

BQ-012

MOBILE APP DEVELOPMENT

2nd EDITION



FROM IDEA TO APP

CREATE WHAT WORLD NEEDS!

Duration 3 months

● on-campus classes

www.banoqabil.org

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Course Title:	Mobile App Development
Course Code:	BQ-012
Duration:	12 Weeks
Class Structure	
Total Hours:	48 Hours
Total Sessions:	24 Sessions (Two sessions per week or as per convenience)
Session Duration:	2 Hours

1. Course Overview

This course equips students with practical and marketable skills in mobile app development, emphasizing cross-platform solutions using Flutter. Learners will gain hands-on experience in UI/UX design, state management, API integration, and Firebase connectivity. The course combines technical proficiency with professional development, enabling students to build and deploy fully functional mobile applications while preparing them for freelancing or industry roles in mobile technology.

2. Course Objectives:

By the end of this course, participants will be able to:

- Develop cross-platform mobile applications using Flutter and the Dart programming language.
- Design responsive, user-friendly interfaces aligned with modern UI/UX principles.
- Integrate databases, APIs, and Firebase services to enhance app functionality and user experience.
- Optimize app performance, security, and deployment for both Android and iOS platforms.
- Prepare students for freelancing and professional app development projects through practical, real-world assignments.

3. Learning Outcomes:

By the end of this course, learners will be able to:

- Build fully functional Flutter mobile applications for both Android and iOS platforms.
- Apply Dart programming principles to develop app logic, interactivity, and functionality.
- Integrate Firebase and REST APIs for authentication, database management, and data exchange.

- Enhance app performance and design, ensuring smooth UI/UX across devices.
- Deploy and publish apps on the Google Play Store and handle freelance app development projects professionally.
- Launch apps on Google Play Store and manage freelance projects.

4. Course Breakdown:

4.1. Theory Work **20%**

Includes: Flutter architecture, Dart programming fundamentals, app lifecycle, UI/UX principles, API communication, and app deployment processes.

4.2. Practical Work **80%**

Includes: Weekly coding exercises, UI design with Flutter widgets, Firebase integration, REST API implementation, performance testing, and final mobile app project development

5. Assessment Criteria

- 5.1. Attendance & Participation: -----15%
- 5.2. Quiz: -----20%
- 5.3. Assignments & Weekly Projects: ----- 25%
- 5.4. Final Capstone Project & Presentation: -----40%

6. Tools Used

- a. **Flutter SDK** – Framework for building cross-platform mobile applications
- b. **Dart Programming Language** – Core language for Flutter development
- c. **Android Studio / Visual Studio Code** – IDEs for coding, debugging, and UI design
- d. **Firebase (Auth, Firestore, Storage)** – Backend services for authentication and data management
- e. **Git & GitHub** – Version control and collaborative project management tools
- f. **REST APIs / JSON** – For data exchange and backend communication
- g. **Emulator / Physical Devices (Android & iOS)** – For app testing and debugging
- h. **Google Play Console** – For publishing and managing mobile application

7. Course Outline - Weekly Breakdown

A. Session Focus:

- a. Mission, Vision & Values – *Bano Qabil Pakistan*
- b. Course Structure, Rules, and Expectations
- c. Student Introduction & Career Orientation

Week-1: Introduction to Flutter & Setup

A. Session-1: Introduction to Flutter Framework

- i. Overview of mobile app development and cross-platform concepts
- ii. Introduction to Flutter & Dart programming language
- iii. Understanding Flutter's advantages over native app development
- iv. **Trainer Resource:** <https://flutter.dev/overview>

B. Session-2: Environment Setup & First App

- i. Installing Flutter SDK, Android Studio, and Visual Studio Code
- ii. Configuring emulators and testing environment
- iii. Running the first Flutter app ("Hello, World!") and exploring folder structure
- iv. **Trainer Resource:** <https://docs.flutter.dev/get-started/install>

C. Assignment: Install Flutter SDK, set up Android Studio or VS Code, and create your first Flutter app.

D. Quiz: Flutter framework overview and installation steps.

E. Trainer Resource: <https://docs.flutter.dev/get-started/test-drive>

Week-2: Dart Fundamentals

A. Session-3: Dart Syntax and Programming Concepts

- i. Introduction to Dart syntax and structure
- ii. Variables, data types, and operators
- iii. Control statements (if, else, switch, loops)
- iv. Functions and modular programming in Dart

B. Session-4: Object-Oriented Programming (OOP) in Dart

- i. Classes, objects, and constructors
- ii. Methods, properties, and encapsulation
- iii. Data handling and scope management
- iv. Practical examples of OOP in Dart

C. Assignment: Create a simple calculator app in Dart using classes and methods.

D. Quiz: Dart syntax, functions, and object-oriented programming basics.

E. Trainer Resource: Dart official language tour

Week-3: Flutter Widgets & Layouts

A. Session-5: Introduction to Flutter Widgets

- i. Text, Image, Button, Container, Row, and Column Widgets
- ii. Understanding Stateless vs Stateful Widgets
- iii. **Trainer Resource:**
<https://docs.flutter.dev/ui/widgets>

B. Session-6: Layout Design & UI Structure

- i. Layout Widgets: Padding, Align, Stack, and Flex
- ii. Hands-on Practice: Designing a Home Page Layout
- iii. **Trainer Resource:**
<https://docs.flutter.dev/ui/layout>

C. Assignment: Design a mobile homepage with a responsive layout

D. Quiz: Flutter Widgets and UI structure

E. Trainer Resource:

<https://docs.flutter.dev/ui>

Week-4: Navigation & State Management

A. Session-7: Navigation Between Screens

- i. Using `Navigator.push()` and `Navigator.pop()` for screen transitions
- ii. Implementing Routes and Named Routes for structured navigation
- iii. **Trainer Resource:**
<https://docs.flutter.dev/cookbook/navigation/navigation-basics>

B. Session-8: Introduction to State Management

- i. Managing State using `setState()`
- ii. Understanding Provider and Lifting State Up in Widget Trees
- iii. **Trainer Resource:**
<https://docs.flutter.dev/data-and-backend/state-mgmt/intro>

C. Assignment: Build a two-screen mobile app with proper navigation and shared state

D. Quiz: Navigation and state management concepts

E. Trainer Resource:

<https://docs.flutter.dev/cookbook/navigation>

Week-5: API Integration / Soft Skill Session

A. Session-9: Introduction to APIs and JSON

- i. Understanding APIs and RESTful architecture
- ii. Fetching data using the HTTP package in Flutter
- iii. Parsing JSON responses effectively
- iv. **Trainer Resource:**
<https://docs.flutter.dev/cookbook/networking/fetch-data>

B. Session-10: Working with Dynamic Data & Error Handling

- i. Displaying dynamic data from APIs in Flutter widgets
- ii. Implementing data models for structured API responses
- iii. Error handling and debugging API calls
- iv. **Soft Skill Session:** Communication & Time Management for Developers
- v. **Trainer Resource:**
<https://docs.flutter.dev/cookbook/networking/background-parsing>

C. Assignment: Build a simple **Weather App** using the OpenWeather API to display live weather updates

D. Quiz: API integration and JSON handling concepts

E. Trainer Resource:

<https://openweathermap.org/api>

Week-6: Local Storage / Soft Skill Session

A. Session-11: Local Data Management in Flutter

- i. Shared Preferences and Local Data Storage
- ii. SQLite Integration and CRUD Operations
- iii. **Trainer Resource:**
<https://docs.flutter.dev/cookbook/persistence/key-value>

B. Session-12: File Handling and Offline Mode

- i. File Handling and Data Caching
- ii. **Soft Skill Session:** Problem Solving & Analytical Thinking
- iii. **Trainer Resource:**
<https://docs.flutter.dev/cookbook/persistence/reading-writing-files>

C. Assignment: Build a Note-Taking App using Local Storage

D. Quiz: Data Persistence in Flutter

E. Trainer Resource: <https://pub.dev/packages/sqlite>

Week-7: Firebase Integration / Soft Skill Session**A. Session-13: Firebase Setup & Authentication**

- i. Configuring Firebase in Flutter Project
- ii. Firebase Authentication – Sign Up, Login, Logout
- iii. **Trainer Resource:**
<https://firebase.google.com/docs/flutter/setup>

B. Session-14: Firestore Database

- i. Storing and Retrieving Data from Cloud Firestore
- ii. **Soft Skill Session:** Communication & Team Collaboration
- iii. **Trainer Resource:**
<https://firebase.google.com/docs/firestore/quickstart>
- iv. quickstart
- C. Assignment:** Build a Login System using Firebase Authentication
- D. Quiz:** Firebase basics and authentication concepts
- E. Trainer Resource:**
<https://firebase.google.com/docs/flutter/setup>

Week-8: Firebase Storage & Push Notifications / Soft Skill Session**A. Session-15: Firebase Storage Integration**

- i. Uploading and Displaying Images using Firebase Storage
- ii. OnManaging User Data and File URLs
- iii. **Trainer Resource:**
<https://firebase.google.com/docs/storage/flutter/start>

B. Session-16: Push Notifications

- i. Configuring Firebase Cloud Messaging (FCM)
- ii. Soft Skill Session: Time Management & Productivity
- iii. **Trainer Resource:**
<https://firebase.google.com/docs/cloud-messaging/flutter/client>
- C. Assignment:** Build an Image Upload App with Push Notification
- D. Quiz:** Firebase Storage and FCM basics
- E. Trainer Resource:**
https://pub.dev/packages/firebase_messaging

Note: 01-hour Soft Skills Session will be conducted weekly from **Week 05 to Week 12.**

Week-9: UI/UX Design & Animation / Soft Skill Session

A. Session-17: UI/UX Best Practices

- i. Color Theory, Typography, and Responsive Design
- ii. Custom Themes and Styling Widgets
- iii. **Trainer Resource:**
<https://docs.flutter.dev/ui>

B. Session-18: Animations in Flutter

- i. Implicit & Explicit Animations
- ii. **Soft Skill Session:** Creative Thinking & Design Mindset
- iii. **Trainer Resource:**
<https://docs.flutter.dev/cookbook/animation>

C. Assignment: Design a Themed App Interface with Animations

D. Quiz: UI Design Principles and Animation Concepts

E. Trainer Resource:
<https://flutter.dev/docs/development/ui/animations>

Week-10: API + Firebase Integration Project / Soft Skill Session

A. Session-19: Combining REST APIs with Firebase

- i. Fetching API Data and Saving to Firestore
- ii. Syncing Offline Data with Firebase
- iii. **Trainer Resource:**
<https://firebase.google.com/docs/firestore/manage-data>

B. Session-20: Project Planning and Integration

- i. App Architecture and API Handling
- ii. **Soft Skill Session:** Freelancing & Client Communication
- iii. **Trainer Resource:**
<https://docs.flutter.dev/cookbook/networking>

C. Assignment: Create a News App using API + Firebase

D. Quiz: API & Database Integration Concepts

E. Trainer Resource:
<https://pub.dev/packages/http>

Week-11: App Testing & Deployment / Soft Skill Session A. Session-21: Debugging & App Testing i. Testing Widgets and Functions ii. App Debugging, Logs, and Bug Fixing iii. Trainer Resource: https://docs.flutter.dev/testing B. Session-22: Deployment Process i. Generating APK and App Bundle ii. Soft Skill Session: Presentation & Communication Skills iii. Trainer Resource: https://docs.flutter.dev/deployment/android C. Assignment: Prepare and Test Final App for Deployment D. Quiz: App Testing and Deployment Process E. Trainer Resource: https://play.google.com/console	Week-12: Final Project & Presentation A. Session-23: Final Project Development i. Project Work and Code Review ii. Final Debugging and Testing iii. Trainer Resource: https://docs.flutter.dev/development B. Session-24: Final Project Presentation i. Project Showcase and Evaluation ii. Soft Skill Session: Professional Portfolio Building iii. Trainer Resource: https://firebase.google.com/docs/flutter C. Assignment: Submit Final Flutter Project (App + Report) D. Quiz: Comprehensive Review of Course Concepts E. Trainer Resource: https://docs.flutter.dev/
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Note: 01-hour Soft Skills Session will be conducted weekly from **Week 05 to Week 12**.

8. Guest Speaker Sessions:

Guest speaker sessions will feature experienced Flutter developers or local freelancers who will share real-world insights into mobile app development, client handling, and freelancing opportunities.