

Course Code	Course Name	Teaching Scheme (hrs/week)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical/Oral	Tutorial	Total
BE ITC704	Wireless Technology	04	02	---	04	01	---	05

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test 2	Avg. of 2 Tests					
BEITC 704	Wireless Technology	20	20	20	80	25	---	25	150

### Course Objectives:

Get acquainted with modern wireless communication networks. Evolution of cellular networks, to understand basic framework of various protocols and standards used to develop wireless personal and wide area networks

### Course Outcomes:

1. Understand the new trends in mobile/wireless communications networks
2. Understand the characteristics of mobile/wireless communication channels
3. Understand the multiple radio access techniques
4. Understand the multiuser detection techniques
5. Understand various wireless networks and their technologies
6. Understand need of securities and economies in wireless systems

**DETAILED SYLLABUS:**

<b>Sr. No.</b>	<b>Module</b>	<b>Detailed Content</b>	<b>Hours</b>
1	Fundamentals of wireless Communication	<ul style="list-style-type: none"> <li>• Fundamentals of Wireless Communication Advantages, Limitations and Applications</li> <li>• Wireless Media</li> <li>• Infrared Modulation Techniques</li> <li>• DSSS And FHSS</li> <li>• Multiple access technique: TDMA,CDMA, FDMA, CSMA,OFDMA [ fundamentals]</li> <li>• Frequency Spectrum</li> <li>• Radio and Infrared Frequency Spectrum</li> </ul>	<b>08</b>
2	Wireless technology	<ul style="list-style-type: none"> <li>• The cellular concepts: Frequency Reuse, Channel assignment strategies, Handoff strategies Interference and System Capacity [Design problems]</li> <li>• Evolution of cellular networks 1G, 2G,3G,4G</li> <li>•GSM: System Architecture, Radio Subsystem, Channel Types, GSM frame structure</li> <li>• CDMA: Architecture, Frequency and channel specifications, forward and Reverse CDMA Channels.</li> </ul>	<b>10</b>
3	Wire less in local loop (WLL)	User requirements of WLL systems, WLL system architecture, MMDS, LMDS, WLL subscriber terminal, WLL interface to the PSTN	<b>04</b>
4	Wire less local area networks (WLAN)	Introduction, WLAN Equipment, WLAN topologies and Technologies, IEEE 802.11 WLAN : Architecture, Physical Layer, Data Link Layer , MAC Layer, Security Latest developments of IEEE 802.11 standards	<b>08</b>
5	Wireless personal area networks (WPAN)	<p>Introduction ,WPAN technologies and Protocols,</p> <p>Bluetooth (802.15.1)[ Protocol stack and network connection establishment, security aspects]</p> <p>HR –WPAN ( UWB) ( IEEE 802.15.3 )</p> <p>LR-WPAN ( IEEE 802.15.4 ) Zigbee [ Stack architecture, components , Network Topologies , Applications]</p> <p>Wireless Sensor networks [ Network model and protocol stack ,</p>	<b>08</b>

		routing algorithms, Applications ]	
6	Wireless metropolitan area networks	IEEE 802.16 [ Protocol Architecture], IEEE 802.16a [Wimax] Wimax and LTE /3GPP comparison	<b>04</b>
7	Security issues in Wireless Systems	The need, attacks , security services, wired equivalent privacy protocol(WEP), Mobile IP, VPN [ PPTP, L2TP, IPSec]	<b>03</b>
8	Economies of Wireless Network	Economic Benefits, Economics of Wireless industry Wireless data forecast, charging issues	<b>03</b>

**Text Books:**

1. Modern wireless communication systems: by Simon Haykin, Michael Moher, adapted by David Koilpillai ; Pearson (Indian edition 2011)
2. Wireless Networks: by Nicopolitidia, M S Obaidat, GI Papadimitriou; Wiley India (student edition 2010)
3. Wireless communications: by T L Singal; Tata McGraw Hill Education private Ltd.( edition 2011)

**References:**

1. Wireless and Mobile Networks: Dr. Sunilkumar S. Manvi & Mahabaleshwar S. Kakkasageri
2. Wireless Communications and Networking: by Vijay K. Garg
3. Wireless Communications: by Theodore S. Rappaport

**Term work:** Students are asked to perform lab sessions using Ns-2 Simulator and Matlab platform.

Assignments should be given based on syllabus.

**Theory Examination:**

1. Question paper will comprise of 6 questions, each carrying 20 marks.
2. Total 4 questions need to be solved.
3. Q.1 will be compulsory, based on entire syllabus wherein sub questions of 2 to 3 marks will be asked.
4. Remaining question will be randomly selected from all the modules.

Weightage of marks should be proportional to number of hours assigned to each module.

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