Year: B. Tech III (Semester VI)

Subject Name: Native Mobile App Development **Subject Code:** BTCO14604
Type of course: Professional Elective II and III
Prerequisite (if any): Object Oriented Programming,

List of Courses where this course will be prerequisite: -

Rationale: There is a growing number of people who uses smartphones and tablets and hence mobile app development has ability to access a large segment. Android has an advantage of being open source. This course will enable the students to develop mobile application using Android.

Teaching and Examination Scheme:

Teaching Scheme				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	
3	0	2	4	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	**Android OS:** Introduction to Android, Android System with Architecture, Android Architecture, Development with Android – Platforms, Tools, Versions, Setup Android Environment, Say Hello to Android Application, Building Blocks of Android Application, Work with Activity, Activity Lifecycle, Intents Fragments, Fragment Lifecycle	4
2	**Android UI And Component using Fragments:** Create Android UI, Working with Layout, Create Custom Layouts, Work with UI Components and Events, Material Design Toolbar, Tab Layout, Recycler View and Card View, Android Menus, Adaptive and responsive user interfaces, User Input Controls, Screen Navigation, Drawables, Themes and Styles, Fragments Fragment Life Cycle, Introduction to Material Design, Testing the user interface.	8
3	**Background tasks:** AsyncTask, AsyncTaskLoader, Connecting App to Internet, Broadcast receivers, Services, Notifications, Alarm managers.	4
4	**Database Connectivity:**	4

	Storage in Android, Shared Preferences, Shared Preferences Layout, Android Requesting Permission at run time (Android 6.0), Work with SD Card and Files, Database in Android, Realm-No SQL Database	
5	**Applicability to Industrial Projects:** Web services and Parsing, JSON Parsing, Access web data with JSON, Connect to Web Services, Using Async Task & Third Party Library : Retrofit	4
6	**Advanced Android Development:** Google Map, Location Service and GPS, Creating Google Map, Work with Location, Location service with Location Manager, Find Current Location, Geo coding Graphics and Animation, Work with 2D Graphics, Bitmap, Animation, Frame Animation, Tween Animation, View Animation, Multimedia in Android, Play Audio Files, Play Video Files Work in Background, Services, Notification Services, Broadcast Receiver Introduction to Firebase with simple CRUD Operation	8
7	**Performance Improvement of App:** Performance Parameters, Profiling Tools, Rendering and Layout, Garbage Collection and Memory Leaks, Best Practices.	4
8	**Development and Deployment:** Delvik Debug Tool, Logcat, Emulator Control, Device Control, Work with ADB, Connect Real Devices, Execute Application on Real Device, Publish your Application	3
9	**Introduction to iOS Application and Basics of Swift Programming:** iOS Architecture and SDK framework, iOS and SDK Version Compatibility, iOS application life cycle (MVC), XCode: Tour of IDE, Templates, Projects and workspace, Simulators, Asset Management, Swift Playground, Connecting the UI to code, Build and Run Introduction, Swift Playground, File Structure, Data types, Variables, Constants, Flow Control Statements: Loops, If and Switch statements, Swift Functions, Swift Arrays, Swift Dictionaries, Swift Sets Tuples, Optionals, Enumerations, Closures, Getters and Setters – A Property Observer, Introduction to Classes in Swift, Classes - Access Levels and Computed Properties, Subclasses, Structures - Not Just a Simple Container	6

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

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

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	Android Application Development Black Book	Pradeep Kothari	DreamTech	Latest Edition
2	Beginning Android 4 Application Development	Wei Meng Lee	Wrox	
3	Android Wireless Application Development	Lauren Darcey, Shane Conder	Pearson U	
4	Android: A Programming Guide	J.F. DiMarzio		
5	Programming android	Zigurd Mednieks		
6	Android User Interface Design: Turning Ideas and Sketches into Beautifully Designed Apps	Ian G. Clifton		
7	iOS 10 Programming Fundamentals with Swift	Matt Neuburg		
8	Swift for Beginner: Develop and Design	Boisy G. Pitre		
9	Head First iPhone and iPad Development	Dan Pilone, Tracey Pilone		

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Understand Android architecture, activities and their life cycle.	10%
CO-2	Apply the knowledge to design user interface using Android UI And Component	40%
CO-3	Manage system database, remote database operations using web services.	20%
CO-4	Apply knowledge of map, location services, Graphics, android system and background services and Publish Android Application	25%
CO-5	Understand iOS architecture and swift programming	5%

List of Open learning website:

https://developer.android.com/
https://www.udemy.com
http://nptel.ac.in/
https://www.tutorialspoint.com/android/index.htm
https://swift.sandbox.bluemix.net/
https://iswift.org/cookbook
http://www.tutorialspoint.com/ios/

List of Open Source Software:

Visual Studio Code
Android Studio
Eclipse

FOR LAB SESSIONS:

List of Experiments:

Sr. No.	Practical
1	To Study Android Architecture and Installing Android Studio on Windows Platform.
2	Develop an android app which displays "Hello (Your name), welcome to Android Lab" message.
3	Develop calculator Android Application.
4	Develop an android app which displays a form to get following information from user. Username, Password, Email-address, Phone number, Country, State, Interest, Birth Date. Form should be followed by a Button with label "Submit". When user clicks the button, a message should be displayed to user describing the information entered.
5	Using Android, Create a login Activity. It asks "username" and "password" from user. If username and password are valid, it displays Welcome message using new activity
6	Write a program that identifies the Bluetooth devices in the range.
7	Write a program to perform Bluetooth file transfer.
8	Write a program that prints the signal strength of Wi-Fi connection of the given mobile phone.
9	Write a program to find hamming distance. For example, Hamming distance d (v1, v2) = 3 if v1=011011, v2=110001.
10	Develop an Android application which displays a form to get two numbers from user using appropriate widget. Toast the value of addition of the given to numbers. Eg. 2+3=5 Toast the answer 5.
11	Develop an android application to demonstrate JSON parsing and load spinner values at run time.
12	Develop an android application to demonstrate user registration and login using android SQLite Database.

Major Equipment Needed: -