Year: B. Tech IV (Semester VII)

Subject Name: Mobile Application Development (Flutter) **Subject Code:** BTCO14706
Type of course: Professional Elective - IV
Prerequisite (if any): Object Oriented Programming,

List of Courses where this course will be prerequisite:

Rationale: In this course you will build a complete, real-world application for iOS and Android, by using Dart, Flutter, Firebase. You will learn basics of Dart, Flutter Mobile Development Framework, Flutter: Dynamic App development, Database connectivity, Sensor and hardware API call.

Teaching and Examination Scheme:

Teaching Scheme				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	
2	0	2	3	60	25	15	30	20	150

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests CA2: Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems TEE: Term End Examination TEP: Term End Practical Exam (Performance and viva on practical skills learned in course) CA3: Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

Content:

Sr. No.	Content	Total Hrs
1	A Dart Introduction: Dart overview, The dartpad editor, first dart program, Functions in Dart, Function return types, String Interpolation, Object Oriented Programming in Dart, Creating Classes, Creating Class Instances, Constructor Functions, The super constructor	4
2	Advanced Dart: Adding Fields to Classes, Associated Methods, Introduction to lists, Introduction to maps, Generics and type annotations, If and else statements, The ternary operator, The while loop, The for loop, Switch statements, Adding Elements to Lists, Customizing Print Statements, Shuffling a List, Annotating Argument Types, Shorthand Function Syntax	4

3	Flutter Setup – MacOS/Windows: Flutter setup on MacOS/Windows, Setting the PATH variable, Installing Flutter in IDE, Installing the Android emulator, Running Flutter from the command line,	2
4	Introduction to Flutter: Creating a Flutter project, Overview of the Flutter counter app, Introduction to widgets, The MaterialApp widget, The Flutter widget tree, Stateless and stateful widgets, Updating the counter with setState	3
5	Building Layouts: Writing the root widget of the app, Adding the MaterialApp, Adding a sign-in page, Adding a Column layout, Adding button, Creating a reusable custom RaisedButton, Making an image button Forms and Validations: Creating the Login Screen, Labels and Hint Text, Customizing Keyboard Type, Handling Password Inputs, Form Validation, Referencing Widgets with Global Keys, The Form Widget and FormState, Creating a Global Key, Referencing FormState with Global Keys, Validating via FormState, Triggering Validation, Retrieving Form Values, Final Form Submit	4
6	Firebase Authentication Part 1: Local and remote authentication, Introduction to Firebase, Creating a Firebase project, Configuring Firebase for Android, Configuring Firebase for iOS, Installing the firebase_auth package, Running on Android, Signing in anonymously with Firebase, The FirebaseAuth singleton, and private constructors, Error handling with try/catch	2
7	HTTP Request with Flutter: Working with JSON, Casting JSON to Model Instances, Adding an Image Model, Function References, The HTTP Package, Issuing HTTP Requests, Parsing Future Responses into a Model, Updating the AppState Widget, Building Lists of Widgets, Sending Images to the ImageList	3
8	Database and Cloud Firestore: Getting started with Firestore, Installing Cloud Firestore, Adding the Database Provider, Writing data to Firestore, Defining a strongly-typed Job model class, Defining a common API path class, Adding security rules, Reading data from Firestore, Reading and parsing Firestore data streams, Adding a StreamBuilder to show a list of jobs, Firestore as a realtime database, Adding a factory constructor to our model class, Adding a FirestoreService class	3
9	Camera, Map and Location: Module Introduction, Planning the App, PlaceList & Place Provider Setup, Adding the "Add Place" Screen & An Image Input, Using Image Picker & The Device Camera, Storing the Image on the Filesystem (on the Device), Managing Data & Images via the Provider Package, Adding a Location Input & The "location" Package, Fetching the User Coordinates, Displaying a Static Map Snapshot, Rendering a Dynamic Map (via Google	3

	Maps), Allowing Users to Pick a Location on the Map, Storing the Location in SQLite	
10	Introduction to API in flutter & Deployment of Application: Introduction to API in flutter, passing key in stateful, making a web request with Future, Storing web response, Getting data on screen and debug, Understand the API response, Fetching data with web, picking up data from JSON Build, release and deploy the Android application and IOS application.	2

Suggested Specification table with Marks (Theory): (For B.Tech only)

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
10	20	30	-	-	-

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

Sr No	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1	Flutter in Action,	Eric Windmill		2020	
2	Beginning App Development with Flutter: Create Cross-Platform Mobile Apps	Rap Payne	Apress	2019	
3	Flutter Succinctly	Ed Freitas		2019	
4	Beginning Flutter: A Hands On Guide to App Developmen	Marco L. Napoli	Wrox	2019	

5	Flutter Complete Reference	Alberto Miola			
6	Flutter for Beginners	Alessandro BIessek			
7	Flutter in Action	Eric Windmill	Packt	2019	

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	To understand and learn fundamentals of Dart Programming Language.	10
CO-2	To understand the function programming and object-oriented Programming in DART.	20
CO-3	To learn Flutter Mobile Development by building apps.	25
CO-4	To design, build, and debug Flutter Android and iOS Apps by fetching data from Server.	25
CO-5	Build Flutter apps to communicate with a real-time database and incorporating features which required Sensor and hardware API calls.	20

List of Open learning website:

List of Open Source Software:

Flutter SDK
Flutter Fix
Visual Studio Code
Screenshots
Android Studio
Codemagic

FOR LAB SESSIONS:

List of Experiments:

Sr. No.	Practical
1	Implement 'Hello World' application from scratch and run on a physical device and emulator.
2	Implement Login and Registration page of Ui with the use of Container, Row, Column, RaisedButton, Text, Padding and Card Widget.
3	Implement an application of Dicee with the use of stateless and statefull widget.
4	Implement an application of calculator using different widgets.
5	Develop a flutter application of Quiz with the use of OOP concept.
6	Implement an application of Todo with use of provider and block management technique.
7	Implement a health application with the use of state management technique and without state management technique
8	Implement an application of Location search(place city name in the text field and search that location in the Google map, initially takes current location) with the use of Geolocator widget
9	Implement an application of COVID 2019 tracker with the used of API. Link of api: https://corona.lmao.ninja/v2/countries?sort=cases
10	Implement an application of login and Registration with the use of firebase and Display user data in the next screen or home screen while pressing the signUp or signIn button.

Major Equipment Needed: