

# Flutter Application Development

**Duration: 7 days / 56 hrs**

**Prerequisites: Knowledge of Any OOPS Programming Language**

## **Day 1: Dart Deep Dive & Flutter Fundamentals**

**Total: 8 Hours**

### **Theory (4 hours)**

- Introduction to Dart
  - Variables, Types, Type inference
  - Functions and Arrow Syntax
  - Control Flow, Exception Handling
- OOP in Dart
  - Classes, Constructors
  - Inheritance, Mixins
  - Abstract classes and Interfaces
  - Collections (List, Set, Map)
- Null Safety
- Asynchronous programming
  - Future, async/await, Stream

### **Lab (4 hours)**

- Dart Playground: Console Apps
    - Build a Class-based model (e.g., Task Manager)
    - Use Futures and Streams for task simulation
    - Small Quiz App using OOP and async methods
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## **Day 2: Flutter Basics & UI Building**

**Total: 8 Hours**

### **Theory (3 hours)**

- Flutter Architecture
- Widgets: Stateless vs Stateful
- Widget Tree, MaterialApp, Scaffold

- Hot Reload and DevTools
- Layout Widgets: Column, Row, Stack, Container
- Navigation and Routing

#### **Lab(5 hours)**

- Create a personal portfolio app
    - Use multiple screens and routing
    - Explore styling using ThemeData
    - Add custom fonts and colors
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### **Day 3: State Management & Forms**

**Total: 8 Hours**

#### **Theory (3.5 hours)**

- State Management Concepts
  - Local state vs global state
  - Provider (intro & setup)
- Forms & Validation
- Input Widgets: TextFormField, Dropdown, Checkbox
- Form Controllers and Validation

#### **Lab (4.5 hours)**

- Build a Registration & Login form
    - Form fields, validation
    - Use Provider for form state
    - Add custom reusable InputField widget
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### **Day 4: APIs, Authentication & Storage**

**Total: 8 Hours**

#### **Theory (4 hours)**

- HTTP & Networking
  - Using http package
  - JSON parsing
- Custom Authentication Flow

- Token handling
- Secure storage (flutter\_secure\_storage)
- Local storage: SharedPreferences
- Requesting Permissions (Android & iOS)

#### Lab (4 hours)

- Build a Login App using dummy API
    - Token-based login
    - Store token in secure storage
    - Display user dashboard on login
    - Request permission for storage access
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### Day 5: Media, File Handling, and PDF

**Total: 8 Hours**

#### Theory (3 hours)

- Accessing Device Storage
  - File Picker
  - Downloading Files
- Displaying PDFs in Flutter (flutter\_pdfview)
- Push Notifications
  - Firebase Cloud Messaging (FCM) setup
  - Background and Foreground notifications

#### Lab (5 hours)

- Build a Document Viewer
    - Upload PDF from local/device storage
    - Show PDF in a scrollable screen
    - Enable push notification for new documents
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### Day 6: Advanced UI and Background Tasks

**Total: 8 Hours**

#### Theory (4 hours)

- Custom Styling

- Themes, Custom Fonts, Styles
- Reusable Components & Templates
- Background Task Processing
  - Using workmanager or android\_alarm\_manager
- Complex Layouts (GridView, ListView.builder, Slivers)

#### **Lab (4 hours)**

- Build a News Aggregator App
    - Scheduled background fetch for news
    - Use reusable card widgets for news tiles
    - Add light/dark themes with toggle
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### **Day 7: App Publishing, Final Project & Review**

**Total: 8 Hours**

#### **Theory (3.5 hours)**

- Preparing for App Store/Play Store
  - Build flavors & configurations
  - Versioning & Build number
  - Icons & Splash Screens
- Platform-specific notes (Permissions, Assets)
- Review of Dart & Flutter concepts

#### **Lab (4.5 hours)**

- Final Project (Choose 1):
    - Task Manager App with Authentication, Notifications, PDF Upload
    - Event Booking App with PDF Tickets, Background Sync
  - Build & Deploy APK (Android) / TestFlight (iOS walkthrough)
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