
    - Flipper, Hermes, and profiling tools
- **Hands-on (5.5 hrs)**
    - Optimize rendering of dynamic lists
    - Implement FastImage for caching
    - Profile app memory and CPU
    - Compare Hermes-enabled and default builds

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**Day 9: Animations, Gestures & Device Feature Access**

- **Theory (2.5 hrs)**
    - Reanimated 2 & Gesture Handler overview
    - Accessing native APIs: Camera, GPS, Biometrics, Sensors
    - Permission handling (iOS/Android)
- **Hands-on (5.5 hrs)**
    - Create animated swipe card UI
    - Use react-native-geolocation and maps
    - Implement fingerprint login with keychain
    - Use image-picker and sensors for motion tracking
    - Setup background task using background-fetch

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**Day 10: Real-time Features, Push Notifications & CI/CD**

- **Theory (3.0 hrs)**
    - Real-time options: WebSocket vs Firebase
    - Local & Remote Notifications with FCM
    - Secure local storage (tokens, credentials)
    - CI/CD: GitHub Actions, CodePush, Fastlane
- **Hands-on (5.0 hrs)**
    - Create real-time chat using Firebase or Socket.IO
    - Send push notifications from Firebase
    - Secure sensitive data using encrypted-storage
    - Set up OTA updates and auto builds with GitHub CI