GUJARAT TECHNOLOGICAL UNIVERSITY

ELECTRONICS & COMMUNICATION (EMBEDDED SYSTEM) (54)

MOBILE PHONE APPLICATION DEVELOPMENT

SUBJECT CODE: 2735405

M.E. SEM-III

Type of course: Mobile application development

Prerequisite: Basic knowledge of Linux kernel and object oriented programming

Rationale: Android is an open source platform built by Google that includes an operating system, middleware and applications for the development of devices employing cellular communications. As android based applications are highly used in many embedded systems, embedded engineer should learn to develop a mobile applications with android.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
				Theory Marks		Practical Marks				
L	T	P	C	ESE (E)	PA (M)	ESE (V)		PA (I)		
						ESE	OEP	PA	RP	
3	2#	2	5	70	30	20	10	10	10	150

Course Content:

Sr. No.	Content	Total Hrs	% Weightage
1	**Introduction to Java and Embedded Android** Java fundamentals; Classes and objects; Inheritance, polymorphism and interfaces, APIs – Linux Kernel – Android Hardware Support – Android Native User-Space – Android System Services – Development Host Setup – AOSP – Building and Running AOSP – Android System Architecture – Memory Layout and Mapping – Development Setup	12	25%
2	**Android OS** Introduction to Android, Introducing Development Framework, Dalvik Virtual Machine – DVM, Android Virtual Device and SDK Manager, Android Architecture and OOPS, Android Development Tools, Android Debug Bridge	8	20%
3	**Building application with Android** Android Layouts, Android UI, Android GUI Architecture, Layouts, Android Widget Toolbox, Understanding Android Menus, Intents and Processes, Graphics Animation and Multimedia, Introduction to Audio on Android, Introduction to Video, Android Persistence, Android Preferences, Using File system, Accessing SD cards, Location and maps, Creating and Using Overlays, Projections, Using Wake Locks, Inter process Communication, Internet Services, Broadcast receivers, Using Camera, Sensor Manager, Bluetooth, Network, Wi-Fi, Services and Content Providers, Near Field Communication, Gesture input	18	45%
4	**Database Connectivity** SQLite Database, SQLite Data Types, Cursors and Content Values, SQlite Open Helper, Adding, Updating and Deleting Content	4	10%

	Total	**42**	**100**

Reference Books:

1. Karim Yaghmour, "Embedded Android", O'Reilly Media Publication, ISBN : 978-1-4493-0829-2
2. Wallace Jackson, "Android Apps for Absolute Beginners", 2nd Edition, Apress Publications, ISBN1 3: 78-1-484200-20-9
3. Jeff Friesen, "Learn Java for Android Development", 2nd Edition, Apress Publications, ISBN 1 3: 978-1-4302-6454-5
4. Ziqurd Mednieks, Laird Dornin, G. Black Meike, Masumi Makamura , "Programming Android", O'Reily Media Publication, ISBN: 978-1-4493-8969-7

Course Outcome:

The main objectives to give the subject Mobile Application Development in Android are:
1. To introduce basic concepts of Android Programming
2. To introduce Android OS
3. To introduce Building Mobile Application with Android
4. To introduce cutting edge technology to the students

List of Experiments:

EXP. NO.	NAME OF THE EXPERIMENT
1.	Installing Android Machine
2.	Creating a simple "Hello World" application
3.	Adding an action bar to android app to make application interactive
4.	Build user interfaces using Views, Menus and Notifications
5.	Saving key-value pairs of simple data types in a shared preferences file and saving arbitrary files in Android's file system.
6.	Handle file operations in Android application program.
7.	Build an android application with multiple screens.
8.	Learning Android Emulator to emulate android apps on various devices.
9.	Use of Intents to perform basic interaction with apps.
10.	Using Android styles and themes to make application
11.	Learn to use Android Debug Bridge to debug system and application

Design based Problems (DP)/Open Ended Problem:

1. Create Android apps that share data between apps and devices. Copy link location and save in text file.
2. Create Android apps to manage audio playback, capture picture. Create an audio recorder and video recorder.
3. Create app to add location-aware features to app by getting the user's current location. Get location of user periodically and save into file with timestamp.
4. Build an Application which keeps the record of total time of Activity displayed on the screen since it has been installed on the device.
5. Create android chat app to communicate via Bluetooth.

6. Create app to operate robot motions via Bluetooth communication.
7. Install android on embedded board like Beaglebone black.

List of Software:

Eclipse, Java, Android Studio

Learning website:

https://developer.android.com/sdk/index.html

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.