



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3170710

MOBILE COMPUTING AND WIRELESS COMMUNICATION

7th Semester

Type of course: Professional Elective

Prerequisite: Computer Network

Rationale: Wireless communication provides mobility, flexibility, convenience. Wireless communication devices are used in various areas including healthcare. Wireless communication has opened many areas for research also.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
			ESE (E)	PA	ESE (V)	PA (I)		
3	0	0	3	70	30	0	0	100

Sr. No.	Content	Total Hrs.
1	<p>Introduction, Transmission Fundamentals: Signals for Conveying Information, Analog and Digital Data Transmission, Channel Capacity, Transmission Media, Multiplexing</p> <p>Communication Networks: LANs, MANs and WANs, Switching Techniques, Circuit Switching, Packet Switching</p>	07
2	<p>Cellular Wireless Networks: Principles of Cellular Networks, First-Generation Analog Second-Generation TDMA Second-Generation CDMA, Third-Generation Systems</p> <p>Antennas and Propagation: Antennas, Propagation Modes, Line-of-Sight Transmission, Fading in the Mobile Environment</p> <p>Spread Spectrum-The Concept of Spread Spectrum, Frequency Hopping Spread Spectrum, Direct Sequence Spread Spectrum</p> <p>Coding and Error Control: Error Detection, Block Error Correction Codes, Convolutional Codes, Automatic Repeat Request</p>	10
3	<p>Multiple access in Wireless System: Multiple access scheme, frequency division multiple access, Time division multiple access, code division multiple access, space division multiple access, packet radio access, multiple access with collision avoidance.</p> <p>Global system for mobile communication: Global system for mobile communication, GSM architecture, GSM entities, call routing in GSM, PLMN interface, GSM addresses and identifiers, network aspects in GSM, GSM frequency allocation, authentication, and security.</p> <p>General packet radio service (GPRS): GPRS and packet data network, GPRS network architecture, GPRS network operation, data services in GPRS, Applications of GPRS, Billing and charging in GPRS.</p> <p>Wireless System Operations and Standards: Cordless Systems, Wireless Local Loop, WiMAX and IEEE 802.16 Broadband Wireless Access Standards</p> <p>Mobile IP and Wireless Application, Protocol</p>	13
4	<p>Wi-Fi and the IEEE 802.11 Wireless LAN Standard: IEEE 802.11 architecture and services, IEEE 802.11 Medium access control, IEEE 802.11 physical layer, Wi-Fi</p>	04



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	protected access.	
5	Bluetooth: Radio specification, baseband specification, link manager specification, logical link control and adaption protocol.	04
6	Android APIs, Android Architecture, Application Framework, The Application components, The manifest file, downloading and installing Android, Exploring the Development Environment, Developing and Executing the first Android application, Working with Activities, The Linear Layout , The Relative Layout , The Scroll View Layout, The Table Layout, The Frame Layout, Using the Text View, Edit Text View, Button View, Radio Button, Checkbox, Image Button, Rating Bar, The options Menu, The Context Menu.	07

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	40	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:

1. Wireless Communications & Networks, Second Edition, William Stallings by Pearson.
2. Mobile Computing Technology, Applications, and service creation by Asoke K Telukder, Roopa R. Yavagal, TMH.
3. Wireless Communications, Principles and Practices by T. S. Rappaport, Pearson Education India.
4. Android Application Development Black Book by Pradeep Kothari, Dreamtech Press.
5. Wireless and Mobile Networks by Dr. Sunilkumar S. Manvi, Dr. Mahabaleshwar S.Kakkasageri, WILEY.
6. Wireless Networks by P. Nicopolitidis, M.S. Obaidat, G. I. Papadimitriou, A.S.Pomportsis by Wiley
7. Mobile Computing by Raj Kamal, Oxford.
8. Mobile Computing Theory and Practice-Kumkum Garg-Pearson.
9. Lauren Darcey and Shane Conder, Android Wireless Application Development, Pearson Education, 2nd ed. (2011).



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Course Outcome: After learning the course the students should be able to:

Sr. No.	CO Statement	Marks % Weightage
CO-1	Understand the mobile and wireless network systems such as 2G/3G/4G	20
CO-2	Understand GSM and GPRS	20
CO-3	Implement various error coding techniques.	10
CO-4	Differentiate between multiple access schemes and various Spread Spectrum techniques.	25
CO-5	Understand the working with local area network, Bluetooth and Android APIs environment.	25

List of Open-Source Software/learning website:

<http://www.wirelessdevnet.com/>

<http://www.protocols.com/>

www.tutorialspoint.com/mobile_computing