



SRM

UNIVERSITY

(Under section 3 of UGC Act 1956)

B.Tech. (Full Time) - Electronics and Communication Engineering

Curriculum & Syllabus for Open Elective Courses

2013 – 2014

**FACULTY OF ENGINEERING AND TECHNOLOGY
SRM UNIVERSITY
SRM NAGAR, KATTANKULATHUR – 603 203**

**B.Tech. Electronics and Communication Engineering
Curriculum – 2013
(Applicable for students admitted from the academic year
2013-14 onwards)**

Open electives							
Course code	Category	Course name	L	T	P	C	Not to be offered to
EC1201	P	Electronic Circuits & Systems	3	0	0	3	EEE, ICE EIE, ITCE ECSE, SWE
EC1202	P	Telecommunication Systems	3	0	0	3	ITCE, CSE, SWE
EC1203	P	Modern Wireless Communication Systems	3	0	0	3	ITCE

OPEN ELECTIVE COURSES

		L	T	P	C
EC1201	ELECTRONIC CIRCUITS AND SYSTEMS	3	0	0	3
	Total Contact Hours – 45				
	Prerequisite				
	EC1001				
PURPOSE					
This course has been designed to help the students to understand how electronic circuits and systems work. This course is essentially practical in its approach, thus encouraging students to assemble and test real circuits at home, or lab. This course also shows how circuit behaviour may be studied with a computer, using circuit simulator.					
INSTRUCTIONAL OBJECTIVES					
1	To provide the students with the basic underpinning knowledge necessary to appreciate the operation of a wide range of electronic circuits and systems.				
2	To learn a great deal from building, testing and modifying simple circuits to more complex circuits.				

UNIT I-ANALOG CIRCUITS

(7 hours)

Overview on semiconductors, diodes, transistor switches, capacitors, fields and inductors – BJT amplifiers, JFET amplifiers, MOSFET amplifiers.

UNIT II-APPLICATION OF ANALOG CIRCUITS

(7 hours)

Operational amplifiers, application of op-amps, active filters, 555 timer and oscillators – power amplifiers – power supplies.

UNIT III-DIGITAL CIRCUITS

(7 hours)

Overview on logical circuits, logical operations, combinational and sequential circuits – display devices – converter circuits.

UNIT IV-ELECTRONIC SYSTEMS - I

(9 hours)

Audio and video systems – noise – telecommunications – cable transmission, optical transmission – electronic control systems – process control systems.

UNIT V-ELECTRONIC SYSTEMS II

(15 hours)

Input and output - microprocessors and programming - sensors and interfacing - The PIC microcontroller - circuit simulation – circuit construction.

TEXT BOOKS

1. Owen Bishop, “*Electronics – Circuits and Systems*”, 3rd Edition, Newnes, 2010.
2. Michael Tooley B A, “*Electronic Circuits: Fundamentals and Applications*”, 3rd Edition, Newnes, 2006.

REFERENCE

1. John B.Peatman ,” *Design with PIC Microcontrollers*”, Prentice Hall, 1998.

EC1201 ELECTRONIC CIRCUITS AND SYSTEMS												
Course designed by		Department of Electronics and Communication Engineering										
1	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X	X		X		X		X	
2	Mapping of instructional objectives with student outcome	1, 2	1, 2	2	2		2		1		2	
3	Category	General (G)		Basic Sciences (B)		Engineering Sciences & Technical Arts (E)			Professional Subjects (P)			
									X			
4	Broad area	Communication		Signal Processing		Electronics		VLSI		Embedded		
						X						
5	Approval	23 rd meeting of Academic Council, May 2013										

EC1202		L	T	P	C
	TELECOMMUNICATION SYSTEMS	3	0	0	3
	Total Contact Hours – 45				
	Prerequisite				
	EC1001				
PURPOSE					
This course has been designed to cover some of the most important changes that have occurred in the telecommunications industry during the last two or three decades. This course gives an excellent overview of existing technology to allow the readers to better manage voice and data networks.					
INSTRUCTIONAL OBJECTIVES					
1.	To discuss various analog and digital technologies in voice and data networks.				
2.	To understand many telecommunications technologies in the generic sense and their applications and implications.				

UNIT I-PSTN TECHNOLOGY

(9 hours)

Introduction: History of telecommunications – various networks used to transmit voice, video and data signals – media used to convey telecommunication signals – basics of the three major voice communication technologies – basics of PC-based voice communication systems (CTI) – basics of LAN & WAN – telecommunication standards.

PSTN Technology: Difference between simplex, half-duplex and duplex transmissions – basic understanding of telephone set – history and evolution of Central Exchange Switching – Operator Switch Boards (PBX) – intraoffice and interoffice calls – Extended Area Service (EAS) – circuit switching, packet switching & TDM switching – DTMF signaling – dial register – in-band & out-of-band signaling.

UNIT II-CUSTOMER-PROVIDED EQUIPMENTS

(9 hours)

Working of telephone – sidetone – ringers – DTMF dial – feature phone, proprietary telephone, hands-free phone, speaker phones, ISDN telephones – key systems – CBXs – private-in-line network and a software-defined network – station features – Telecommunication Application Program Interface (TAPI).

UNIT III-ELECTRONICS FOR TELECOMMUNICATIONS (9 hours)

Multiplexing: TDM – FDM – AM technology – WDM & DWDM – PAM & PCM - TDM using PAM & PCM – STDM – various levels of SONET – DS0 & DS1 systems.

Analog & Digital signals: Characteristics of analog and digital signals – conversion of analog voice signal into a digital signal – conversion of PSTN into a digital network – digital data coding techniques – bandwidth vs power loss.

UNIT IV-DATA COMMUNICATIONS & NETWORKING (9 hours)

Data Communications: Various ways to connect DTE & DCE – serial vs parallel transmission – UART, baud rates and MODEM – asynchronous vs synchronous transmission – error detection & error correction techniques – SS7 networks – ISDN – ADSL.

Data Networking: LANs & LAN architectures – OSI model – bridged LAN – LAN medium – NIC – packets, frames – PSN – STDM – PDN – Packet Assembler/Disassembler – switched virtual circuit vs permanent virtual circuit – X.25 packet network – LAPB – frame relay – ATM, Voice-Over ATM.

UNIT V-MOBILES PHONES AND WIRELESS COMMUNICATIONS (9 hours)

Mobile Phones: Evolution of mobile telephone technology – DAMPS vs GSM vs CDMA – PCS Networks.

Wireless Communication: Analog & Digital access – WAP, WLANs, Microwave LANs, radio LANs, infrared LANs, WLL technologies – Satellite communications – satellite earth station – geosynchronous satellite, LEO & MEO satellites – international wireless communication systems.

TEXT BOOKS

1. Marion Cole, “*Introduction to Telecommunications: Voice, Data and Internet*”, Pearson Education, 2nd edition, 2008.
2. Anu A. Gokhale, “*Introduction to Telecommunications*”, Delmar, 2nd edition, 2005.

REFERENCES

1. Pete Moulton, Jason Moulton, “*The Telecommunication Survival Guide*”, Pearson Education, 2001.
2. Roger L. Freeman, “*Telecommunication System Engineering*”, Wiley-India, 4th edition, 2004.

EC1202 TELECOMMUNICATION SYSTEMS												
Course designed by		Department of Electronics and Communication Engineering										
1	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X						X		X	
2	Mapping of instructional objectives with student outcome	1,2	1,2						1,2		1,2	
3	Category	General (G)		Basic Sciences (B)		Engineering Sciences & Technical Arts (E)			Professional Subjects (P)			
											X	
4	Broad area	Communication	Signal Processing	Electronics	VL	SI	Embedded					
		X										
5	Approval	23 rd meeting of Academic Council, May 2013										

EC1203	MODERN WIRELESS COMMUNICATION SYSTEMS			
	L	T	P	C
	3	0	0	3
	Total Contact Hours – 45			
Prerequisite				
EC1001				
PURPOSE				
This course is to provide comprehensive background knowledge of wireless and mobile communication for readers. This course is intended for anyone who wants (or needs) to learn about the new wave of wireless networks. It will introduce the readers to all the most important wireless technologies				
INSTRUCTIONAL OBJECTIVES				
1.	To discuss the fundamentals of cellular mobile wireless networks.			
2.	To provide an overview of various approaches to communication networks.			
3.	To study the numerous different-generation technologies with their individual pros and cons.			
4.	To discuss about the principles of operation of the different access technologies like FDMA, TDMA, SDMA and CDMA and their pros and cons.			

UNIT I-TRANSMISSION FUNDAMENTALS (10 hours)

Cellphone Generations: 1G, 2G, 2.5G, 3G & 4G

Transmission Fundamentals: Time domain & Frequency domain concepts, Radio, Analog Vs Digital, channel capacity, transmission media, carrier-based signaling, spread-spectrum signaling.

UNIT II-NETWORK CONCEPTS (12 hours)

Communication Networks: LANs, MANs, WANs, circuit switching, packet switching, ATM

Cellular Networks: Cells, duplexing, multiplexing, voice coding

Multiple Access Techniques: FDMA, TDMA, SDMA, CDMA, spectral efficiency.

UNIT III-PERSONAL COMMUNICATION SERVICES (8 hours)

GSM, HSCSD, GPRS, D-AMPS, CDMA One, CDMA Two, Packet Data Systems.

UNIT IV - 3G & BEYOND (7 hours)

IMT-2000, W-CDMA, CDMA 2000, EDGE, Wi-Fi, WiMAX, OFDM.

UNIT V-MOBILE DATA SERVICES & SHORT-RANGE NETWORKS

(8 hours)

Mobile Data Services: Messaging, wireless web, WAP, site design

Short-Range Wireless Networks: Unlicensed spectrum, WLANs, cordless telephony, IrDA, Bluetooth

Smart Phones: Future phones, mobile OSs, smart phone applications.

TEXT BOOKS

1. Andy Dornan, “*The essential guide to wireless communications applications: from cellular systems to Wi-Fi*”, 2nd Edition, Prentice Hall, 2002.
2. Misra, “*Wireless Communications and Networks: 3G & Beyond*”, Tata McGraw-Hill, 2009.

REFERENCES

1. Theodore S. Rappaport, “*Wireless Communications: Principles and Practice*”, 2nd Edition, Pearson Education, 2009.
2. William Stallings, “*Wireless communications and networking*”, Prentice Hall, 2002.

EC1203 MODERN WIRELESS COMMUNICATION SYSTEMS												
Designed by		Department of ECE										
1	Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X		X			X	X	X		X
2	Mapping of instructional objectives with student outcome	1,2,3,4	3,4									
3	Category	General (G)	Basic Sciences (B)	Engg. Sciences & Technical Arts (E)		Professional Subjects (P)						
						X						
4	Broad area	Commn.	Signal Processing	Electronics	VL SI	Embedded						
		X										
5	Approval	23 rd meeting of Academic Council, May 2013										

S.No.	Details of Amendment	Effective from	Approval with date