

<b>UNIT I WIRELESS LAN</b>	<b>9</b>
Introduction-WLAN technologies: Infrared, UHF narrowband, spread spectrum -IEEE802.11: System architecture, protocol architecture, physical layer, MAC layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, Radio Layer, Baseband layer, Link manager Protocol, security - IEEE802.16-WIMAX: Physical layer, MAC, Spectrum allocation for WIMAX	
<b>UNIT II MOBILE NETWORK LAYER</b>	<b>9</b>
Introduction - Mobile IP: IP packet delivery, Agent discovery, tunneling and encapsulation, IPV6-Network layer in the internet- Mobile IP session initiation protocol - mobile ad-hoc network: Routing, Destination Sequence distance vector, Dynamic source routing	
<b>UNIT III MOBILE TRANSPORT LAYER</b>	<b>9</b>
TCP enhancements for wireless protocols - Traditional TCP: Congestion control, fast retransmit/fast recovery, Implications of mobility - Classical TCP improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, Transaction oriented TCP - TCP over 3G wireless networks.	
<b>UNIT IV WIRELESS WIDE AREA NETWORK</b>	<b>9</b>
Overview of UTMS Terrestrial Radio access network-UMTS Core network Architecture: 3G-MSC, 3G-SGSN, 3G-GGSN, SMS-GMSC/SMS-IW MSC, Firewall, DNS/DHCP-High speed Downlink packet access (HSDPA)- LTE network architecture and protocol.	
<b>UNIT V 4G NETWORKS</b>	<b>9</b>
Introduction – 4G vision – 4G features and challenges - Applications of 4G – 4G Technologies: Multicarrier Modulation, Smart antenna techniques, OFDM-MIMO systems, Adaptive Modulation and coding with time slot scheduler, Cognitive Radio.	
<b>TOTAL: 45 PERIODS</b>	

<b>Course Objectives (CO)</b>	CO1: To study about Wireless networks, protocol stack and standards. CO2: To study about fundamentals of 3G Services, its protocols and applications CO3: To study about evolution of 4G Networks, its architecture and applications
<b>Expected Course Outcomes (ECO)</b>	At the end of the course, the students should be able to: ECO1: Conversant with the latest 3G/4G and WiMAX networks and its architecture. ECO2: Design and implement wireless network environment for any application using latest wireless protocols and standards

	ECO3: Implement different type of applications for smart phones and mobile devices with latest network strategies
<b>Related Website URLs</b>	<a href="https://www.wikipedia.org/wiki/wireless_network/">https://www.wikipedia.org/wiki/wireless_network/</a> <a href="https://www.techopedia.com/definition/24942/optical-communication">https://www.techopedia.com/definition/24942/optical-communication</a> <a href="https://www.youtube.com/watch?v=CVV0TvNK6pk">https://www.youtube.com/watch?v=CVV0TvNK6pk</a> <a href="https://www.youtube.com/watch?v=PpsETvNkL_0">https://www.youtube.com/watch?v=PpsETvNkL_0</a> <a href="https://www.youtube.com/watch?v=LyDrGJRT0PI">https://www.youtube.com/watch?v=LyDrGJRT0PI</a> <a href="https://www.youtube.com/watch?v=Oi2vFowjYiY">https://www.youtube.com/watch?v=Oi2vFowjYiY</a>
<b>Related Video Course Materials (min. 4 no.s)</b>	W1: <a href="https://www.youtube.com/watch?v=sPRMjSfuts">https://www.youtube.com/watch?v=sPRMjSfuts</a> W2: <a href="https://www.youtube.com/watch?v=oYRMYSIVj1o">https://www.youtube.com/watch?v=oYRMYSIVj1o</a> W3: <a href="https://www.youtube.com/watch?v=mfSWO3TpGq4">https://www.youtube.com/watch?v=mfSWO3TpGq4</a> W4: <a href="https://www.youtube.com/watch?v=PpsEaqJV_A0">https://www.youtube.com/watch?v=PpsEaqJV_A0</a> W5: <a href="https://www.youtube.com/watch?v=wPxTv4_5jMg">https://www.youtube.com/watch?v=wPxTv4_5jMg</a> W6: <a href="https://www.youtube.com/watch?v=rKy5dOI3Et4">https://www.youtube.com/watch?v=rKy5dOI3Et4</a>
<b>Bridging the Curriculum Gap (Additional Topics beyond syllabus)</b>	BCG1: PPTs on recent technological development standards. BCG2: Seminars on application oriented development /issues. BCG3: Assignments: Basic Analog & Digital Modulation Schemes. BCG4: Individual discussion about the future communication networks BCG5: MIMO/OFDM using VirtualLab( Amrita Univ)
<b>Text books</b>	<b>T1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education 2012.(Unit I,II,III)</b> <b>T2. Vijay Garg, "Wireless Communications and networking", First Edition, Elsevier 2007.(Unit IV,V)</b>
<b>Reference Books</b>	R1. Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming, "3G Evolution HSPA and LTE for Mobile Broadband", Second Edition, Academic Press, 2008. R2. Anurag Kumar, D.Manjunath, Joy kuri, "Wireless Networking", First Edition, Elsevier 2011. R3. Simon Haykin , Michael Moher, David Koilpillai, "Modern Wireless Communications", First Edition, Pearson Education 2013

**Mapping of CO & PO(Specify the PO's) - (Fill the col.s with the legend given below)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	C,3				C,1					C,2		
CO2		D,1			D,3							
CO3	H,2		D,2				E,2			H,3		
CO4										E,3	E,1	
CO5		B,3			B,2	B,1						E,2
CO6		A,3					A,1			A,2		



S.No	Topic Name	Book	Page no	Mode of delivery	No of hrs	Cumulative hrs
<b>UNIT I- WIRELESS LAN</b>						
1	Introduction	T1	201	BB	1	1
2	WLAN technologies: Infrared, UHF narrowband, spread spectrum	T1	204-205	BB	1	2
3	IEEE802.11: System architecture, protocol architecture, physical layer, MAC layer	T1	207-230	BB	2	4
4	802.11b, 802.11a	T1	231-234	BB	1	5
5	Hiper LAN: WATM, BRAN	T1	239-256	BB	1	6
6	HiperLAN2	T1	257-268	BB	1	7
7	Bluetooth: Architecture, Radio Layer, Baseband layer, Link manager Protocol, security	T1	269-289	BB/PPT	2	9
8	IEEE802.16	T1	290	BB	1	10
9	WIMAX: Physical layer, MAC, Spectrum allocation for WIMAX	T1	291-294	BB	1	11
<b>UNIT II- MOBILE NETWORK LAYER</b>						
10	Introduction - Mobile IP	T1	304-307	BB	1	12
11	IP packet delivery, Agent discovery, tunneling and encapsulation	T1	309-310	BB	2	14
12	IPV6-Network layer in the internet-	T1	323-324	BB	1	15
13	Mobile IP session initiation protocol	T1	324-327	BB	1	16
14	Mobile ad-hoc network	T1	330-331	BB	1	17
15	Routing, Destination Sequence distance vector	T1	332-335	BB/PPT	2	19
16	Dynamic source routing	T1	336-338	BB/PPT	2	21
<b>UNIT III - MOBILE TRANSPORT LAYER</b>						
17	TCP enhancements for wireless protocols	T1	351	BB	1	22
18	Traditional TCP: Congestion control, fast retransmit/fast recovery	T1	352-354	BB/PPT	2	24
19	Implications of mobility	T1	354-355	BB	1	25
20	Classical TCP improvements: Indirect TCP, Snooping TCP	T1	355-359	BB/PPT	2	27
21	Mobile TCP	T1	360-362	BB	1	28
22	Time out freezing, Selective retransmission	T1	363-364	BB	1	29
23	Transaction oriented TCP	T1	364-365	BB	1	30
24	TCP over 3G wireless networks	T1	366-367	BB	1	31

**UNIT IV- WIRELESS WIDE AREA NETWORK**

25	Overview of UTRAN Terrestrial Radio access network	T2	506-515	BB	1	32
26	UMTS Core network Architecture: 3G-MSC, 3G-SGSN, 3G-GGSN	T2	518-521	BB/PPT	2	34
27	SMS-GMSC/SMS-IWMSC	T2	522	BB/PPT	2	36
28	Firewall	T2	522	BB	1	37
29	DNS/DHCP	T2	522-523	BB	2	39
30	High speed Downlink packet access (HSDPA)	T2	530-535	BB	1	40
31	LTE network architecture and protocol	T2	532-535	BB	2	42

**UNIT V- 4G NETWORKS**

32	Introduction – 4G vision	T2	23.1-23.2	BB	1	43
33	4G features and challenges- Applications of 4G	T2	23.3-23.6	BB	1	44
34	4G Technologies: Multicarrier Modulation	T2	23.7-23.9	BB	1	45
35	Smart antenna techniques	T2	23.10-23.13	BB	2	47
36	OFDM-MIMO systems	T2	23.14	BB/PPT	2	49
37	Adaptive Modulation and coding with time slot scheduler	T2	23.14-23.15	BB	2	51
38	Cognitive Radio	T2	23.20-23.22	BB	1	52