GUJARAT TECHNOLOGICAL UNIVERSITY

WIRELESS COMMUNICATION
SUBJECT CODE: 2710209
SEMESTER: I

Type of course: Core

Prerequisite: ----

Rationale: ----

Teaching and Examination Scheme:

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

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	**Introduction:** History and applications of wireless communications. Signal Propagation modes: Path loss, multi-path propagation. Overview of Multiplexing: Space Division, Frequency Divison, Code Division and Time Division. Overview of Modulation: ASK,FSK,PSK. Overview of Spread Spectrum: DSSS, FHSS.	04	10
2	**Global System for Mobile Communication (GSM):** GSM architecture, GSM entities, call routing in GSM,PLMN interface, GSM addresses and identifiers, network aspects in GSM, GSM frequency allocation, authentication and security, Protocols, Localization and calling, Handover, Security, CDMA v/s. GSM.	04	12
3	**General Packet Radio Service (GPRS):** Main Features, GPRS Architecture: Roles of GGSN, SGSN, HLR, VLR. GPRS Mobile Station (MS).GPRS transmission plane, GPRS signaling plane, Data transfer between MS and SGSN. GPRS Protocols. GPRS Channels. Medium Access Control and Radio Link Control. Mobility management, Location Management. GPRS Routing, GPRS QoS. GPRS Security.	04	14
4	**Wireless LAN:** IEEE 802.11: System Architecture, Protocol Architecture, Physical Layer, MAC Layer, MAC Management, 802.11a, 802.11b. Bluetooth: Architecture, Radio Layer, Baseband Layer, Link Manager Protocol, L2CAP, Security	06	20
5	**Mobile IP:** Goals, assumptions and requirements. Entities and terminology. IP packet delivery. Agent Discovery. Registration. Tunneling and	03	05

	encapsulation. Optimizations. Reverse Tunneling. IP micro-mobility support		
6	**Mobile Ad hoc Networks:** Routing in ad hoc networks : AODV, DSDV, DSR.	03	12
7	**Mobile Transport Layer:** Overview of Traditional TCP and implications of mobility control. Improvement of TCP: Indirect TCP, Snoop TCP, Mobile TCP, Fast retransmit/fast recovery, Time-out freezing, Selective retransmission, Transaction-oriented TCP.	03	05
8	**Wireless Application Protocol:** Architecture, Wireless Datagram Protocol, Wireless Transport Layer Security, Wireless Transaction Protocol, Wireless Session Protocol, Wireless Application Development, Wireless Markup Language, WML Scripts, Wireless Telephony Application, push architecture, Push/pull services	03	07
9	**Introduction to Android** History of Mobile Software Development, The Open Handset Alliance, The Android Platform, Android SDK, Building a sample Android application	04	05
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 Intent Filter, Permissions, Managing Application resources in a hierarchy, Working with different types of resources	10	10

Reference Books:

1. Mobile Computing , Asoke K Telukder, Roopa R Yavagal, TMH
2. Mobile Communications, Jochen Schiller, Pearson
3. Programming for Mobile and Remote Computers, G. T. Thampi, dreamtech
4. Handbook of Wireless Networks and Mobile Computing, Ivan Stojmenovic ,Wiley
5. Android Wireless Application Development, Shane Conder, Lauren Darcey, Pearson
6. Principles of Mobile Computing, - Hansmann, Merk, Nicklous and Stober, Springer

Course Outcome:

After learning the course the students should be able to

1. Understand the concept of Wireless Communication and its use
2. Understand the concept of GSM,GPRS and CDMA Technology
3. Understand and build mobile adhoc network
4. Understand various wireless protocols
5. Understand and implement various routing algorithms
6. Understand and implement mobile application development on Anroid platform
7. Use Various simulation tools like NS2,NS3 etc

List of Experiments:

1. Write a program to simulate Fixed TDM.
   Take 12 stations. Every station has time slice of 417 microseconds. Delay should be 10ms.
   Also show the uplink and downlink concept.
2. Implement AODV protocol.
3. Implement DSDV protocol.
4. Implement DSR protocol.
5. Write a program that identifies the devices in the wireless range.
6. Implement an Android application that converts Fahrenheit to Celsius and Celsius to Fahrenheit.
7. Implement an Android application, that takes name as input. It gives radio buttons with list of subjects. User need to choose 1 subject. Then there are list of books user has to choose. Then display name, choice of subject and selected subjects.
8. Implement Multiple Raw Scrolling Application.
9. Implement an Android Application that creates a menu with following options.
   a. Display menu items for example – List the choice of food items.Display list of selected items. Calculate the bill.
10. 10 Use TableLayout to display the buttons with images on them. When you click on that image it should be displayed in large area.
11. Create a table with student information. Apply the operations add, modify, delete.

12. Implement an Android Application that rotates a red ball in clockwise direction for 1 minute and after that yellow ball in the anticlockwise direction.

Open Ended Problems:

1. Compare performance of AODV and DSR
2. Compare performance of DSDV and DSR
3. Develop Anroid base application to implement Location based service
4. Develop Anroid base application to read PDF file (E-book)
5. Develop Anroid base application to implement MP3 PlayBack
6. Develop Anroid base application for taking Picture using camera
7. Develop Anroid base application to implement wifi connectivity
8. Develop Anroid base application to implement dialer (Dial Home number)

Major Equipments:

Latest PC with required software

List of Open Source Software/learning website:

Kismet and NetStumbler
Pathrater
NS2,NS3
Anroid SDK
Website
www.android.com/
developer.android.com/tools/help/index.html
www.slideshare.net/venturehire/best-android-application-development-tutorials-for-beginner