

Programme Name	F.Y. B.Tech. in Computer & IT Engineering
Course Code	
Course Title	Mobile Application Development Using Flutter
Prerequisites	Basic Programming Knowledge

Course Outcomes

After completion of the Course, the student should be able to -

1. Apply Dart programming fundamentals and understand Flutter project structure.
2. Develop user interfaces using Flutter widgets and layouts.
3. Implement navigation and multi-screen Flutter applications.
4. Manage application state using appropriate state management techniques.
5. Implement data persistence and CRUD operations using SQL/NoSQL databases.

Course Contents

Dart Fundamentals and Flutter Project Structure (6 hours)

Introduction to Flutter and Dart, Flutter's cross-platform architecture, Dart programming basics, variables, data types, control statements, functions, collections, classes and objects, null safety, Flutter project structure, widget tree, `main()` function, `runApp()`, packages, dependencies, hot reload, and hot restart.

Flutter Widgets and User Interface Development (6 hours)

Flutter widget tree, `StatelessWidget` and `StatefulWidget`, `setState()`, common layout and UI widgets, `Row`, `Column`, `Container`, `Text`, `Image`, `Button`, `TextField`, `ListView`, `GridView`, forms, styling, themes, reusable widgets, and responsive user interface development.

Navigation and Multi-Screen Applications (6 hours)

Screen navigation, `Navigator`, `push()` and `pop()` operations, route management, `MaterialPageRoute`, passing and returning data between screens, and development of multi-screen Flutter applications.

State Management in Flutter (6 hours)

Introduction to application state, local and shared state, managing state using `setState()`, updating user interfaces based on state changes, introduction to state management, and implementing shared application state using a suitable approach such as `Provider`/`Riverpod`.

Data Management and Persistence using SQL/NoSQL Databases (6 hours)

Introduction to data persistence, local and cloud databases, SQL and NoSQL database concepts, tables and collections, rows and documents, integration of a suitable SQL/NoSQL database with Flutter, and CRUD operations: Create, Read, Update, and Delete.

Text Books

1. Beginning Flutter: A Hands-On Guide to App Development Using Dart and Flutter, Marco L. Napoli, 1st Edition.
2. Flutter Cookbook, Simone Alessandria & Brian Kayfitz, 1st Edition.
3. Flutter in Action, Eric Windmill, 1st Edition.
4. Dart Apprentice, Jonathan Sande & Jawwad Ahmad, 1st Edition.

Recommended Reading

1. Official Flutter Documentation — <https://docs.flutter.dev>
2. Official Dart Language Tour — <https://dart.dev/language>
3. Provider Package Documentation — <https://pub.dev/packages/provider>
4. Riverpod Documentation — <https://riverpod.dev>
5. SQLite Documentation — <https://www.sqlite.org/docs.html>
6. Dart Packages Repository (pub.dev) — <https://pub.dev>