COURSE TITLE	**ADVANCED IPHONE APPLICATION DEVELOPMENT**
COURSE CODE	**05MB0302**
COURSE CREDITS	**4**

Objective:

1. Implement complex and dynamic user interfaces using SwiftUI and UIKit while following Apple's Human Interface Guidelines.
2. Utilize multithreading with Grand Central Dispatch (GCD) and Operation Queues for efficient background processing.
3. Work with Core Data, CloudKit, and RESTful APIs for seamless data storage and synchronization.
4. Optimize app performance using multithreading (GCD & NSOperation), memory management, and debugging tools like Instruments
5. Work with RESTful APIs using URLSession and Alamofire for JSON/XML data parsing and cloud integration.
6. Implement Core Location, Camera, Face ID authentication, HealthKit, and other iOS-native capabilities.

Course Outcomes: After completion of this course, student will be able to:

1. Build advanced, interactive, and scalable iOS apps using Swift and SwiftUI/UIKit.
2. Optimize app performance with Grand Central Dispatch (GCD) and background tasks.
3. Work with RESTful APIs, JSON parsing, Core Data, and CloudKit for data storage and synchronization.
4. Integrate advanced features like Face ID, ARKit, CoreML, HealthKit, and Location Services.
5. Implement best practices for performance optimization, unit/UI testing, and App Store deployment.

Pre-requisite of course: Basic Knowledge of iPhone Programming

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
2	0	4	50	30	20	50	50

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Contents : Unit	Topics	Contact Hours
1	**Location & Native Capabilities** Mapkit: Introduction to Location Services, Map kit, Map View, Location Manager,Core Location: core services – Email, Contacts,Camera: Introduction to Media, Camera API, Accessing Camera, Audio: Audio API, Recording Audio, Playing Audio, Video,Core Motion: Introduction to Motion,Core Motion API, Accelerometer, Gyro Scope, Local and Push notification	15
2	**Graphics & Animation, Features** Core Graphics & OpenGL: Introduction to Graphics, View Layers, Working with Layers,Introduction to OpenGL, OpenGL API, Working with OpenGL, Multitasking,Integration with Bluetooth, Core Animation & Quartz Core: Introduction to Animation, Core Animation API, Working with Core Animation,Gestures: What is Gesture, Types of Gestures, Gesture Classes, Implementing Gestures,New iOS features: Storyboards - iOS features, what is a storyboard, Designing UI with a storyboard,Designing for iPad: what is iPad, iPad Screen elements, developing an app for iPad,Web services: Introduction to Web Services, Different Technologies to design Web Services,Accessing Web Services in iPhone App, Loading XML and JSON Data, JSON Parsing	15
Total Hours		**30**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Unit-1** Build a Custom UI using SwiftUI – Create a complex UI with animations and transitions,Implement Dark Mode Support – Enable dark mode adaptation in an iOS app,Develop a Custom Collection View Layout – Implement a dynamic grid-based UI,Use TabBar & Navigation Controller – Build an app with tabbed navigation and push/pop transitions., Implement Gesture Controls – Add swipe, pinch, and tap gestures to an app,Use Core Data for Local Storage – Store and retrieve structured data using Core Data,Implement UserDefaults for Small Data Storage – Save user preferences and small data., Create a To-Do List App using SQLite – Integrate SQLite for structured data storage,Work with FileManager API – Store and retrieve files locally in an iOS app,Encrypt & Store Sensitive Data using Keychain – Secure login credentials using iOS Keychain,Fetch JSON Data from a REST API using URLSession – Consume and display data from a web API.	30

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Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
2	**Unit-2** Use Alamofire for Network Calls – Make efficient API requests using Alamofire,Parse XML Data from a Web API – Use XMLParser to extract and display data,Implement Pull-to-Refresh Feature – Refresh API data in a table view,Implement Pagination in API Calls – Load data in chunks to optimize performance., User Authentication using Firebase – Implement login/signup with Firebase Auth.,Store & Retrieve Data using Firebase Realtime Database – Build a chat or notes app with Firebase,Upload & Download Files from Firebase Storage – Manage images/documents in Firebase Storage,Implement Firebase Firestore for NoSQL Storage – Create a real-time syncing data app., Enable Push Notifications using Firebase Cloud Messaging (FCM) – Send and receive push notifications,Access iPhone Camera & Capture Images – Implement a photo capture app using UIImagePickerController,Record and Play Audio using AVFoundation – Develop a voice recorder app.	30
3	**Unit-3** Use CoreLocation to Get User's Current Location – Build a GPS tracking app,Integrate Face ID & Touch ID for Authentication – Secure an app using biometric authentication,Detect Device Motion using CoreMotion – Use accelerometer and gyroscope for motion tracking., Develop a Step Counter using HealthKit – Fetch step count data from HealthKit API,Optimize App Performance with Instruments – Detect and fix memory leaks & CPU usage issues,Enable Background Processing using GCD & NSOperation – Handle background tasks efficiently., Integrate In-App Purchases (IAP) – Implement subscriptions and one-time purchases,Deploy an App to the App Store – Prepare an app, generate certificates, and submit it for review.	30
Total Hours		**90**

Textbook :

1 iOS 5 Essentials, Steven F. Daniel, Packt Publishing, 2012

2 iPhone Open Application Development, Jonathan Zdziarski, O'Reilly , 2008

References:

1 Head First iPhone and IPad Development, Head First iPhone and IPad Development, Dan Pilone, Tracey Pilone, O'Reilly Media, Inc., 2011

2 Programming iOS 5, Programming iOS 5, Matt Neuburg , O'Reilly Media, Inc., 2012

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

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Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
10.00	20.00	25.00	25.00	10.00	10.00

Instructional Method:

1 PPT,BOARD WORK,PRACTICALS

Supplementary Resources:

1 https://developer.apple.com/tutorials/app-dev-training/

2 https://www.javatpoint.com/ios-development-using-swift

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