

COURSE CODE	COURSE NAME	L-T-P-C	YEAR OF INTRODUCTION
EC404	ADVANCED COMMUNICATION SYSTEMS	3-0-0 -3	2016
Prerequisite: EC302 Digital Communication, EC403 Microwave & Radar Engineering			
Course objectives:			
<ul style="list-style-type: none"> To impart the basic concepts of various communication system. 			
Syllabus: Microwave Radio Communications, Diversity, protection switching arrangements, Digital TV, Satellite communication systems, Satellite sub systems, Evolution of mobile radio communications, Introduction to Modern Wireless Communication Systems, wireless networks, Over view of WIMAX technologies, Cellular concept, Wireless propagation mechanism, Introduction to Multiple Access GSM system architecture, Introduction to new data services			
Expected outcome:			
<ul style="list-style-type: none"> The students will be able to understand the basics and technology of advanced communication system 			
Text Books: <ol style="list-style-type: none"> Dennis Roody, Satellite communication, 4/e, McGraw Hill, 2006. Herve Benoit, Digital Television Satellite, Cable, Terrestrial, IPTV, Mobile TV in the DVB Framework, 3/e, Focal Press, Elsevier, 2008 Simon Haykin, Michael Mohar, Modern wireless communication, Pearson Education, 2008 Theodore S. Rappaport: Wireless communication principles and practice, 2/e, Pearson Education, 1990 			
References: <ol style="list-style-type: none"> Jochen Schiller, Mobile Communications, Pearson, 2008. Mishra, Wireless communications and Networks, McGraw Hill, 2/e, 2013. Nathan, Wirelesscommunications, PHI, 2012. Singal, Wireless communications, Mc Graw Hill, 2010. Tomasi, Advanced Electronic Communication Systems, 6/e, Pearson, 2015. W.C.Y.Lee, Mobile Cellular Telecommunication, McGraw Hill, 2010. 			
Course Plan			
Module	Course content (42hrs)	Hours	End Sem. Exam Marks
I	Microwave Radio Communications : Introduction, Advantages and Disadvantages, Analog vs digital microwave, frequency vs amplitude modulation	1	15%
	Frequency modulated microwave radio system, FM microwave radio repeaters	1	
	Diversity, protection switching arrangements, FM microwave radio stations, microwave repeater station, line of sight path characteristics	2	
II	Digital TV: Digitized Video, Source coding of Digitized Video, Compression of Frames, DCT based (JPED), Compression of Moving Pictures (MPEG). Basic blocks of MPEG2 and MPE4, Digital Video Broadcasting (DVB)	4	15%
	Modulation: QAM (DVB-S, DVB-C), OFDM for Terrestrial Digital TV (DVB -T). Reception of Digital TV Signals (Cable, Satellite and	4	

	terrestrial). Digital TV over IP, Digital terrestrial TV for mobile		
	Display Technologies: basic working of Plasma, LCD and LED Displays	2	
FIRST INTERNAL EXAM			
III	Satellite Communication systems, introduction, Kepler's laws, orbits, orbital effects, orbital perturbations	2	15%
	Satellite sub systems, Antennas, Transponders, earth station technology, Link calculation,	2	
	Satellite systems- GEO systems, non-GEO communication systems, Satellite Applications- Global Positioning System, Very Small Aperture Terminal system, Direct to Home Satellite Systems	3	
IV	Evolution of mobile radio communications, paging systems, Cordless telephone systems, comparison of various wireless systems	2	15%
	Introduction to Modern Wireless Communication Systems, Second generation cellular networks, third generation wireless networks, fourth generation wireless technologies	1	
	Wireless in local loop, wireless local area networks, Blue tooth and Personal Area networks, Over view of WIMAX Technologies, architecture, spectrum allocation	2	
SECOND INTERNAL EXAM			
V	Cellular concept, hand off strategies, Interference and system capacity: Cell splitting, Sectoring, Repeaters, and Microcells. Cellular System Design Fundamentals: Frequency Reuse, channel assignment strategies, handoff Strategies, Interference and system capacity, tracking and grade off service, improving coverage and capacity	3	20%
	Wireless propagation mechanism, free space propagation model, ground reflection model, knife edge diffraction model, path loss prediction in hilly terrain, introduction to fading and diversity techniques, Introduction to MIMO system	3	
VI	Introduction to Multiple Access, FDMA, TDMA, Spread Spectrum multiple Access, space division multiple access, CDMA, OFDM	2	20%
	Wireless Networking, Difference between wireless and fixed telephone networks, development of wireless networks, fixed network transmission hierarchy, traffic routing in wireless networks, wireless data services, Wireless standards,	2	
	GSM system architecture, radio link aspects, network aspects	1	
	Introduction to new data services like High Speed Circuit Switched Data (HSCSD), General Packet Radio Service (GPRS), Digital Enhanced Cordless Telecommunications (DECT) , Enhanced Data Rate for Global Evolution (EDGE), Ultra wideband systems (UWB), Push To Talk (PTT) technology, Mobile IP	5	
END SEMESTER EXAM			

Question Paper Pattern

The question paper shall consist of three parts. Part A covers modules I and II, Part B covers modules III and IV, and Part C covers modules V and VI. Each part has three questions uniformly covering the two modules and each question can have maximum four subdivisions. In each part, any two questions are to be answered. Mark patterns are as per the syllabus with 60% for theory and 40% for logical/numerical problems, derivation and proof.