**Course Title: Flutter App Development**

**35 Hours**

**Course Objectives:**

1. Provide a comprehensive understanding of Flutter and Dart.
2. Teach participants how to build high-performance, cross-platform mobile applications.
3. Enable participants to create complex user interfaces using Flutter widgets.
4. Familiarize participants with state management, API integration, and local storage.
5. Equip participants to deploy functional Flutter applications to app stores.

**Expected Outcomes:**

By the end of this course, participants will:

1. Have a solid understanding of the Flutter framework and Dart language.
2. Be able to design and develop fully functional, cross-platform mobile applications.
3. Understand and implement state management in Flutter.
4. Be able to integrate REST APIs and local data storage solutions.
5. Have the skills to optimize and deploy Flutter applications.

**Course Outline:**

**1. Introduction to Flutter & Dart (5 Hours)**

* **Introduction to Cross-Platform Mobile Development**
  + Overview of cross-platform frameworks
  + Benefits of using Flutter
* **Setting Up the Development Environment**
  + Installing Flutter and Dart SDK
  + Configuring IDE (Visual Studio Code/Android Studio)
* **Dart Programming Basics**
  + Variables, data types, and control flow
  + Functions and classes in Dart
* **Flutter Basics**
  + Introduction to widgets and the widget tree
  + Stateless vs Stateful widgets
  + Basic UI design (Text, Images, Buttons)

**2. Building User Interfaces in Flutter (5 Hours)**

* **Common Flutter Widgets**
  + Text, Image, Icon, Container
  + Row, Column for layouts
* **Advanced UI Layouts**
  + Flex, Stack, and Align widgets for custom layouts
  + Padding, margins, borders for layout customization
* **Handling User Input**
  + TextField and form widgets
  + Input validation techniques
* **Responsive Design**
  + Introduction to MediaQuery and LayoutBuilder
  + Designing for various screen sizes

**3. State Management in Flutter (5 Hours)**

* **Understanding State in Flutter**
  + Stateful widgets and lifecycle
  + The role of state in building dynamic apps
* **State Management Approaches**
  + setState() method
  + Provider package for managing state
  + Other approaches: BLoC and Riverpod (overview)
* **Handling Forms and Data Input**
  + Using Form and TextFormField widgets
  + Validating and processing form inputs

**4. Navigation & Routing in Flutter (5 Hours)**

* **Navigation Basics**
  + Understanding navigation and routes
  + Navigating between screens
  + Passing data between routes
* **Advanced Routing**
  + Nested navigation and managing multiple screens
  + Navigator 2.0 (overview)

**5. Networking & API Integration (5 Hours)**

* **HTTP Package for Networking**
  + Making GET and POST requests
  + Handling API responses
* **Working with JSON**
  + Parsing and handling JSON data
  + Displaying dynamic data in ListView and GridView
* **Asynchronous Programming**
  + Using async, await, and Future
  + Stream and StreamBuilder for real-time data

**6. Data Storage in Flutter (5 Hours)**

* **Local Data Storage Options**
  + Introduction to SQLite with sqflite package
  + Performing CRUD operations
* **Using Shared Preferences**
  + Storing simple key-value pairs
* **Firebase Integration**
  + Setting up Firebase in Flutter
  + Firebase Authentication and Firestore
  + Real-time data with Firestore

**7. App Deployment & Performance Optimization (5 Hours)**

* **Building and Releasing Flutter Apps**
  + Generating APK and app bundles
  + Preparing the app for Play Store and App Store
* **Performance Optimization Techniques**
  + Identifying performance bottlenecks using Flutter DevTools
  + Optimizing widget trees and reducing build times
  + Reducing app size and improving load times