SARVAJANIK UNIVERSITY
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SARVAJANIK UNIVERSITY
Sarvajanik College of Engineering and Technology
Bachelor of Technology

Year: B. Tech IV (Semester VII)

Subject Name: Wireless Communications **Subject Code:** BTIT14705
Type of course: Professional Elective Course
Prerequisite (if any): Computer Network

Rationale: Wireless communication provides mobility, flexibility, convenience. Wireless communication devices are used in various areas including healthcare. The course addresses the fundamentals of wireless communications and provides an overview of existing and emerging wireless communication Technology and networks. It covers radio propagation and fading models, fundamentals of cellular communications, multiple access technologies, and various wireless systems like GSM, GPRS, CDMA etc., including past and future generation wireless networks.

Teaching and Examination Scheme:

Teaching Scheme				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	
3	0	0	3	60	25	15	0	0	100

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.

Contents:

Sr. No.	Contents	Total Hours
1.	**Introduction** **Transmission Fundamentals :**Signals for Conveying Information, Analog and Digital Data Transmission, Channel Capacity, Transmission Media, Multiplexing **Communication Networks** :LANs, MANs, and WANs, Switching Techniques, Circuit Switching, Packet Switching, **Protocols and the TCP/IP Suite** :The Need for a Protocol Architecture, The TCP/IP Protocol Architecture, The OSI Model, Internetworking	08
2.	**Cellular Wireless Networks** Principles of Cellular Networks, First-Generation Analog, Second-Generation TDMA Second-Generation CDMA, Third-Generation Systems	08

	Antennas and Propagation: Antennas, Propagation Modes, Line-of-Sight Transmission, Fading in the Mobile Environment **Modulation Techniques:** Signal Encoding Criteria, Digital Data- Analog Signals, Analog Data-Analog Signals, Analog Data-Digital Signals **Spread Spectrum:** The Concept of Spread Spectrum, Frequency Hopping Spread Spectrum, Direct Sequence Spread Spectrum, Code Division Multiple Access, Coding and Error Control-Error Detection, Block Error Correction Codes, Convolutional Codes, Automatic Repeat Request	
3.	**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. **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 **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 **Wireless System Operations and standards :**Cordless Systems, Wireless Local Loop, WiMAX and IEEE 802.16 Broadband Wireless Access Standards **Mobile IP and Wireless Application Protocol**	15
4.	**Wi-Fi and the IEEE 802.11 Wireless LAN Standard** IEEE 802 architecture, IEEE 802.11 architecture and services, IEEE 802.11 Medium access control, IEEE 802.11 physical layer, Wi-Fi protected access	08
5.	**Bluetooth** Radio specification, baseband specification, link manager specification, logical link control and adaption protocol	06

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

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
15	20	10	15	-	-

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (Revised Bloom's Taxonomy)

Reference Books:

Sr no	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1	Wireless Communications & Networks	William Stallings	Prentice hall	2002	2nd Edition
2	Wireless Communication	Theodore S. Rappaport	Prentice hall	2001	2nd Edition
3	Wireless Communications and Networking	Vijay Garg	Elsevier	2007	1st Edition

Course Outcomes (CO):

Sr. No.	CO statements	Marks % weightage
CO-1	Comprehend the fundamental concepts of data transmission and communication network.	15%
CO-2	Describe the key elements vz. Generations of wireless communication, Modulation Techniques, Spread Spectrum etc. of cellular network.	25%
CO-3	Compare and contrast the mobile radio standards i.e. GSM, GPRS, Mobile IP etc. for wireless systems.	50%
CO-4	Describe the emerging trends in Wireless communication like Bluetooth, WiFi, WiMAX, Wireless Adhoc Network	10%