GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER ENGINEERING (SOFTWARE ENGINEERING) (02) AND INFORMATION TECHNOLOGY (23)

UBIQUOUS COMPUTING

SUBJECT CODE: 2730206

M.E. SEM-III

Type of course: Elective

Prerequisite: NA

Rationale: NA

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	History and applications of wireless communications. Signal Propagation modes: Path loss, multi-path propagation. Overview of Multiplexing: Space Division, Frequency Division, Code Division and Time Division. Overview of Modulation: ASK, FSK, PSK. Overview of Spread Spectrum: DSSS, FHSS. Cellular system	03	05%
2	Global System for Mobile Communication (GSM): Mobile Services, System Architecture, Radio Interface, Protocols, Localization and calling, Handover, Security, CDMA v/s. GSM. Digital enhanced cordless telecommunications (DECT) Wireless Medium Access control and CDMA- based communication – Medium access control, Spread spectrum in CDMA systems, coding methods in CDMA	05	10%
3	Wireless LAN: IEEE 802.11: System Architecture, Protocol Architecture, Physical Layer, MAC Layer, MAC Management, 802.11a, 802.11b. Bluetooth: Architecture, Security , 3G and 4G Technology	04	10%
4	Mobile IP: Goals, assumptions and requirements. Entities and terminology. IP packet delivery. Agent Discovery. Registration. Tunneling and encapsulation. Optimizations. Reverse Tunneling. IP micro-mobility support	03	10%
5	Mobile Ad hoc and Sensor Networks: Introduction to Mobile Ad hoc Network- MANET-Routing and Routing Algorithm-Security – Wireless Sensor Networks-Applications-Distributed Network and Characteristics-Communication Coverage-	03	10%

	Sensing Coverage-Localization- Routing -Function Computation-Scheduling		
6	Mobile internet connectivity WAP 1.1, Layers of WAP, Wireless Application Environment, WML and WML Script , wireless telephony application, WAP 2.0 architecture , XHTML-MP(Extensible Hypertext Markup Language Mobile profile) Mobile Operating System ,Mobile file system, Security in mobile computing	04	10%
7	Human Computer Interface Introduction to HCI, User Interfaces & Interaction for four widely used devices, Hidden UI via Basic Smart devices, Hidden UI via wearable and Implanted devices, Human Centered Design (HCD), User Models: Acquisition and Representation, iHCI Design	04	05%
8	Ubiquitous Communication Introduction, Audio Networks, Data Networks, Wireless Data Networks, Universal and Transparent Audio, Video and Alphanumeric Data Access Networks, Ubiquitous Networks, Further Network Design Issues	04	05%
9	Introduction to Android History of Mobile Software Development, The Open Handset Alliance, The Android Platform, Android SDK, Building a sample Android application	03	10%
10	Android Application Design Essentials Anatomy of an Android applications, Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broad-casting Intents, Android Manifest File and its common settings, Using In tent Filter, Permissions, Managing Application resources in a hierarchy, Working with different types of resources	06	15%
11	Android User Interface Design Essentials User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation	03	5%
12	Using Common Android APIs Using Android Data and Storage APIs, Managing data using SQLite, Sharing Data Between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs	04	5 %

Reference Books:

1. John schiller, Mobile Communications, Pearson
2. Ubiquitous Computing by Stefan Poslad Wiley Publication
3. Lauren Darcey and Shane Conder, Android Wireless Application Development, Pearson Education, 2nd ed. (2011).
4. Asoke K. Telukder, Mobile Computing , TMH
5. Mobile Computing by Raj Kamal OXFORD
6. Donn Felker ,'Android Application Development For Dummies, Wiley, 2010
7. Reto Meier,Professional Android 2 Application Development, Wrox's Programmer to Programmer series 8. Ed Burnett
8. Kaveh Pahlavan, Principles of Wireless Networks – A unified approach, 2002 , Prentice Hall

Course Outcome:

1. Have knowledge about cellular networks, ad-hoc and sensor network protocols and standards.
2. Have knowledge about different mobile operating systems.
3. To introduce basic concepts of android programming
4. Be able to develop applications using android.
5. To introduce building mobile application with android

List of Experiments:

(Pl. Note: List of Experiments should be as per theory covered in the class, below mentioned practical are just for the reference purpose)

Lab Assignment 1

Develop an android app which displays "Hello, welcome to Android Lab" message. Name of application should be set to "FirstApp". Application icon should be your own photograph.

In your answer you should show appropriate files. Below each file, you should explain its contents in brief. This instruction is applicable to all tutorials. So it will not be repeated henceforth.

Lab Assignment 2

Develop an android app which displays a form to get following information from user.

- Username
- Password
- Email Address
- Phone Number
- Country
- State
- State
- Gender
- Interests
- Birth Date
- Birth Time

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.

Utilize suitable UI controls (i.e. widgets). [When user enters country in AutoCompleteTextView, list of states should be displayed in Spinner automatically.]

Lab Assignment 3

Part I Layouts

Develop a form like Tutorial 2 in following different ways:

(i) Using Relative Layout
(ii) Using Table Layout
(iii) Using Absolute Layout

Observe the difference in main.xml code and ease of maintenance.

Part II Menus

(i) Create an options menu as follows: It displays options like "New", "Open" and "Save As". When user selects any options, Toast message is displayed showing the option selected.
(ii) Create a Context menu as follows: Put a TextView on Screen. When user presses TextView for long time, a context menu is displayed. Menu has following options: RED, GREEN and BLUE. When user selects a color, background color of TextView should be changed to selected color. Show all required files.

Lab Assignment 4

Extend the form developed in tutorial 2 so that when user clicks on submit button it should verify the data entered by user and if everything is correct insert data into database.

Lab Assignment 5

Create a Service which sorts 1000 numbers. Once sorting is finished, it should notify user about the event using notification. When user clicks on notification, notification should be closed.

Lab Assignment 6

Develop a form as in Tutorial 2. Instead of "Submit" button, use "Save" button. When user clicks on "Save", data entered by user should be saved in shared preferences. User exits the application. When again application is started, same information should be displayed back.

Lab Assignment 7

Develop an App as follows:

Create a login Activity. It asks "username" and "password" from user. Create an Asyc task which communicates with server side services to check whether username and password are correct or not. Accordingly Activity displays appropriate message. On server side, create a web-page which to fetch data from database.

Lab Assignment 8

Develop an Application which notifies user when battery is critically low. It should also reduce the screen brightness when battery level is low.

Lab Assignment 9

Develop an Application which lists all the contacts in a phone showing Contact Name and Contact Number. When user clicks on a contact name your app should make a call to that number.

Lab Assignment 10

Create an Application to play video. Provide Next, Previous and Pause button.

Design based Problems (DP)/Open Ended Problem:

List of Open Source Software/learning website:

- http://developer.apple.com/library/ios/navigation/
- http://dev.windowsphone.com/en-us/develop
- http://www.oracle.com/technetwork/java/javame/index.html
- VideoProgramming Applications:
    - http://www.youtube.com/watch?v=SUOWNXGRc6g&list=PL2F07DBCDCC01493A
    - Study Tutorial: 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.